Changes in spontaneous speech associated with therapy hiatus: a retrospective study

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Abstract

Three single-subject case studies were used to determine if language skills regress following extended breaks from therapy. Language samples were elicited from three preschool language-impaired males following four alternating periods of therapy and no therapy. The samples, which were analysed for a variety of linguistic measures, indicated that regression usually did not occur following breaks from therapy. In fact, many measures evidenced substantial improvement.

Introduction

The literature detailing normal language development is extensive, and that describing the effects of language training and the nature of impaired language is growing steadily. Little is known, however, about the changes which occur in spontaneous speech during the course of language training. Knowledge of how spontaneous speech changes during the training process could provide significant information about the nature of impaired language. Such information might provide practical data to speech-language pathologists permitting them to make informed clinical decisions, as well as to researchers employing single-subject designs.

The range of issues to study relative to changes in spontaneous speech during therapy is endless. For example, one might describe how certain measures (e.g. mean length of utterance) vary; how target structures

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emerge; if imitations or dysfluencies predict change; or if there is evidence for 'plateaus'. We chose to explore the nature of language change during extended hiatuses from direct therapy. The rationale for selecting this topic is based on our impressions about the expectations of speech-language pathologists and the impact that such information could have on the body of knowledge associated with impaired language and language treatment.

Controlled studies related to this topic are scarce. To identify research even remotely associated to it one must extrapolate from the reading and articulation training literature. Edgar, Spence, and Kenowitz (1977) write that special educators appear to believe that their charges suffer a loss of skills following the summer vacation. Edgar *et al.* analysed the results of 18 studies and concluded that the reading skills of some handicapped children do, in fact, regress during the summer months.

Conversely, children with articulation disorders appear to improve during periods of nontreatment. Olswang and Bain (1985) presented data indicating that the articulation skills of speech-impaired children improve following termination of therapy, although consistently correct productions of the target had not been attained during the course of therapy.

An extensive review of the literature failed to reveal research that documents change of language skills in language-impaired children following a hiatus from therapy or research that indicates speech-language pathologists support or reject the regression contention. Conversations with practising speech-language pathologists, however, suggest that there may be widespread acceptance of the contention that following a break from language therapy, children tend to regress with respect to their language skills.

The purpose of this paper is to describe three retrospective case studies which explored changes in spontaneous speech following extended hiatuses from direct therapy to determine if the language skills of the children regressed, improved, or remained the same.

Subjects

The subjects were three, white, male preschoolers from monolingual, middle- to upper-middle-class families. The children were candidates for involvement in the study because: (1) of the absence of hearing problems, neurological problems, and mental retardation; (2) the parents had granted us permission to use the language transcripts from the clinic files;

and (3) qualifying language samples (described in the procedures section below) were available in the clinic files.

The designation of language impairment was based on performance on some or all of the following measures: spontaneous language samples, the *Peabody Picture Vocabulary Test* (Dunn, 1965), a communication assessment profile (McLean and Snyder-McLean, 1978), a symbolic play checklist (Westby, 1980), and informal measures of language comprehension.

The profiles of impairment for the children varied markedly. Subject A was language delayed, with his primary deficit in the expression of language. Subject B evidenced expressive language delay and an associated phonological impairment. Subject C was considered to be language disordered. He experienced pronounced difficulty in all aspects of language with the exception of the phonological component; his pragmatic skills were particularly impaired.

Table 1 lists the age of each subject at the time of each of the data collection periods, and the length of time each child was involved in therapy prior to the initial data collection period.

Table 1 Chronological ages of subjects at data collection points and previous therapy involvement

Subject	Prior therapy	Chronological age ET1	NT1	ET2	NT2
A	4 sessions	2;9	3;1	3;3	3;5
B	3 quarters	4;5	4;9	4;10	5;1
C	2 ⅓ quarters	2;6	2;10	3;5	3;10

Procedures

The clinical records of children who had been supervised by the first author were inspected to identify children with qualifying language samples. For a file to be designated as containing qualifying language samples, transcripts from all of the following time frames were to be present: (1) the last three sessions at the end of an extended period (one academic quarter) of therapy (ET1); (2) the initial three therapy sessions following the extended period (six weeks to three months) of no therapy subsequent to ET1 (NT1); (3) the last three sessions at the end of a second extended period of therapy (ET2); and (4) the initial three therapy sessions following the extended period of no therapy subsequent to ET2

(NT2). Thus, the data for each child consisted of 12 language samples with each time frame (ET1, NT1, ET2, NT2) being represented by three language samples. The three samples for each of the time frames had been elicited within a 10-day period.

Student clinicians had elicited the spontaneous language samples from their clients as part of their clinical assignment. During the course of a session, five-minute samples were regularly elicited using procedures derived from Hubbell (1977). Each student clinician transcribed the samples lexically and phonemically within four days of the elicitation.

Because therapy was undertaken in a university clinic, new student clinicians were usually assigned to the clients at the beginning of each academic quarter. Therefore, with one exception (ET2 and NT2 for subject B), the student clinicians differed for each time frame.

Measures

Graduate students in speech pathology entered the qualifying language samples into an Apple IIe computer to be analysed by the *Systematic Analysis of Language Samples* (SALT) (Miller and Chapman, 1983). The measures which were selected for analysis included mean length of utterance in words (MLU-W), mean length of utterance in morphemes (MLU-M), speaker dominance, and the percentage of use in obligatory contexts of selected bound morphemes. Although MLU-M and MLU-W yielded essentially identical results, they are both presented here to avoid addressing the issue regarding which measure is more appropriate. The four measures were selected because a pilot study had indicated that these were the only measures from an extensive array of syntactic, morphological, semantic, and pragmatic measures that reflected both stability and change. (The measures that were found to be unsuitable for this study included percentage of intelligible utterances, number of different word roots, percentage of complete utterances, total number of words, total number of bound morphemes, type-token ratio, tally of semantic categories, total number of different semantic categories, tally of speech act categories, and the number of different speech act categories.)

Reliability

The reliability of each student clinician's transcriptions was checked by having the clinical supervisor (the first author) listen to the audiotape while reading the transcriptions. The supervisor made corrections on the original transcripts, and all of the supervisor's changes were retained. The reliability of the SALT was controlled for in a similar fashion. The supervisor reviewed the SALT entries of the graduate students, and any changes made were retained.

Presentation of results

A summary of the results of this study is given below. The detailed results are given in the Appendix, and are presented in two ways. First, there are data concerning the MLU-M (Figures 1, 2, 3), reflecting each child's progress following the periods of therapy (ET1, ET2) and no therapy (NT1, NT2). MLU-M was selected because of the frequency of use of this measure in the literature describing language-impaired children, and because the MLU-M data exhibited patterns that were similar to the patterns represented in the other measures under study (MLU-W, speaker dominance, and percentage of occurrence of selected bound morphemes in obligatory contests). Secondly, three sets of data represent the direction and magnitude of the change in these measures (Tables 3–5). The first, HIATUS 1, reflects the difference between the data collected following the first period of extended therapy and the data collected following the first period of no therapy (ET1–NT1). The second set of data, TREATMENT, was determined by calculating the difference between the data collected following the first period of no therapy and the subsequent period of extended therapy (NT1–ET2). The third set of data, HIATUS 2, represents the difference between the data collected following the second period of extended therapy and the data collected following the second period of no therapy (ET2–NT2). Consequently, there are three sets of data designed to represent change: two reflecting changes following periods of no therapy (HIATUS 1, HIATUS 2) and one reflecting change following an extended period of therapy (TREATMENT).

Results and discussion

The results of the three case studies (given in detail in the Appendix) indicate that children's language as represented by selected measures tends to remain the same or improve following periods of therapy (TREATMENT) as well as following periods of no therapy (HIATUS 1, HIATUS 2). Table 2 depicts the direction of the change exhibited by each of the children for the measures under consideration. Decreases in measures were rare as they accounted for only 12.5% (10/80) of the cases. Cases in which no change was evidenced represented only 20% (16/80) of the total. Increases in the selected measures were the dominant condition, representing 67.5% of the cases.

Table 2 Summary of changes in subjects A, B, and C[a]

	HIATUS 1			TREATMENT			HIATUS 2		
	Subjects								
	A	B	C	A	B	C	A	B	C
MLU-W	+	+	+	+	−	+	+	−	+
MLU-M	+	+	+	+	−	+	+	−	+
Speaker dominance	−	+	+	+	+	+	+	−	+
Use in obligatory contexts									
Contractions									
'll						+			
'm						+	+	0	0
negative				+		+			0
're							+		
's	+		+	+		+	−		+
've					0		0	0	0
-ing	+	+	−	0	+	+	0	0	+
past regular			0	+				0	0
possessive	+					+		+	0
regular plural	+	+	−	0	+	+	0	+	+
3rd person singular	+		+	+	+	+	−	+	+

[a]Increases are represented by plus signs (+), decreases are represented by minus (−), and no changes represented by zero (0)

Although in most cases the children tended to improve or remain the same, subject B did exhibit some systematic regression. Subject B evidenced decreases in MLU-W, MLU-M, and speaker dominance following a period of therapy (TREATMENT) and a period of no therapy (HIATUS 2). It is not clear why these selected measures decreased for subject B. However, there are several possible explanations for this apparent regression, including the instability of the data and the nature of the child's training programme. The rationale for the first explanation is rooted in the documented instability of MLU and our lack of knowledge about the stability of the other measures. For example, MLU-M has been found to vary in different contexts (Kramer, James, and Saxman, 1979) and on three consecutive days (Chabon, Kent-Udolf, and Egolf, 1982). Thus, rather than being symptomatic of true regression, the depressed scores might be the result of variance inherent in the measures employed in this study. This explanation is tempered by the fact that, for the majority of the cases in this study, we judged MLU-M to be quite stable.

The second explanation is rather more involved. Unlike subjects A and C, subject B was phonologically impaired and the emphasis of his training programme was phonological. This emphasis may have drawn his attention towards certain aspects of productive language (phonology) and prevented him from focusing his attention on the syntactic/morphological system of the language. Such an explanation is not without merit, for Muma (1978) has described the concept of oscillating cycles – periods of time when certain structures are sacrificed in favour of other structures. Perhaps, subject B's phonological system was changing during these time frames (ET2, NT2) in which his syntactic skills apparently regressed.

The decrease in the MLU data of subject B following HIATUS 2 does not detract from the overall finding that, in most cases, the children improved or remained the same following breaks from therapy. There are several factors that might account for this tendency to improve in the absence of therapeutic intervention, and the differential investigation of the role of these factors should be an important goal of future research:

(1) The children may have evidenced 'lag effects' related to previous therapy. This contention is rooted in the concept that while subjects are involved in therapy, all progress may not immediately manifest itself in spontaneous speech. Rather, subjects may begin to produce some of the structures or functions they learned in therapy after a certain period of time has elapsed. During the 'lag' time, the subject may have been covertly 'working on' the structure by observing its use in others or by trying to comprehend it.

(2) Significant others in the homes may have altered their methods of interaction, and thus promoted improvements following treatment and hiatuses. The mother and/or father of each of the subjects had observed or participated in therapy. Although no data were collected regarding parent/child interaction, it is feasible that the parents may have generalized the techniques employed in the clinic to the home. Thus, the reason these subjects failed to regress could be rooted in their continued language training in the home.

(3) Language may have become internally reinforcing to the children – that is, the improvement may be related to the children's need to communicate. Assuming the subjects did not find communication to be reinforcing prior to involvement in therapy, the development of the ability to communicate successfully may have been a forceful, motivating factor in the acquisition of language. Once the subjects began communicating successfully, they may have continued to improve in the absence of therapy because of a 'pay-off' for interacting at increasingly higher linguistic levels.

(4) The children may have acquired language acquisition strategies in therapy – rather than, or in addition to, linguistic structures. Once these strategies had been activated, the subjects continued to employ them, irrespective of their enrolment in therapy.

(5) The improvements may be a manifestation of the instability or

variability of the measures used. The variability of MLU has been well documented and the variability of the other measures is not known. Perhaps the apparent improvements were not real; that is, they were merely chance occurrences related to unstable data.

(6) The improvements may have been due to maturation. That is, the changes may have been brought about simply by the tendency of all children (including language-impaired children) to acquire language.

Notwithstanding these questions of interpretation, there are several implications of the findings of this research. First, following a break from therapy, speech-language pathologists should not expect a child to regress relative to the following measures: MLU-W, MLU-M, speaker dominance, and the percentage of occurrence of selected morphemes in obligatory contexts. Should a child evidence systematic regression on these measures, the speech-language pathologist might explore a variety of factors (e.g. the home environment, hearing loss, socioemotional problems) which could be interfering with continued language progress. Because the subjects in these studies had no known extraneous problems (e.g. mental retardation, hearing impairment, neurological impairment) generalization of the results of these three case studies to children other than those with specific language impairments is questionable.

Secondly, the results of the study have implications for those who deal with single-subject research designs. This report presents evidence for sustained periods of improvement following the termination of therapy. If this finding proves to be the case with language-impaired children in general, it could have serious implications for the withdrawal phases of ABAB designs. The assumption of such designs is that when there is no treatment, there is no gain. The results of this study contradict such an assumption. Thus, researchers should avoid using the measures employed in this study in single-subject experimental designs.

Thirdly, the findings of this study support the exploration of the acquisition of selected morphemes in language-impaired children. The consistency of the data representing the percentage of occurrence of selected morphemes in obligatory contexts is intriguing. This measure appears to be relatively stable and reflective of change over time – two attractive qualities. Future research might track this measure for more children over longer periods.

Finally, the findings of this study must be considered in the light of its limitations. Because of the nature of case study design, external events and normal developments were not controlled. Also, the attempt to control for between-subject variation by replications with multiple subjects was not entirely successful because the subjects were not entirely homogeneous (they had different profiles of disability) and because the replications were not exact (there were different amounts of time between data collection periods and different clinicians). Nevertheless, we believe that the findings sufficiently support the contention that speech-language pathologists should not expect the spontaneous language skills of children to regress following periods of no therapy.

Note

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Appendix

Performance of subject A

The raw MLU-M data for the performance of subject A during therapy sessions following the extended periods of therapy and extended periods of no therapy are presented in Figure 1. For the first period of extended therapy (ET1) the averaged MLU-M was 1.02, with individual data points of 1.00, 1.06, and 1.00. The data from the first period of no therapy (NT1) revealed that the averaged MLU-M was 1.65, with individual data points of 1.61, 1.53, and 1.70 morphemes. Following the second period of extended therapy (ET2), the averaged MLU-M was 2.17, and the individual data points were 2.14, 1.94, and 2.45. The averaged MLU-M following the second period of no therapy (NT2) was 2.91, with individual data points of 3.80, 2.86, and 2.83 morphemes.

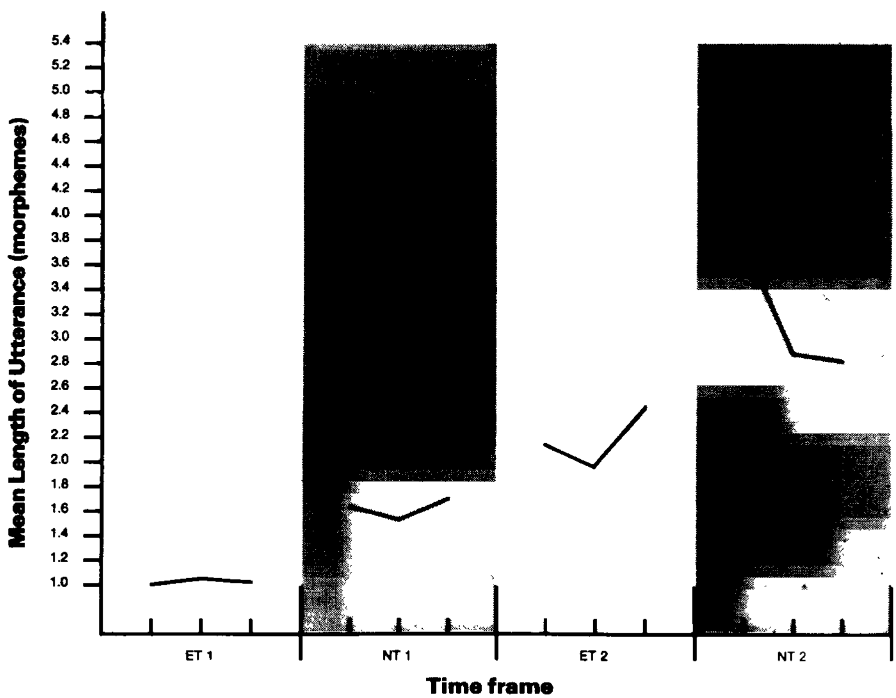

Figure 1 Mean length of utterance morphemes (MLU-M) for Subject A. ET = Extended Therapy, NT = No Therapy

Table 3 Summary of changes: subject A[a]

	HIATUS 1	TREATMENT	HIATUS 2
MLU-W	+ .53	+ .51	+ .69
MLU-M	+ .63	+ .52	+ .74
Speaker dominance	− 3%	+ 1%	+ 5%
Use in obligatory contexts			
Contractions			
'll			
'm			+ 100%
negative		+ 100%	
're			+ 100%
's	+ 17%	+ 83%	− 25%
've			NC
-ing	+ 100%	NC	NC
past regular		+ 100%	
possessive	+ 50%		
regular plural	+ 100%	NC	NC
3rd person singular	+ 33%	+ 67%	− 100%

[a]NC = no change
blank = no obligatory context for morpheme noted, or percentage of occurrence was 0%

Table 4 Summary of changes: subject B[a]

	HIATUS 1	TREATMENT	HIATUS 2
MLU-W	+ .65	− .44	− .15
MLU-M	+ .82	− .53	− .19
Speaker dominance	+ 21%	+ 1%	− 2%
Use in obligatory contexts			
Contractions			
'll			
'm			NC
negative			
're			
's			
've		NC	NC
-ing	+ 61%	+ 6%	NC
past regular			NC
possessive			+ 50%
regular plural	+ 17%	+ 50%	+ 33%
3rd person singular		+ 14%	+ 86%

[a]NC = no change
blank = no obligatory context for morphemes noted or percentage of occurrence was 0%

Table 3 lists the magnitude and the direction of the change exhibited by subject A from one data collection period to the next (HIATUS 1, TREATMENT, and HIATUS 2). For the most part, subject A evidenced increases of varying degrees following periods of therapy and periods of no therapy. Increases were noted for the following measures during the designated time frames:

MLU-W (HIATUS 1, TREATMENT, HIATUS 2)
MLU-M (HIATUS 1, TREATMENT, HIATUS 2)

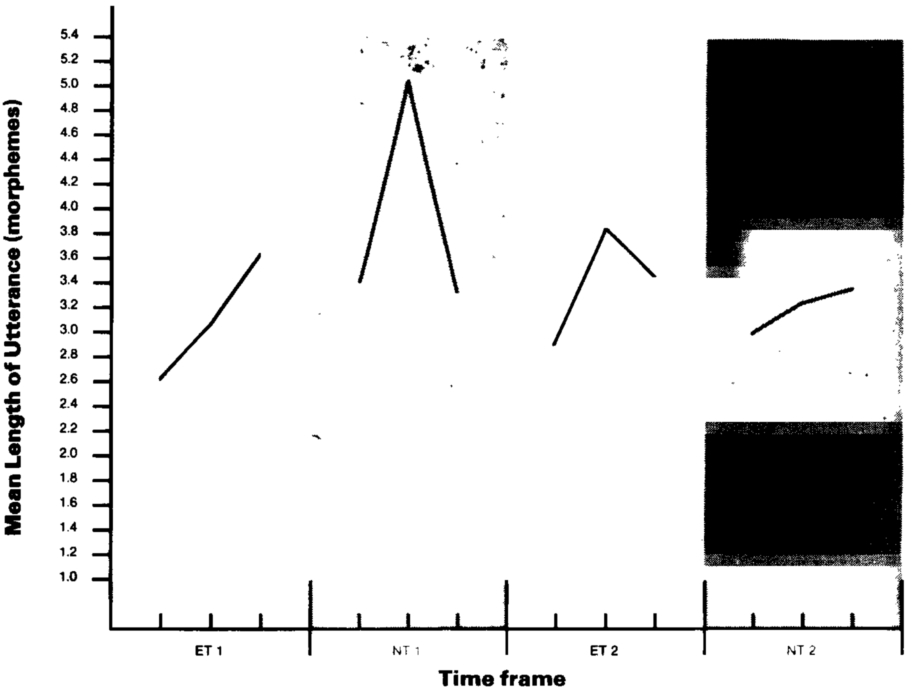

Figure 2 Mean length of Utterance morphemes (MLU-M) for Subject B. ET = Extended Therapy, NT = No Therapy

speaker dominance (TREATMENT, HIATUS 2)
obligatory contexts
  contractions: *'m* (HIATUS 2)
    negative (TREATMENT)
    're (HIATUS 2)
    's (HIATUS 1, TREATMENT)
  -ing (HIATUS 1)
  past regular (TREATMENT)
  possessive (HIATUS 1)
  regular plural (HIATUS 1)
  3rd person singular (HIATUS 1, TREATMENT)

The following measures displayed decreases during the noted time frames: speaker dominance (HIATUS 1); obligatory contexts, contracted *'s* (HIATUS 2) and 3rd person singular (HIATUS 2). No change was noted for the following measures at the designated time periods: obligatory contexts, contracted *'ve* (HIATUS 2); *-ing* (TREATMENT, HIATUS 2); and regular plural (TREATMENT, HIATUS 2).

Performance of subject B

Figure 2 depicts the performance of subject B following the alternating periods of therapy (ET1, ET2) and of no therapy (NT1, NT2). For ET1 the averaged MLU-M was 3.12, and the individual data points were 2.61, 3.07, and 3.68 morphemes. The data for NT1 revealed an averaged MLU-M of 3.94, and individual data points of 3.41, 5.04, and 3.36 morphemes. Data from ET2 yielded an averaged MLU-M of 3.41, with individual data points of 2.92, 3.84, and 3.47 morphemes. For NT2, the averaged MLU-M was 3.22, and the individual data points were 3.03, 3.27, and 3.37 morphemes.

Table 5 Summary of changes: subject C[a]

	HIATUS 1	TREATMENT	HIATUS 2
MLU-W	+ .04	+ .94	+ .36
MLU-M	+ .16	+ 1.19	+ .40
Speaker dominance	+ 4%	+ 4%	+ 2%
Use in obligatory contexts			
Contractions			
'll		+ 50%	
'm		+ 100%	NC
negative		+ 100%	NC
're			
's	+ 10%	+ 53%	+ 4%
've			NC
-ing	− 29%	+ 12%	+ 6%
past regular	NC		NC
possessive		+ 100%	NC
regular plural	− 20%	+ 12%	+ 8%
3rd person singular	+ 36%	+ 24%	+ 35%

[a]NC = no change
blank = no obligatory context for morphemes noted or percentage of occurrence was 0%

The magnitude and the direction of the changes evidenced by subject B from one data collection period to the next are listed in Table 4. Subject B exhibited increases in the following measures:

MLU-W (HIATUS 1)
MLU-M (HIATUS 1)
speaker dominance (HIATUS 1, TREATMENT)
obligatory contexts
- *-ing* (HIATUS 1, TREATMENT)
- possessive (HIATUS 2)
- regular plural (HIATUS 1, TREATMENT, HIATUS 2)
- 3rd person singular (TREATMENT, HIATUS 2)

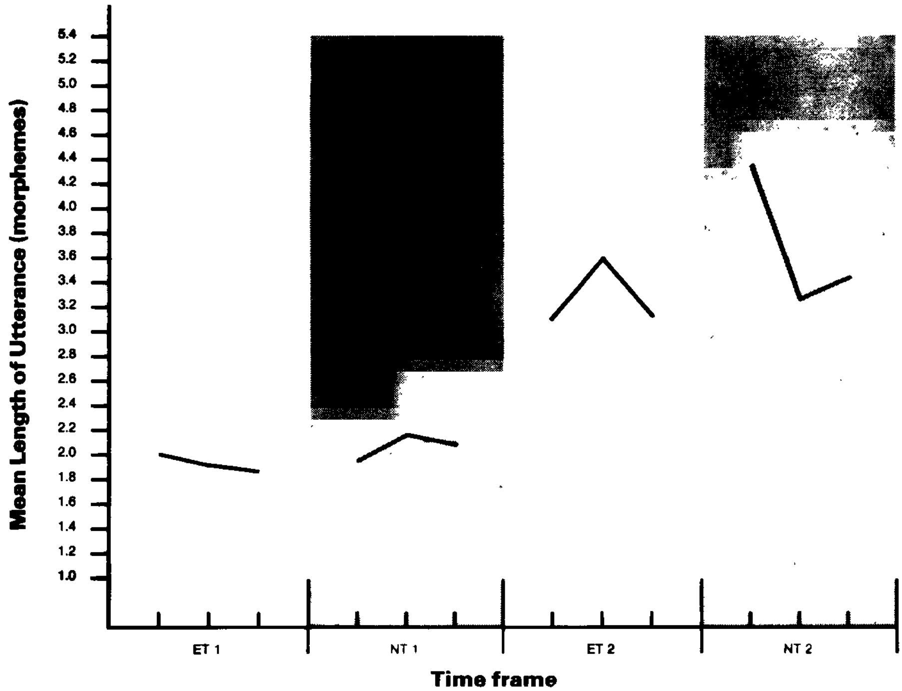

Figure 3 Mean length of utterance morphemes (MLU-M) for Subject C. ET = Extended Therapy. NT = No Therapy

Decreases were observed in the designated measures during the following time frames: MLU-W (TREATMENT, HIATUS 2), MLU-M (TREATMENT, HIATUS 2), and speaker dominance (HIATUS 2). No changes were noted for several obligatory context measures during the following time frames: contractions *'m* (HIATUS 2) and *'ve* (TREATMENT, HIATUS 2); *-ing* (HIATUS 2); and past regular (HIATUS 2).

Performance of subject C

Figure 3 displays the raw MLU-M data collected for subject C. For ET1 the averaged MLU-M was 1.93, and the individual data points were 2.00, 1.91, and 1.89 morphemes. The data for NT1 revealed that the average MLU-M was 2.09, with individual data points of 1.94, 2.19, and 2.15 morphemes. For ET2, the average MLU-M was 3.28, and the individual data points were 3.10, 3.60, and 3.13 morphemes. The NT2 data yielded an average MLU-M of 3.68, and individual data points of 4.38, 3.25, and 3.41 morphemes.

Table 5 lists the magnitude and the direction of change exhibited by subject C from one data collection period to the next. Increases were noted in the following measures at the designated time frames:

MLU-W (HIATUS 1, TREATMENT, HIATUS 2)
MLU-M (HIATUS 1, TREATMENT, HIATUS 2)
speaker dominance (HIATUS 1, TREATMENT, HIATUS 2)
obligatory contexts
  contractions *'ll*, *'m*, negation (TREATMENT)
    's (HIATUS 1, TREATMENT, HIATUS 2)
  possessive (TREATMENT)
  regular plural (TREATMENT, HIATUS 2)
  3rd person singular (HIATUS 1, TREATMENT, HIATUS 2)
  -ing (TREATMENT, HIATUS 2)

Decreases were noted in the percentage of occurrence of the bound morphemes *-ing* (HIATUS 1) and regular plural (HIATUS 1). No changes were exhibited for the following bound morpheme measures: contracted *'m*, negation, and *'ve* (HIATUS 2), past regular (HIATUS 1, HIATUS 2), and possessive (HIATUS 2).

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