Title	Mean Length of Utterance and the Acquisition of Irish
Authors(s)	Hickey, Tina
Publication date	1991-10
Publication information	Hickey, Tina. “Mean Length of Utterance and the Acquisition of Irish” 18, no. 3 (October, 1991).
Publisher	Cambridge University Press
Item record/more information	http://hdl.handle.net/10197/4153
Publisher's version (DOI)	10.1017/S0305000900011247

J. Child Lang. 18 (1991), 553–569. Printed in Great Britain

Mean length of utterance and the acquisition of Irish*

TINA HICKEY
Linguistics Institute of Ireland

(*Received* 14 *November* 1988. *Revised* 2 *January* 1991)

ABSTRACT

One of the most widely used indices of language development is a measure of utterance length in morphemes (MLUm). This study examines the applicability of MLUm to the acquisition of Irish. MLUm was calculated for data from Cian, aged 1; 11–3; 0. Even when an attempt was made to 'assume the maximum' by counting all possible morphemes, the correlation between a morpheme MLU (MLUm) and a word count MLU (MLUw) was very high (0·99). This points to MLUw being as effective a measure of Irish development as MLUm, as well as being easier to apply and more reliable. MLUw was calculated for the two younger children in the study (Eibhlís 1; 4–2; 1 and Eoin 1; 10–2; 6). An examination of the relationship between the three children's MLUw values and their grammatical complexity as measured on ILARSP (the Irish adaptation of LARSP) indicates that MLUw is a useful preliminary index for early development in Irish. However, further data are necessary to check whether MLUw loses its predictive relationship with grammatical complexity after a certain point. The study emphasizes the caution necessary in applying MLU to languages whose acquisition has not hitherto been studied, and underlines the role of MLU as a preliminary measure, which must not be overinterpreted.

INTRODUCTION

MLU has become one of the generally accepted measures in child language research. Initially it was used to calculate utterance length in words (Nice, 1925), but following Brown (1973) the calculation of MLU in morphemes (henceforth MLUm) became standard. Brown used MLUm as the basis for his analysis of English development. However, in the study of the acquisition of other languages, the researcher is forced to re-assess MLU for its

[*] The author wishes to thank Michael Garman, Diarmuid Ó Sé and two referees for their comments on earlier versions of this paper. Address for correspondence: Tina Hickey, Linguistics Institute of Ireland, 31 Fitzwilliam Place, Dublin 2, Ireland.

applicability to a new set of problems and its value in comparison to other measures. This was a problem encountered in a general study of Irish acquisition (Hickey, 1987).

This paper begins by reviewing some of the advantages and disadvantages of MLU, focusing in particular on previous applications to languages other than English. A short description of relevant features of Irish concludes the introduction. After an account of the subjects, the language samples used in the analysis and the issues which arose in calculating MLUm are discussed and the results of various MLU counts and their relationship to age and grammatical complexity (as measured by ILARSP, the Irish adaptation of LARSP; see Hickey, 1990) are presented.

Criticisms of MLU

The motivation for the use of MLUm is the belief that it is a better predictor of a young child's syntactic development than chronological age. Brown observed a high degree of variability between the children in his study when matched by age and concluded that children who are matched for MLU are much more likely to have speech that is at the same level of constructional complexity than children of the same chronological age. He supplied a set of rules for the application of MLUm and it has become a standard measure in child language research.

However, MLU has been criticized on a number of grounds. Rondal, Ghiotto, Bredart & Bachelet (1987: 433) point out that 'despite its wide use and general acceptance, mean length of utterance has been the subject of little evaluative research'. Crystal (1974: 295) notes that, though the notion of such an index is 'eminently defensible', it must be consistently applied. He points out that, while the morpheme concept is of great value for agglutinative languages, it is not easily applicable to English and many other languages which are not strongly agglutinative. The danger, he claims, is that researchers are then forced to make arbitrary *ad hoc* decisions in their attempt to apply MLU to their data.

In their work on syntactic profiles for assessing language disorders, Crystal, Fletcher & Garman (1976:9) dispense with MLU on the grounds that measures of length 'readily motivate the making of superficial judgements'. The principle criticism of using a measure of length is that, even when the unit of measurement is agreed, it has to be applied consistently in order to be of real value, rather than simply pseudo-scientific. Crystal *et al.* do admit that measures of length have some methodological value as a way of imposing a preliminary ordering on samples before carrying out further detailed analysis; indeed, Fletcher (1985) uses MLUm in his study of normal English acquisition. Crystal *et al.* claim that, on its own, the only thing in favour of a measure of length is that it is easy to apply; however, with

morphemes counting, if judgements of what constitutes a morpheme in a particular language for an individual child must be made, even this is not the case.

Arlman-Rupp, van Nierkerk-de Haan & van de Sandt-Koenderman (1976) support this position. They state that an element in a child's utterance can only be called a morpheme on the basis of a well-developed grammar of the child's language at that time. Thus, they note that it is questionable whether MLUm can be used *a priori* as a measure of grammatical development for matching with equivalent corpora from other children. They, like Crystal, see the danger in the use of *ad hoc* rules of questionable validity.

MLU and age

The validity of morpheme counting rests on Brown's assertion that matching by MLUm is more accurate than matching by age. Brown's graph of his subjects' MLUm shows that the curves of all three rise over the testing period, but that these curves are variously placed along the age axis. Obviously MLU would not be a useful index with which to match children if it showed a zig-zag pattern over time, or levelled off while the child's language continued to develop.

Wells (1985), while accepting the criticisms of MLU, used MLUm as a heuristic device prior to more detailed analyses. He found that MLUm rose predictably with age for his 128 subjects until it levelled off at about 3; 6. He also found that MLUm correlated quite highly with linguistic measures of development up to that age. Miller & Chapman (1981), also with a large pool of subjects (123 children between 1; 5 and 4; 11), found a strong positive correlation between age and MLUm ($r = 0{\cdot}88$). However, Klee & Fitzgerald (1985: 258) present conflicting evidence based on a group of two- to four-year-olds, with a correlation of only 0·26. They explain this as showing that the relationship between MLU and age is not consistent over the entire age range, since they found no predictable relationship for subjects aged between two and four years.

Conant (1987) re-analyzed the Klee & Fitzgerald data and found that, when the data from the three-year old group (aged 3; 1–3; 11) were examined separately, there was a correlation with age of 0·75, similar to the Miller & Chapman result, and that only the two-year old group (aged 2; 1–2; 10) showed no predictable relationship between age and MLU. Since the age range of the subjects acquiring Irish in this study is 1; 4–3; 0, which overlaps that in the Miller & Chapman and the Klee & Fitzgerald studies, it is of interest to investigate whether a similar trend is visible here.

MLU and other languages

Most difficulties have arisen in the attempt to calculate MLU for languages other than English, the only language for which Brown outlined specific rules. Brown noted that studies of highly inflected languages, such as Finnish, Swedish and Spanish, all showed some difficulty in adapting his rules for MLU calculation. Park (1981) discussed the difficulties of applying MLUm to German acquisition. He found that calculating MLU on the basis of morphophonemic features led to an overestimation of the child's linguistic ability; while disregarding these features would underestimate it.

Dromi & Berman (1982) developed a complex measure, MPU, or morpheme-per-utterance, which allows comparison between children acquiring Hebrew. The term MPU was chosen in order to reflect the view that it is the number of morphemes, not length *per se* which characterizes linguistic maturity in Hebrew, a highly synthetic language. The rules developed are far more explicit than Brown's, and MPU was found to be an effective index of Hebrew development between two and three years of age. However, Dromi & Berman (1982: 419) admitted that they were forced to make 'numerous arbitrary decisions' in establishing those rules.

Despite reservations about the application of MLU to languages other than English (and warnings regarding its overinterpretation sounded by Miller & Chapman (1981: 27) among others), its values are frequently reported without comment. McKenna & Wall (1986) in a study of Irish acquisition give MLU values for their two subjects acquiring Irish, without stating whether this is a morpheme counting measure, and without any reference to decisions taken in applying MLU to the language. This study will examine in more detail the application of MLU to Irish data. First, the relevant facts about Irish will be summarized, with particular reference to the initial mutations pervasive in the language.

Irish

Irish is a strong VSO language, according to Greenberg's (1966) universals. The basic order of elements is: verb + subject + X, where X can be object, indirect object, adverbial, prepositional phrase, verbal noun etc. Negatives and interrogatives are marked by an appropriate particle in front of the verb. Stenson (1981: 17) characterized Irish as an 'inflectional language, tending more towards isolating than polysynthetic in general'.

Initial mutations, a characteristic of Celtic languages, are pervasive in Irish and these are of particular relevance to a measure of length. The major mutations of Irish are LENITION and ECLIPSIS (sometimes called ASPIRATION and NASALISATION in Irish grammars). These mutations were originally phonetically conditioned, but now signal various morphological processes.

With lenition, an *h* is inserted after the initial consonant in the written language, and the consonant sound is changed, according to certain regular rules. With eclipsis, one of a small number of consonants is written before the eclipsed consonant, and the eclipsed consonant is no longer sounded. Examples of lenition and eclipsis in (2) to (8) illustrate the range of their application. (The convention in Celtic linguistics of using ' to indicate a palatalized consonant is followed here.)

Base forms:

(1) /b'an/ *bean* 'a woman'
/p'aun/ *peann* 'a pen'
/k'ap/ *ceap* 'think'

Lenition of feminine noun following an article:

(2) /an v'an/ *an bhean* 'the woman'

Lenition following third person singular masculine possessive (but not feminine):

(3) /ə f'aun/ *a pheann* 'his pen' /ə p'aun/ *a peann* 'her pen'

Lenition of a noun following a preposition:

(4) /ər f'aun/ *ar pheann* 'on a pen'

Eclipsis following preposition + article:

(5) /ər an b'aun/ *ar an bpeann* 'on the pen'

Eclipsis following first person plural possessive:

(6) /a:r b'aun/ *ár bpeann* 'our pen'

Past tense lenition

(7) /x'ap me:/ *cheap mé* 'I thought'

Eclipsis following a question clitic:

(8) /ə g'apən tu:/ *an gceapann tú?'* 'do you think?'

Lenition in (2) cannot be treated as being purely the marker of a feminine noun occurring after the article, because lenition also follows the masculine possessive as in (3), some prepositions as in (4) and occurs in the past (7) and conditional tenses, and after certain clitics as well as in other environments. Nouns are eclipsed following prepositions plus articles (5), plural

possessives (6), the numbers 7 to 10 and in several other environments; while verbs are eclipsed after some particles as in (8). Initial mutations may affect nouns, verbs and adjectives, and may signal gender, tense, relativization, questions and negatives among other functions.

Arlman-Rupp *et al.* (1976: 268) note that 'morphemes are... generally characterized by linguists as the smallest elements which have a semantic-syntactic function.' Oftedal (1962: 96–7) discussed the status of initial mutations in Irish and suggested a distinction between PROJECTED MUTATIONS and INCORPORATED MUTATIONS. The former, he argues, are 'part of the preceding mutating morpheme, but they manifest themselves phonemically in the initial of an immediately following form', and are not counted as separate morphemes. An example of this is the change from /pˈaun/ *peann* 'pen' to /ə fˈaun/ *a pheann* 'his pen', where, he claims, the two forms /pˈaun/ and /fˈaun/ are merely allomorphs of the same morpheme. Incorporated mutations on the other hand are 'part of the form in which they are manifested and not of any preceding morpheme'. As examples of such incorporated mutations he offers past tense lenition as in (7) or the genitive of nouns. Oftedal suggests that such incorporated mutations are either allomorphs or morphemes in their own right, but he does not resolve the issue.

The problem is that the child who can productively manipulate the allomorphs of, for example, *bean* in an adult fashion is obviously more advanced than the child who cannot. Yet if these mutations are counted as separate morphemes, we get a grossly inflated MLU value. Initial mutations present the child with a problem which concerns morphophonemes rather than morphs. The child must learn (lexically in many cases) where they occur. If mutations are counted, despite the objections already noted, a further objection is that one is then marking more highly an element which the young child may well have learned by rote, rather than as a productive element.

Counting lenition and eclipsis presents the problem of inflating MLU, while portmanteau morphs (such as *sa* 'in-the' or *liom* 'with-me') deflate it. Regarding the latter, the prepositional pronouns, McCloskey & Hale (1984) note that, while they exhibit some sub-regularities, it is not possible to predict the inflected form of a preposition for a given person-number combination on the basis of the form of the independent preposition and the corresponding pronoun; this argues against treating them as two morphemes, particularly in child language. Other features of the language which present problems in the application of MLU are the plural (an extremely complex system in Irish) and the progressive. Clearly, there is a problem in applying a morpheme counting measure to Irish. On the other hand, a general index of development would help to order our information on that development, provided its interpretation is not stretched too far. Thus, it was decided to

investigate the usefulness of MLU in morphemes, words and syllables in the study of Irish acquisition.

METHOD

Subjects

The subjects of this study were three children living in an Irish-speaking district in the south-west of Ireland. The eldest was a boy named Cian /k'i:ən/, who was aged 1; 11 in an initial pilot session, and who was then taped between the ages of 2; 3 and 3; 0. Eoin /o:n'/ was taped first at 1; 6 and then between 1; 10 and 2; 6. Eibhlís /aili:ʃ/ a girl, was taped between the ages of 1; 4 and 2; 1.

Language samples

The children were taped for between 40 and 90 minutes every 18 days while interacting with a parent, usually their mother. Each session aimed to sample the child's normal routine, such as mealtimes or dressing. In addition, the child and parent were given a set of toys and books which they could play with or discuss if they wished. A pattern also developed in that the children would spend the early part of every session recounting what had happened since the previous one, or what they had done that day.

MLU counts were carried out on the first 100 spontaneous utterance sample after the 50th which contained the same proportion of clauses (to within $\pm 5\%$) with two or more elements as the total sample. Thus a sample was not made unrepresentative of an entire session by a cluster of one-word utterances.

MLU measures

Morpheme (MLUm), word (MLUw) and syllable (MLUs) counts were carried out on samples from Cian's data, the eldest of the three children studied. Decisions made during the morpheme count were noted so that their possible arbitrariness might be judged independently, and a set of rules developed if necessary. Word and syllable counts of the other two children were also carried out. An ILARSP analysis (Hickey, 1990) was also performed on each sample from the three children.

In attempting to count morphemes in acquisition data, the usual approach is to try to count only those morphemes which are productive in the child's language and not part of an amalgam learned by rote. This is implicit in Brown's rules. However, while Brown counted *gonna* and *wanna* etc. as one morpheme each, on the grounds that they function as such for the child, he counted separately all plural and progressive inflections, whether productive

or not. A measure of MLUm based on this approach was calculated for Cian (aged between 1; 11 and 3; 0), but was found to be virtually indistinguishable from MLUw. An alternative MLUm was calculated which was similar to a morpheme count for the adult language, even if there was doubt about a morpheme's productivity for the child at that time. The following rules were used in carrying out this count:

(1) All plural suffixes were counted as separate morphemes.
(2) Tense was not counted separately for irregular verbs, but synthetic person markers were counted as additional morphemes on the verb stem.
(3) Tense suffixes of regular verbs were counted separately.
(4) Verbal nouns were counted as one morpheme only.
(5) The plural definite article *na* was counted as one morpheme.
(6) Prepositional pronouns were counted as one morpheme.
(7) Lenition and eclipsis were not counted separately.
(8) Contracted forms such as *cá'il* (*cá bhfuil*) 'where is' and *sea* (*is ea*), the affirmative reply to a copular question, were counted as two morphemes.
(9) The contracted form *n'fheadar* (*ní fheadar*) 'not know-I' was counted as two morphemes, i.e. as negative and verb; the irregular person marker unique to this defective verb was not counted separately.
(10) Genitive marking on nouns was counted as an extra morpheme, e.g. *cluasa bábóige* (ears-pl doll-genitive) was counted as four morphemes.
(11) Diminutives were counted separately, e.g. *capaillín* (horse-diminutive) was counted as two morphemes.
(12) Interrogative particles were counted separately, e.g. *an bhfuil*? (Q be) was counted as two morphemes.
(13) Emphatic markers were counted separately, e.g. *mo cheannsa* (my one-emphatic) was counted as three morphemes.
(14) The particle *ag* before verbal nouns was counted separately, even when contracted.
(15) Compounds such as *bóín Dé* (cow-dim. of-God) 'ladybird' were counted as one morpheme.

RESULTS

Comparison of MLUm, MLUw and MLUs

Fig. 1 plots the three measures of length for Cian's data. The correlation between the MLUm calculated in this way and MLUw was extremely high ($r = 0{\cdot}99$). Clearly there was only a very small number of instances where

there was any possibility of counting more morphemes than words. Thus, even when we were assuming the maximum by counting morphemes as though in adult language, his language was presenting only a small number of suffixed morphemes. The correlations between MLUm and MLUs and between MLUw and MLUs were 0·90 and 0·92 respectively.

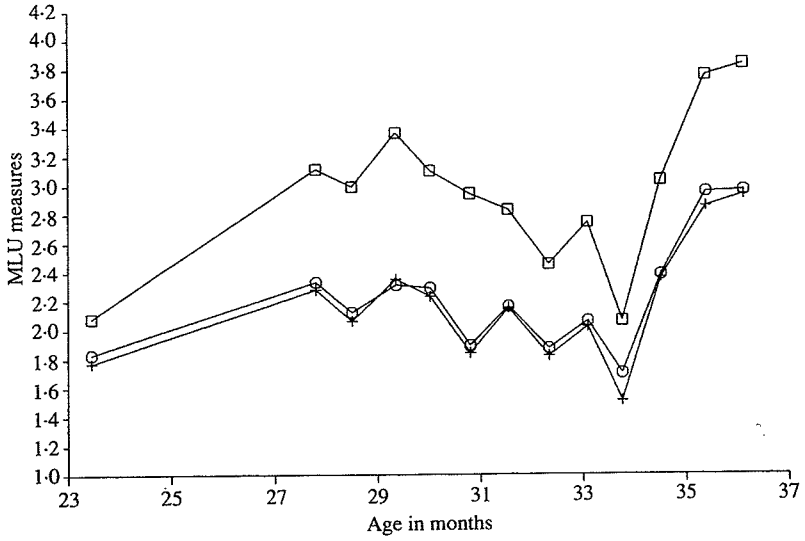

Fig. 1. MLU measures for Cian: +, MLU word; □, MLU syllable; ○, MLU morpheme.

MLU and age

The correlation of any of the MLU measures with age in Cian's case did not exceed 0·30 indicating that for his data there is, in fact, no predictable relationship between age and any of the MLU measures.

In Fig. 2 we can see that the MLUw curves for Eibhlís and Eoin are very similar to each other, except that Eoin's is displaced by about six months. The overall trend for Eibhlís and Eoin was upward, whereas in the case of Cian there was extreme variability. But Cian's level at the overlap in ages is consistent with the curves of the other two children, and the level of the rest of his observations is above the younger children's. There was a significant correlation between MLUw and age for Eibhlís ($r = 0{\cdot}76$) and for Eoin ($r = 0{\cdot}87$). Neither Eibhlís nor Eoin had MLUw values of 2·00 or higher, but two-thirds of Cian's sample points yielded MLUw scores higher than 2·00.

The same picture is repeated on the MLUs graph in Fig. 3. Eoin's curve is very similar to Eibhlís's and again is displaced by about six months. In this case the curves rise more sharply up to about 3·0. Cian's data again show a

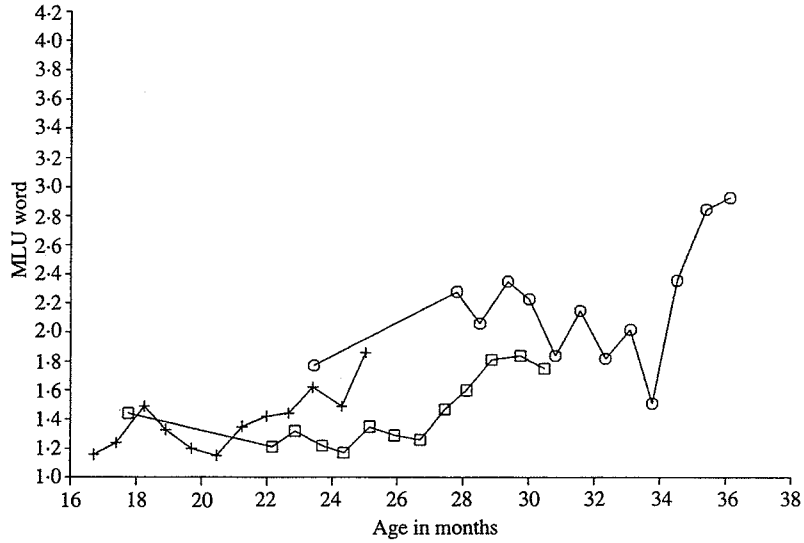

Fig. 2. MLU word: +, Eibhlís; □, Eoin; ○, Cian.

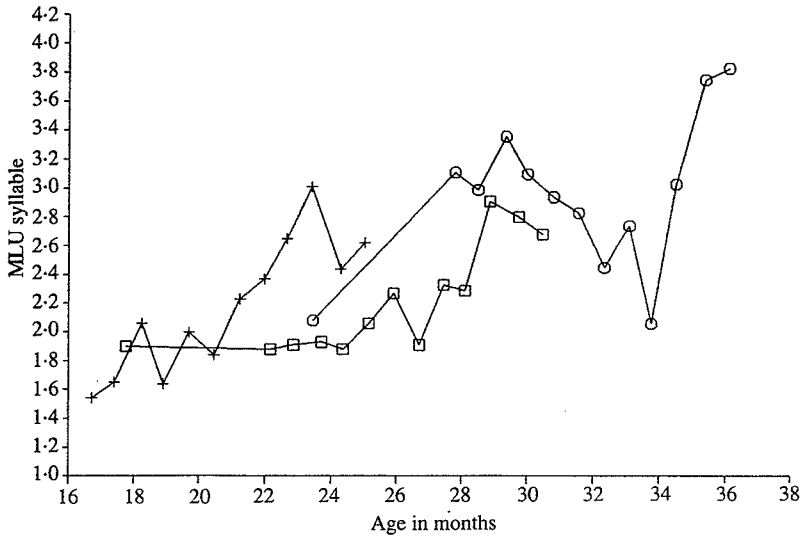

Fig. 3. MLU syllable: +, Eibhlís; □, Eoin; ○, Cian.

similar pattern until they exceed 3·0 and then become more variable. There was a significant correlation between MLUs and age for Eibhlís ($r = 0{\cdot}87$) and Eoin ($r = 0{\cdot}87$).

MLU and grammatical development

The children's data were also profiled on ILARSP, the Irish adaptation of LARSP. This allowed a measure of their grammatical development at clause, phrase and word levels. For Cian, correlations between MLUm, MLUw and MLUs and the frequency of ILARSP structures at the different levels and stages showed a significant relationship between the MLU measures and one word utterances, Stage III and IV Clause, Stage II Phrase and Expansions III and IV (see Table 1).

Looking at the ILARSP profiles of the other two children (Table 2) it was found that in Eibhlís's case there were significant correlations between MLUw and all but Stage III and IV Phrase. In Eoin's case there were significant correlations between MLUw and all but Stage IV Clause and Phrase and Stage III and IV Expansions.[1]

Individual ILARSP profiles matched by MLUw were compared (Table 3). Three profiles from Cian's data which had MLUw values of between 1·77 and 1·84 showed that the earliest sample at 1; 11 had very limited use of phrase level structures, whereas the samples from 2; 7 and 2; 8 were much more balanced. The first profile was in fact inflated by the use of a number of formulaic Stage II and III utterances (e.g. *níl sé* (he is-not) 'he isn't'; *cad tá ann*? 'what is it/there?'; *ná dein é* 'don't do it'; *tá sé te* 'it is hot'); the ILARSP profile provides a clue to this when these more advanced Stage III utterances are seen in the context of the still sparse Stage II, with concentration on a number of Stage II categories also indicating non-productivity of those utterances (e.g. *n'fheadar* (not-know-I) 'I don't know'). The two later profiles with these MLUw values present evidence of development in negatives, questions, statement clauses and phrases, and there are fewer non-productive utterances.

When the language sampled is not inflated by a significant proportion of formulas as in Cian 1 at 1; 11, the profiles of the three children when matched by MLUw at 1·8 were quite similar. Thus profiles from Eibhlís at 2; 1, Eoin at 2; 6 and Cian at 2; 7 and 2; 8, with MLUw between 1·82 and 1·86 were

[1] One would expect to find 5 out of every 100 test statistics to be spuriously significant at the 5 % level; but the number of significant correlations between MLU and frequency of grammatical structures in the present data far exceeds such levels. Klee & Fitzgerald (1985) and Rondal *et al.* (1987) divided the standard 5 % significance level by the number of tests carried out. However, this adjustment may be too conservative.

TABLE 1. *Correlations between MLU measures and frequency of ILARSP structures : Cian*

	MLUm	MLUw	MLUs	Age
One word utterances	−0·88**	−0·91**	−0·87**	−0·05
Clause				
Stage II	0·29	0·25	0·10	0·14
Stage III	0·89**	0·87**	0·68**	0·35
Stage IV	0·62*	0·64*	0·57*	0·30
Phrase				
Stage II	0·61*	0·65*	0·73**	0·24
Stage III	0·35	0·36	0·58*	−0·22
Stage IV	0·15	0·23	0·40	−0·21
Expansions				
Stage II	0·23	0·23	0·31	0·56*
Stage III	0·90**	0·89**	0·75**	0·30
Stage IV	0·74**	0·69**	0·63*	0·26
Word level	0·47	0·47	0·57*	0·10
MLUm	—	0·99**	−0·90**	0·30
MLUw		—	0·92**	0·24
MLUs			—	0·28

** = $p < 0·01$; * = $p < 0·05$.

TABLE 2. *Correlations between MLU measures and frequency of ILARSP structures : Eibhlís and Eoin*

	Eibhlís			Eoin		
	MLUw	MLUs	Age	MLUw	MLUs	Age
One word utterances	−0·94**	−0·73**	−0·76**	−0·89**	−0·92**	−0·77**
Clause						
Stage II	0·65*	0·40	0·41	0·83**	0·82**	0·84**
Stage III	0·81**	0·43	0·69**	0·72**	0·65*	0·58*
Stage IV	0·84**	0·77**	0·72**	0·15	0·03	−0·02
Phrase						
Stage II	0·82**	0·74**	0·70**	0·75**	0·80**	0·52*
Stage III	0·35	0·63*	0·28	0·59*	0·51*	0·33
Stage IV	0	0	0	0·01	0·05	0·12
Expansions						
Stage II	0·88**	0·74**	0·62*	0·70*	0·85*	0·69*
Stage III	0·77**	0·70**	0·61*	0·40	0·38	0·43
Stage IV	0·64*	0·67**	0·48*	−0·19	−0·32	−0·48
Word level	0·60*	0·18	0·08	0·55*	0·53*	0·50
MLUw	—	0·77**	0·76**	—	0·95**	0·87**
MLUs		—	0·87**		—	0·87**
Age			—			—

** = $p < 0·01$; * = $p < 0·05$.

characterized as Stage II/early Stage III (ILARSP stages) or late Stage II/early Stage III. Table 3 shows the distribution of structures in these profiles; the column headed 'Cian 1' shows the profile of the sample in which MLUw was inflated by formulas in Stages II and III.

TABLE 3. *Comparison of the children's ILARSP profiles at MLUw 1·8*

	Eibhlís 2; 1	Eoin 2; 6	Cian 1 1; 11	Cian 6 2; 7	Cian 8 2; 8
Stage I	39%	42%	51%	46%	54%
Stage II					
Clause	32	26	42	31	27
Phrase	24	22	7	28	36
Utterances[a]	45%	45%	42%	49%	40%
Stage III					
Clause	14	9	7	2	5
Phrase	0	4	0	5	1
Utterances[a]	14%	13%	7%	5%	5%
Stage IV					
Utterances	2%	0	0	0	1%

[a] Stage II (III) utterances include all Stage II (III) clauses; but some Stage II and III phrases may be expansions of utterances classified as Stage II, III or IV.

DISCUSSION

MLUm versus MLUw/MLUs

There were some differences between the different MLU measures in their prediction of grammatical complexity, but these appear not to be major ones, as is to be expected, since for all three children there were significant correlations between the different MLU measures. These high correlations between MLUm, MLUw and MLUs support the results of a Dutch study which compared them. Arlman-Rupp *et al.* (1976) found that the correlations between MLUm, MLUw and MLUs were extremely high and significant, ranging from 0·91 to 0·99 over four children. They concluded:

> Counting words or syllables is faster, easier, more reliable and theoretically more justifiable than counting morphemes, since no *ad hoc* decisions are necessary.
>
> Arlman-Rupp *et al.* (1976: 269)

This finding is supported by the Irish data. The high correlations between MLUm, MLUw and MLUs make morpheme counting, with its greater arbitrariness and doubts about the productivity of certain morphemes at particular times, seem the least attractive measure.

This leaves us with a choice between a word and syllable count. The reliability of the word measure has been well attested in the literature. Earlier studies (e.g. Darley & Moll, 1960; Siegel, 1962) showed a coefficient of 0·92 for samples of 100 utterances and found inter-examiner agreement of 0·94. A syllable count is more difficult to interpret than a word count, and is more susceptible to contextually determined variation. Young children's tendency to duplicate syllables and their use of diminutives would both inflate a syllable count. Thus a syllable count may be skewed by factors which do not necessarily indicate development in a child's language. Crystal (1979: 105) advocates the calculation of MLU in words, and it appears that it is this measure which is most suitable for these data. Of course it must be stressed that elements counted as words do not necessarily exist as units for the child; instead, a later, more sensitive analysis may show them to be part of a formula. The change from morpheme counting to word counting underlines the fact that this measure is intended only as an initial ordering of the data, which precedes a more complete analysis.

MLU and age

MLUw and MLUm correlate highly with age in the case of Eibhlís and Eoin. However, as in Klee & Fitzgerald's (1985) data it was found that the strong positive relationship between age and MLU is not consistent over the age range of 1; 4–3; 0 for the Irish data. Conant's (1987) re-analysis of Klee & Fitzgerald's data found that it was children aged between 2; 1 and 2; 10 who showed no relationship between age and MLU. Cian's data, gathered between 2; 3 and 3; 0, show no predictable relationship between age and any of the MLU measures. After about 2; 3, when his MLUm and MLUw have exceeded 2·20 and MLUs is over 3·00, the MLU measures do not seem to capture the development which is evident from the ILARSP profiles. It may be the case that a plateau is reached in Irish development at about the point where the child is beginning to make distinctions which are represented by initial mutations, which are not counted in the morpheme, word or syllable measures. Development from this point needs more detailed examination than can be obtained from a morpheme or word count.

In Figure 2 we saw that on MLUw the curves for Eibhlís and Eoin are very similar to each other, except that Eoin's is displaced by about six months. Their overall trend is upward, whereas in the case of Cian there is extreme variability. Such variability has been noted in studies of other children (e.g. Plunkett's (1985) subject Jens). Richards (1989) found similar fluctuations due to individual differences when using a language development index based on the auxiliary. In Cian's case it was probably due to his switching from a mixed holistic-analytic strategy in the early samples, to a more completely analytic one later. There are many difficulties in the identification

of formulas in young children's data (see Hickey, 1990*b*), and the rule of thumb adopted by Brown – only to count as a morpheme those elements which occur in other linguistic environments – has been shown to be inadequate, as well as troublesome to apply in an initial measure. MLU measured in either morphemes, words or syllables can give an inflated index of a child's productive language when formulas make up a significant proportion of the sample, and MLU is therefore subject to marked variability when there is a change in the relative dominance of the holistic/analytic strategy.

Nevertheless, Cian's level at the overlap in ages is consistent with the curves of the two younger children, and the level of the rest of his observations is above theirs. Since it is possible that MLU in other children of his age acquiring Irish would show less extreme variability, it would be necessary to check with data from more children whether Cian's MLU curves are the result of his acquisitional style, or are related to language-specific factors which give rise to an earlier ceiling than is found in analysis of other languages.

MLU and frequency of grammatical constructions

The distribution of utterance types in the samples matched by MLUw in Table 3 is very similar. The main differences lies in the very thin Stage II Phrase line for Cian 1, compared to the other children. The profiles of course show other differences between these samples but nevertheless, it appears that the use of MLUw as a preliminary basis for matching is reasonable, provided that it is not inflated by a number of non-productive utterances as in Cian 1. Only a more detailed analysis can show up the differences between these language samples: for example, the ILARSP profiles show differences in the children's use of phrasal expansions, negatives and imperatives, and word level phenomena, as well as pointing to formula use.

The data used here are longitudinal, allowing the assessment of the relationship between MLU, grammatical development as measured by ILARSP, and age in the same children over a period of nine months. Most previous studies have been cross-sectional, with larger groups of subjects. Klee & Fitzgerald (1985) found no significant relationship between the frequency of different clause or phrase constructions and MLUm in their three groups of children, grouped according to Brown's stages, which are based on MLUm. On the other hand, Rondal *et al.* (1987) analysed individually the relationship between frequency of grammatical constructions and MLUm in 21 children and found significant correlations between LARSP stage scores and MLU, with the exception of Stage II Clause constructions. Results from the Irish data are less clear-cut, but they show that for the two younger children aged between 1; 4 and 2; 6 there are

significant correlations between MLUw and ILARSP constructions in Stages I, II and III and at word level.

There are also significant correlations in Cian's data between MLUm or MLUw and Stage III and IV clause constructions, as well as Stage II phrase. However, there is no significant correlation between MLUm or MLUw and Stage II clause constructions. Rondal *et al.* found that this variable has a curvilinear trend: it increased first and then decreased as the children's language became more sophisticated.

The results from these children on the relationship between MLU and frequency of ILARSP categories fall between the extremes of Rondal *et al.* on the one hand, whose results showed a very strong relationship between utterance length and grammatical complexity, and on the other, Klee & Fitzgerald who found only minimal predictive value of MLU for frequency or diversity of grammatical constructions on LARSP. For these Irish data it was found that MLU measures had some predictive validity, but this relationship was not as strong as that noted by Rondal *et al.* The comparison of five profiles with the same MLUw values shows that there is some validity in using MLUw as a gross index of development, provided it is not skewed by a number of formulaic utterances (or conversely by an unrepresentative use of one-word utterances), and that a closer analysis must then be used to support this index.

CONCLUSIONS

In summary, the applicability of MLU to a language whose acquisition has not yet been studied in depth must be assessed carefully. There is a clear need for a wider data base upon which to test the present findings concerning Irish. The following interim conclusions may be noted. MLUw was found to be the measure which best balanced effectiveness and ease of application for these data. The choice of MLUw is clearly motivated by its high correlation with the morpheme measure, but MLUw makes clear the fact that it is a preliminary index which is not burdened by decisions concerning productivity and morphemic status. It is preferred to the syllable count because of the greater susceptibility of the latter to fairly arbitrary inflation, which makes its interpretation more difficult.

In any attempt to develop a measure of language development there may be two objectives: intralinguistic comparison and cross-linguistic comparison. Dromi & Berman (1982: 422) quote Slobin's doubts (in a personal communication to them) about the possibility of finding 'a cross-linguistic metric by which one can say that two children, speaking different languages, are at the "same stage" of linguistic development'. MLUm gives the impression that it can be used for cross-linguistic comparison on the assumption that like is being compared with like, when in fact that is

generally not the case. Such comparisons may be useless at best and deceptive at worst. It seems advisable to regard MLU as a purely intra-linguistic device, allowing comparisons of the same child's language over time, and between children acquiring the same language.

REFERENCES

Arlman-Rupp, A., Van Niekerk-de Haan, D. & van de Sandt-Koenderman, M. (1976). Brown's early stages: some evidence from Dutch. *Journal of Child Language* **3**, 267–74.

Brown, R. (1973). *A first language: the early stages*. London: Allen & Unwin.

Clancy, P. (1985). Acquisition of Japanese. In D. Slobin (ed.), *The crosslinguistic study of language acquisition*. Hillsdale, NJ: Erlbaum.

Conant, S. (1987). The relationship between age and MLU in young children: a second look at Klee & Fitzgerald's data. *Journal of Child Language* **14**, 169–73.

Crystal, D. (1974). Review of R. Brown 'A first language'. *Journal of Child Language* **1**, 289–307.

—— (1979). *Working with LARSP*. New York: Elsevier.

Crystal, D. Fletcher, P. & Garman, M. (1976). *The grammatical analysis of language disability: a procedure for assessment and remediation*. New York: Elsevier.

Darley, F. & Moll, K. (1960). Reliability of language measures and size of language sample. *Journal of Speech and Hearing Research* **3**, 166–73.

Dromi, E. & Berman, R. (1982). A morphemic measure of early language development: data from modern Hebrew. *Journal of Child Language* **9**, 403–24.

Fletcher, P. (1985). *A child's learning of English*. Oxford: Blackwell.

Greene, D. (1966). *The Irish language: An Ghaeilge*. Cork: Mercier Press.

Hickey, T. (1987). The early acquisition of Irish: grammatical patterns and the role of formulas. Unpublished doctoral dissertation, University of Reading, England.

—— (1990*a*). ILARSP: a grammatical profile of Irish. *Clinical Linguistics & Phonetics* **4**, 363–76.

—— (1990*b*). Identifying formulas in first language acquisition. Paper presented at the 5th International Congress for the Study of Child Language, Budapest.

Klee, T. & Fitzgerald, M. (1985). The relation between grammatical development and mean length of utterance in morphemes. *Journal of Child Language* **12**, 251–69.

McCloskey, J. & Hale, K. (1984). On the syntax of person-number inflection in Modern Irish. *Natural Language and Linguistic Theory* **1**, 487–533.

McKenna, A. & Wall, E. (1986). *Our first language: acquisition of Irish*. Dun Laoghaire: Glendale Press.

Miller, J. & Chapman, R. (1981). The relation between age and mean length of utterance in morphemes. *Journal of Speech and Hearing Research* **24**, 154–61.

Nice, M. (1925). Length of sentence as a criterion of a child's progress in speech. *Journal of Educational Psychology* **16**, 370–409.

Oftedal, M. (1962). A morphemic evaluation of the Celtic initial mutations. *Lochlann* **2**, 93–102.

Park, T.-Z. (1981). *The development of syntax in the child with special reference to German*. Innsbruck: Innsbrucker Beitrage zur Kulturwissenschaft. Sonderheft 45.

Plunkett, K. (1985). Learning strategies in two Danish children's language development. *Child Language Seminar Papers* 1985, Reading: University of Reading.

Richards, B. (1989). *Language development and individual differences. A study of auxiliary verb learning*. Cambridge: C.U.P.

Rondal, J., Ghiotto, M., Bredart, S. & Bachelet, J.-F. (1987). Age relation, reliability and grammatical validity of measures of utterance length. *Journal of Child Language* **14**, 433–46.

Siegel, G. (1962). Interexaminer reliability for mean length of response. *Journal of Speech and Hearing Research* **5**, 91–5.

Stenson, N. (1981). *Studies in Irish syntax*. Tübingen: Narr.

Wells, G. (1985). *Language development in the pre-school years*. Cambridge: C.U.P.