

4

Mean length of utterance

In this chapter, I compare the mean length of utterances (henceforth MLU) in Qaqet CDS and ADS. Section 4.1 summarises previous research on mean length of utterance in CDS. Then in Section 4.2 the definition of an utterance and its operationalisation for the calculation of the MLU in Qaqet are discussed. Afterwards, in Section 4.3 the choice of words over morphemes as a measure of utterance length is explained. Finally, in Section 4.4, the methodology is introduced and the results for MLU in the Qaqet pear corpus are presented.

4.1 Previous research on MLU in CDS

The MLU is a measure used to assess syntactic complexity, both in child language development and in caregiver speech (Snow 1972; Harkness 1977). Reduced complexity in CDS is associated with ease of comprehension. Brown (1973) first used the measure for assessing the language competence of English children, assuming that every step in development, associated with complexity, increases length (1973: 53). He proposed five stages of development, ranging from 1.75 morphemes per utterance to 4.00. MLU measures exceeding four morphemes per utterance have been found not to be representative of other developmental features (Behrens 2008).

Various studies show that CDS has a lower MLU than ADS. The MLU count has been criticised because it may ‘mask utterance-by-utterance changes in the complexity of the speech which mothers address to their children’ (Pine 1994: 18). It has nevertheless proven a valuable measure for the analysis of CDS.

Snow (1972) found in her experiments that the MLU of English-speaking mothers’ speech to 10 year olds was higher (10.9–11.2 words) than when speaking to two-year-old children (6.6–9.8 words). Newport et al. (1977) tested the speech of English-speaking mothers to children aged 12–27 months and their utterances proved significantly shorter (4.3 words) than the speech directed at the experimenter (11.9 words). Phillips (1973) found in her experiments that the utterances of English mothers speaking to children of eight months (3.6 words), 18 months (3.5 words) and 28 months (4.0 words) were significantly shorter than when speaking to adults (8.45 words).

Regarding research on non-Indo-European languages spoken in less WEIRD environments, there is some variation. Pye (1986a) did not discover differences in Mayan mothers’ MLU whether they were talking to children or adults.¹ He attributes this to the effect of cultural concepts, as children are not usually addressed in K’iche’, but also considers personality and speech style as possible factors (Pye 1986a: 92). Vaughan et al. (2015) measured the caregivers’ MLU in naturalistic recordings at two distinct points of time for two Australian Kriols. They discovered, for Wumpurrarni English in Tennant Creek, that the caregiver’s MLU increases as children grow older, but the opposite happens in the Fitzroy Valley Kriol-speaking community in Yakanarra. The authors explain these differences in part with reference to the small sample size and the different age range of the child participants in the two communities. For CDS in Australian Pitjantjatjara, Defina (2020) reported a lower MLU than in ADS, increasing gradually with child age. Such a correlation with children’s age or the children’s MLU suggests that adults adapt their speech to the age of children, which is well known from a study of CDS in large-scale societies (Phillips 1973; Newport et al. 1977). Ko (2012) reports that the MLU of British and American English-speaking mothers

1 Research on other Mayan languages reports that there is no register of speech for small children, especially as they are infrequently addressed by caregivers (Pfeiler 2007). Despite the vast body of literature on acquisition of Mayan languages, I was not able to find other studies on MLU of CDS in Mayan languages.

does not increase in a linear fashion but rather shows abrupt shifts correlating with milestones in the children's development, such as the start of word combinations. However, the data did not allow for conclusions regarding the causal direction of this correlation. The reported literature has shown that in many languages, MLU in CDS is lower, but increases with age, and that ideologies towards child language socialisation may be of relevance. In Section 2.2.4, I reported that a low utterance length is seen by Qaqet mothers as beneficial for successful communication with children. Therefore, I expect to find a low MLU in speech to smaller children that increases with child age.

First, the MLU of CDS and ADS are compared. In order to test if the MLU in CDS depends on the maturation of the child, the MLU of CDS was correlated with child age. The latter was taken as a proxy for the development of the child.

Before proceeding to the analysis of the data, the following basic difficulty must be addressed:

In order to compute a MLU, one has to decide what is a word and what is an utterance and these are two of the biggest decisions that one has to make when transcribing and analyzing child language. In this sense, the computation of MLU serves as a methodological trip wire for the consideration of these two deeper issues. (MacWhinney 2000: 57)

This is addressed in the next two sections. The concepts of utterance and word are defined and operationalised based on the literature on MLU while also considering the specifics of Qaqet grammar.

4.2 Utterances

In the following, I will define and operationalise the concept of 'utterance' with regard to literature on MLU, the way others have operationalised it, and to the Qaqet pear corpus. In this study, I take an utterance to be the smallest unit carrying communicative intention (Tomasello 2009: 72). The intonation unit is equated with the utterance. According to Himmelmann (2006: 270), however, an utterance is a unit on a hierarchically higher level than the intonation unit, made up of intonation units that 'belong closer together' (2006: 270) than others.

There are two questions that arise from these considerations. First, what is the usual definition of utterance in the multiplicity of studies that use MLU as a measure of complexity? Second, what is the relationship between an utterance and an intonation unit in Qaqet?

Most studies do not explicitly define an utterance (Brown 1973; Harkness 1977; Newport et al. 1977). Those studies that do define it use different combinations of criteria. For example, Snow (1972) used phonetic cues, pauses and intonation patterns as indicators for utterance boundaries. The instructions in the CHAT (Codes for the Human Analysis of Transcripts) annotation conventions state that one utterance should not include multiple main clauses and may also consist of incomplete sentences (MacWhinney 2000: 59). The basic utterance terminators in CHAT, like the question mark, the period and the exclamation point, are defined with reference to their intonation contours in English. Still, the comma as a non-terminative symbol is allowed in the CHAT format and expresses 'a combination of features such as pause, syntactic juncture, intonational drop, and others' (MacWhinney 2000: 61). A mixture of syntactic and intonational criteria is used here for identification of utterance boundaries.

Ko remarks in her comparative analysis of 25 corpora from the CHILDES (CHILd Language Data Exchange System) database that this may well lead to 'some differences in the exact method of aligning the utterance boundaries among the transcribers for each of the corpora' (Ko 2012: 845). Miller (1981: 14) counts a terminal intonation contour or a pause of two or three seconds as criterial to identify an utterance boundary, as opposed to the pragmatic criteria proposed by Tomasello (2009) above. Vaughan et al. (2015: 7) merely say about utterances that they can 'range from a single token to a full clause'. Overall, a mix of syntactic, prosodic and pragmatic criteria are applied in the studies that make use of MLU as a measure of syntactic complexity. Clearly, the absence of a common definition affects the comparability of results.

The Qaqet pear corpus is segmented on the basis of prosodic cues (see Section 3.2.4). Instead of applying additional criteria, I used those as unit of comparison. As a means of comparison, the IU offers a more solid measure than the varied composition of features applied so far, especially with regard to different languages.

4.3 Words or morphemes?

For the current study, the MLU has been calculated in words. In this section, the use of words versus morphemes as a measure of utterance length is discussed. Brown (1973) argued for the use of morphemes (MLUm) instead of words for calculating the mean length of child utterances because many new developments in child language are mirrored in the addition of new morphemes (1973: 53f). Subsequently, both variants have been used in many studies. For CDS, Snow (1972) and Harkness (1977) as well as Ko (2012) used words as a basic unit. For Ko, this decision was motivated by the fact that not all the corpora in her cross-linguistic examination contained a morpheme break line. Allen and Dench (2015) tested the different measures, and calculated the MLU for eastern Canadian Inuktitut child utterances in words (MLUw), in morphemes (MLUm) and in syllables (MLUs). They additionally counted the mean length of words in morphemes (MLWm) and syllables (MLWs). They found that only the MLUm, MLWm and MLWs correlated significantly with the age of the children and could thus serve as a reliable predictor of the language ability of the children. Inuktitut is a polysynthetic language with a rich inflectional system. What is considered a word could be made up of 11 morphemes or more (Allen & Dench 2015: 379). Therefore, it is not surprising that words per utterance is not a useful measure in this case. Consequently, not only developmental issues, but also the typological profile of a language, must be taken into account when deciding on the units to count in order to calculate the MLU. Qaqet is not a polysynthetic language, but it does make extensive use of cliticisation, resulting in fairly long phonological words. Therefore, the decision was made to calculate the MLU on the basis of grammatical words, that is, both free morphemes and clitics were counted as separate words (while affixes were not counted). Nevertheless, a test with morpheme counts showed that the results of the ADS/CDS-comparison did not significantly change.

4.4 Procedure and results

To calculate the MLU, I used the CLAN (Computerized Language ANalysis) MLU program (MacWhinney 2000). This program runs on the tier annotated with the CHAT annotation format MacWhinney (2000). Brown (1973: 54) proposed a set of rules for calculating the MLU for child language that is still widely applied and partially implemented

in the CLAN program. Utterances containing unintelligible words are excluded, and repeated material is not counted. Many of Brown’s other rules are designed for English or child language, and will not be considered here. The MLU program needs utterance delimiters (such as a period or a question mark) to identify the boundaries of utterances. In the pear corpus, the utterance delimiters are only used on the tier that is annotated corresponding to the CHAT annotation format and segmented by words. Thus, the MLU program was executed on that tier, and calculated using words as a measure of utterance length. Utterances consisting only of single words like ‘yes’ or a name have been excluded from the count. They cannot be expressed in a less complicated form, and therefore do not reflect if adults adjust utterance length to the age of their interlocutor as they are narrating. Table 4.1 shows the results of the MLU count.

Table 4.1: Results of MLUw counts ADS vs CDS.

Age, ID	MLUwADS MLUwCDS	
28, BLN	9.950	6.720
34, DCK	7.460	5.300
34, ARL	7.430	5.200
40, AVD	6.960	6.250
40, BCP	8.050	8.000
44, AMT	7.030	6.740
53, ABD	5.270	6.060
53, AGK	7.160	6.730
60, ALR	6.710	7.410
67, DCM	6.980	7.670

The results for CDS and ADS were compared using a Wilcoxon Signed Rank-test for related samples, a test appropriate for small data sets. The samples of CDS ($m = 6.6$; $SD = 0.9$) and ADS ($m = 7.3$, $SD = 1.1$) did not differ significantly ($Z = 9.500$; $p = 0.066$), meaning that the MLU in CDS and ADS is not significantly different. For a visualisation of the results, see Figure 4.1. Each pair of bars represents one speaker. The age of the child she speaks to in months and the speakers’ name codes are given on the x-axis. On the y-axis, the MLU in words is shown.

Apart from three speakers, all have a higher MLU in ADS than in CDS.

4. MEAN LENGTH OF UTTERANCE

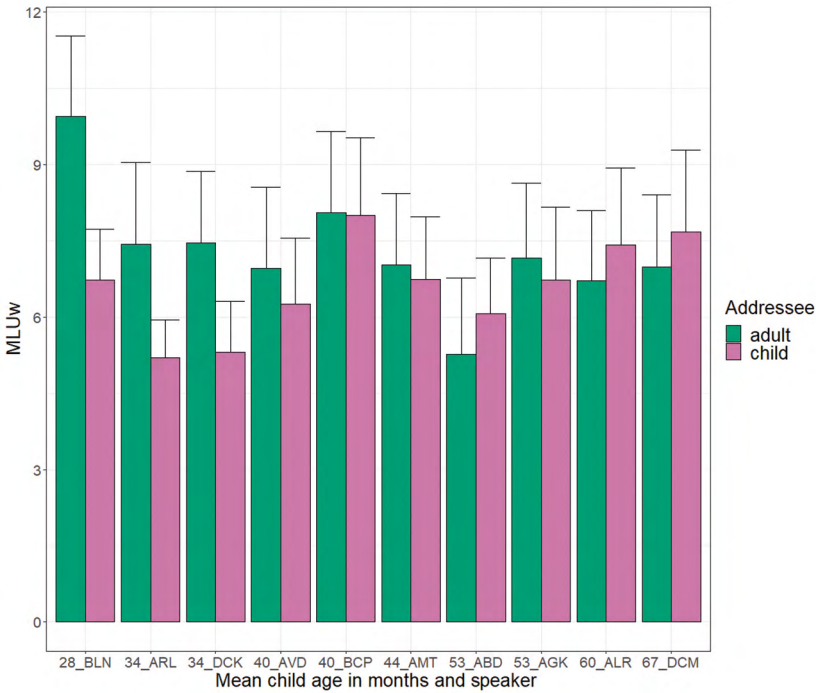


Figure 4.1: MLUw CDS vs MLUw ADS.

From the bars in Figure 4.1, it seems that the difference between ADS utterance length and CDS utterance length gets smaller the older the listening child is. To test if this is a significant effect in the data, the difference in MLUw ADS-CDS was correlated for each individual speaker with the mean age of the listening children. By subtracting the MLUw for CDS from the MLUw for ADS for each speaker, I controlled for the individual differences in utterance length. That value was then correlated with the age of the child involved in the CDS part of the task. In the two cases where two children were present during the CDS task (see Section 3.1.2), their mean age was used. The Spearman coefficient was $r = -0.802$ ($p = 0.005$), the correlation is significant. The results are illustrated in Figure 4.2.

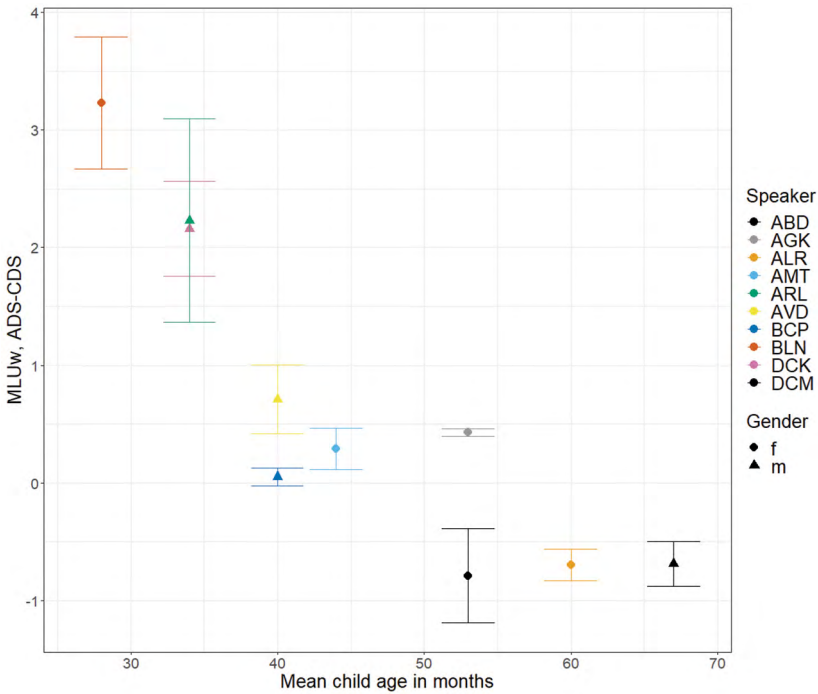


Figure 4.2: MLU(ADS)-MLU(CDS) of individual speakers in correlation with (mean) age of child addressees.

Figure 4.2 shows a clear negative correlation, meaning that the older the child, the smaller the difference gets between CDS and ADS. As hypothesised, the MLU in CDS depends on the age of the child: the older the child, the higher the MLU.

For speakers talking to children up to 36 months of age, the difference in MLU between ADS and CDS is large (mean for ADS is 8.27 words per utterance, and the mean for CDS is 5.74 words per utterance). From Figure 4.2 it can be seen that by around the age of 40 months, there is no difference between ADS and CDS in utterance length any more.

4.5 Summary: MLU in Qaqet CDS

The results show that in the pear story experiment, utterance length in CDS correlates with the age of the children. However, the samples of CDS and ADS do not differ significantly in MLU, probably due to the age of the children in the sample. For children up to the age of 34 months,

the MLU is much higher in ADS than in CDS, but approaches ADS-values at around 40 months. In comparison, Defina (2020) found that utterances were still shorter in Pitjantjatjara CDS, for children between three and four years. Harkness (1977) still found significant differences in MLU for Kipsigis CDS at 43 months.

The results also contradict the adults' opinions reported in Section 2.2 that mothers, but not fathers, adapt their speech in communication with child listeners. Qaqet adults' belief that short utterances are easier to understand for small children fits the pattern of age-dependent MLU. Using short utterances can be helpful in communication with children who are not yet fully competent language users. The transition towards more adult-like speech probably reflects adults' perception of the children's growing competence (Harkness 1977; Vaughan et al. 2015).

In this chapter, I used MLU as a measure of complexity for comparison of CDS and ADS in Qaqet. More complicated issues demand more processing effort and may also cause processing difficulties that can result in hesitations. These are addressed in the following chapter.

This text is taken from *Child-directed Speech in Qaet: A Language of East New Britain, Papua New Guinea*, by Henrike Frye, published 2022, The Australian National University, Canberra, Australia.

doi.org/10.22459/CDSQ.2022.04