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School Based Speech and Language Therapists' Perceptions of MLU-w and Its Use

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Abstract: The aim of the study was to examine how mean length of utterance counted in words (MLU-w hereafter) is perceived and used by speech and language therapists (SLTs) in the Greek Cypriot education system. A postal questionnaire was used to gather information from SLTs in the Greek Cypriot education system. A mixed method approach was used to analyse the data collected from the responses of the SLTs. Results indicated that these SLTs feel positive about the use of MLU-w in everyday practice as a supportive tool in the diagnostic process for pre-school Cypriot Greek (CYG) speaking children. Moreover, it was revealed that there are issues regarding language sample analysis (LSA) measures in school settings, as well as the need for SLTs to have adequate specialised training with regard to MLU-w in order to expand their knowledge of the use of LSA measures. Although further research is needed in the area of MLU-w and LSA measures, the findings of the study form an initial analysis of SLTs' perceptions and offer valuable insights regarding their practices.

Keywords: MLU-w; SLTs, Greek Cypriot Education System

1. Introduction

The procedures most commonly employed to assess children with language impairments fall in to two basic categories: a) standardised or formal language ones and b) non-standardised or alternative language assessments [7] with the former typically being the most favoured [4]. However, many such formal tests are not constructed as well as they might be, and many age levels and areas of language are sparsely covered by standardised measures [29]. In addition, many language tests are poorly designed, either ignoring or inadequately treating many age levels and areas of language [33].

Such issues have encouraged some in the field to advocate the use of informal or naturalistic assessment because of its greater ecological validity and goodness-of-fit with the real world [14, 24] with the most popular among these alternative methods being language sample analysis (LSA) [14]. LSA is a procedure based on the recording and transcription of a true language sample, which allows for analysis of language production in a variety of speaking conditions [21]. By drawing on data collected in this way, LSA legitimises the ordinary talk of every child as a clinical resource and brings cultural sensitivity, validity, accessibility and flexibility to the screening process [38]. Language samples and their related analyses have proven to be a useful tool for researchers in the study of child language [10]. Clinicians analyse spontaneous language samples in order to examine typical and impaired language development of children [17].

The present study was conducted in the context of increasing interest in using LSA measures [14]. The measure of average utterance length, namely the mean length of utterance (MLU hereafter), is often used in language analysis [25]. MLU is the most well-known language measure obtained from LSA [31].

1.1. MLU

MLU has been used for almost a century to quantify children's language production, to measure the expressive language of young children and to observe how a child uses his/her language, as it allows for a more natural discourse [19, 16]. It is frequently used cross linguistically as a measure of language development [20]. MLU can be used as a tool for measuring grammatical development before producing complex sentences [35]. Moreover, it is considered useful in detecting language impairment in children [3, 22]. MLU can give an indication of syntagmatic richness of children's language [25].

Despite the widespread use and acceptance of MLU, it has

been criticised on a number of grounds. The MLU is considered too general a measure to highlight areas of deficits as it gives only an overall picture and fails to pinpoint specific targets for intervention [18]. Furthermore, issues concerning the different ways in which MLU is counted have been documented in the literature [18]. Researchers and clinicians use several different ways to compute utterance length in different languages with the most common being MLU in words (MLU-w) and MLU in morphemes (MLU-m). There is a considerable debate over the inherent reliability of MLU and whether it is morphemes (MLU-m) or words (MLU-w) that should be measured [15, 31].

Depending on the languages investigated, the calculation of MLU-w eliminates—for the most part—the inconsistencies of inflectional morphology pattern that are used to compute MLU-m. In this sense the reliability of MLU-w does not present a problem in terms of counting words [41]. For both research and clinical practice, reliability of the analysis is an important issue because the results may not be valid or comparable from child to child and thus can affect diagnostic decisions.

Numerous researchers have suggested deploying MLU-w as a supportive language tool which can be used alongside other standardised language tools [44]. Moreover, the MLU-w is considered a very useful way of benchmarking general language acquisition [23]. There is evidence that MLU-w can be used as an unbiased measure with children who speak dialects and with those who are learning multiple languages [8].

Although the use of MLU-w or another LSA measure on its own may not be sufficient to diagnose a language impairment its use is strongly recommended for several reasons including strengthening standardised assessment, monitoring progress as well as providing information on the language of children who may not comply with standardised assessment procedures [7, 44].

1.2. Linguistic Situation in Cyprus

The official languages of Cyprus—where this study took place—are Standard Modern Greek (SMG) and Standard Turkish [1]. In the part of the island controlled by the Republic of Cyprus the majority of the population consists of native speakers of CYG, the linguistic variety of interest in this study. CYG is a south-eastern dialect of Modern Greek and it is spoken on the island of Cyprus by approximately 800,000 people [39]. The Greek dialects, including CYG, have a range of several syntactic and morphosyntactic phenomena [34]. CYG exhibits a range of several syntactic and morphosyntactic patterns that are not found in SMG and have not yet been studied [42]. Although the research on CYG is quite limited, CYG appears to be highly inflected and large variations may be predicted with respect to language development rates, particularly during the pre-school period [11].

In addition, another topic that has been barely touched upon is the prosody of CYG, and in fact little is known about its rhythm and prosodic structure [39]. Many lexical items and their phonological elements, from Turkish, Arabic, English, Italian, and French, have been also integrated into CYG and they have been adapted to fit in with the phonological and grammatical structure of CYG [30].

Furthermore, Cyprus is becoming increasingly multilingual, with a large number of immigrants from a variety of socio-economic, cultural and linguistic backgrounds enriching the island with a "potpourri" of languages. In general, it seems that the CYG is an under-described dialect in a highly intriguing situation (bidialectism, bilingualism, trilingualism, etc.) [27]. The history of Cyprus, the peculiarities of the Cypriot education system and the linguistic situation have all influenced the development of CYG.

For the purpose of the present study, MLU as counted in words was adopted. MLU-w maintains cross-language consistency and comparability and is recommended in bilingual and dialectal research [12]. Similarly, MLU-w as a measure obtained from LSA can sample a natural behaviour of children and it may be also less susceptible to dialect in comparison with formal testing [29]. Thus, the focus of this paper is MLU-w use in the very specific context of the Greek Cypriot education system.

1.3. Practices Among SLTs Within the Field of Special Education in Cyprus

From September 2001, the Ministry of Education and Culture put into effect the Education and Training of Children with Special Needs Law 1999 [113(I)/1999], the Mechanisms for Early Detection of Children with Special Needs [185(I) 2001] and the Regulations for Education and Training of Children with Special Needs [186(I) 2001], which support the application of the Law [9]. Cyprus law requires that children who have speech and language development difficulties be assessed and given the appropriate remedial help [9]. The Ministry of Education and Culture is responsible for the education of children aged 3 years and older.

SLTs in the Cypriot education system participate in the multidisciplinary teams that are tasked with evaluation of referred students for eligibility for special educational provision; thus they are fully involved in the dynamic assessment of students. SLTs assess children who may have language impairment to determine their needs and the intervention required. The SLTs employed in state pre-primary and primary schools in Cyprus have to deal with any and all kinds of language impairment of students (from 3 to 12 years of age) who are deemed by the District Committee to have special educational needs.

Current practice in state schools is to employ a variety of informal language assessment procedures in order to distinguish between typical and impaired language development in young children. Further, SLTs are rarely allocated more than two sessions per child for the assessment. They are given no guidelines from the Ministry of Education and Culture, nor are they offered officially any suggestions for assessment tests.

However, to date, there have been no studies evaluating the assessment tools and procedures used by SLTs in this education system. This study was the very first attempt to research MLU-w amongst SLTs in the Cypriot education system against the backdrop of a growing worldwide interest in language assessment through language sampling techniques, specifically the employment of MLU-w. The study aimed to contribute to a growing body of literature on SLT beliefs and concerns related to the use of MLU-w in their everyday practice and also to provide policy makers and researchers with a detailed picture of the Cypriot situation in this regard. For school-based SLTs who are facing ever larger caseloads in the schools, MLU-w indices are more appealing because they can be quickly calculated [26]. It is underlined that in this study MLU-w will be considered as a measure for describing a child's developing language skills and not as an end-all diagnostic tool.

2. Method

A mixed methods approach was deemed most suitable for this study. A quantitative approach typically refers to counts and measurements; it uses methods that are designed to ensure objectivity, generalisability, and reliability [2]. The major strengths of the quantitative approach are that it can yield extremely rich, quantifiable, and reliable data that are usually generalisable to some larger population [43].

On the other hand, a qualitative approach aims to clarify how participants interpret situations and what their perspectives are on particular issues [5]. Potential strengths of a qualitative methodology are that it portrays perspectives, conveys experiences and encompasses processes [40]. However, qualitative studies may suffer also from the fact that they cannot rely on statistical analysis and so data may be more subjective, biased and lacking in precision [6].

Therefore for this study, before which there had been a lack of any research related to school-based SLTs' perceptions of MLU-w and its use, a mixed method approach was deemed the most appropriate method.

2.1. Participants

Participants were recruited by the author, after permission was sought from the Ministry of Education and Culture of Cyprus, as study participants were all SLTs employed in the Greek Cypriot education system during the 2013 school year. Geographically, all parts of the Republic of Cyprus were represented in the garnered responses. Over half of those SLTs who received the questionnaire completed and returned it. Out of the 112 questionnaires sent, 72 were returned which constituted a response rate of 64%. This was a high response rate to a postal survey of this type [5]. One was returned blank and considered unusable so 71 questionnaires were included in the analysis. Partially completed questionnaires were not excluded from the analysis. The results of the research may be reasonably considered to be representative of the views of SLTs working in the Greek Cypriot education system.

Sixty seven of the respondents were women. With respect to the respondents' length of service in the Cypriot education system, seventeen SLTs had one to five years of service, 48 respondents six to ten years, five respondents 11 to 15 years, and one 16 to 20 years. Regarding the SLTs' positions in the educational system, seventy participants said they were working as an SLT, and one participant was working as head assistant in special education. Concerning their highest level of educational qualifications, six participants had completed a bachelor's degree, 64 participants had a masters and one participant had completed a doctoral degree.

2.2. Questionnaire

The design of the questionnaire was split into three elements: a) determining the questions to be asked, b) selecting the question type for each question and specifying the wording, and c) designing the question sequence and overall questionnaire layout. Based on an extensive review of the literature relating to MLU-w, the questions to be asked were determined to investigate the perceptions of SLTs working in the education system regarding MLU-w measure and its use in their everyday practice.

In the first section of the questionnaire, information about participants' gender, the number of years they had been working in the education system, their exact title or position and their highest educational degree was ascertained. This was followed by a section on SLTs' perceptions regarding MLU-w and its use in the Greek Cypriot education system.

Specifically, after being asked to provide some demographic information on the first page, SLTs were asked to write briefly about what they knew about MLU-w, and if they were familiar with it, to specify how they learned about it (e.g. university studies, seminars etc.). Respondents were also asked whether they used MLU-w in their work and if so, to give their views on the advantages and disadvantages of its use. The first page also asked respondents to identify the age groups with which they believed it was appropriate to use MLU-w. Moving on, further open-ended questions were asked regarding the use of MLU-w in respondents' everyday practice and their training regarding using it.

The questionnaire was sent by post to the participating SLTs. The packages containing the questionnaires were addressed to each specific respondent by name with a stamped addressed envelope for the return of the reply.

2.3. Data Analysis Procedures

The method of analysis adopted in this study was that of thematic content analysis, perhaps the most common method of data analysis used in qualitative work [32].The process of thematic content analysis is often very similar in all types of qualitative research, in that the process involves identifying themes and categories that "emerge from the data" [37]. The method of analysis described in this paper involves managing the data "by hand." This involves discovering themes to verify, confirm and qualify by searching through the data and repeating

the process to identify further themes and categories [36].

The analysis of the data began by highlighting important points, suggested issues, interconnections, etc. Prior to analysis, questionnaires were checked for completeness. Once this task was completed, the data were ordered into basic categories in an integrated, succinct way. Coding sheets were developed for encompassing a set of themes and subthemes presented in the responses of SLTs with respect to each question of the questionnaire. If similar issues were raised in response to different questions, they were included in the analysis for supporting the validity of responses. Themes were explored as they occurred, in order to provide a coherent description. Finally, only information that pertained to the original research question was included.

Furthermore, descriptive statistics were used to provide simple summaries about the sample and about the themes that have emerge from the data. Percentages were used to summarise and present raw data. To ensure that the analysis process was systematic and rigorous, the whole corpus of collected data was thoroughly analysed.

3. Results

In describing the findings of the study, the structure of the questionnaire will be followed. When the participants were asked to write briefly what they knew about MLU-w, the most commonly expressed view was that MLU-w is a measure of average utterance length and only a very small number (three participants, 3%), reported that they did not know what it was.

Respondents were asked to indicate how they learned about MLU-w. With the exception of five participants (7%), the majority (66 participants, 93%) claimed that they had learned about it in their university studies. Some (33 participants, 46%) also mentioned reading about it in articles or books, while the least common response, given by just one person, was attending relevant training seminars.

Table 1. *Participants' Views on the Advantages of Using MLU-w.*

Descriptive themes	Numbers of participants	Percentage
MLU-w is a good approximation of everyday language.	8	11%
During language assessment the test-takers respond physically in ways that represent natural communication.	6	8%
MLU-w is less affected by dialect	35	49%
With MLU-w, it is possible to arrive at a holistic description of a child's language production.	28	39%
Through the use of MLU-w a child could be evaluated relative to a criterion of real performance instead of according to an abstract score.	11	16%
MLU-w can be used as a supporting tool with norm-referenced tests for pin-pointing specific areas of impairment or for determining treatment goals.	9	13%
MLU-w can be simpler to implement and less arbitrary in nature.	39	55%

As mentioned above, the SLTs were asked to express their views on the advantages and disadvantages of using MLU-w. Several SLTs (61 participants, 86%) reported mainly advantages of using MLU-w as presented in Table 1. Two central themes emerged: a) MLU-w as a language measure obtained from LSA samples, the natural language production of children; b) it is a practical tool in the sense that it is user friendly and time efficient.

The major themes which were given in response to the related question regarding the disadvantages of MLU-w usage are presented in Table 2.

Table 2. *Participants' Views on the Disadvantages of Using MLU-w.*

Descriptive themes	Numbers of participants	Percentage
MLU-w is sensitive to response length and it may vary depending on what the SLT considers to be an utterance.	6	8%
Context variation would affect a child's score and the validity of claims regarding language performance of a child.	7	10%
MLU-w can be unreliable because the language samples taken, even from the same speaker under the same circumstances, are not likely to be replicated precisely.	2	3%
Language variety depends on factors such as the type of task, structure of the place, oral instructions and the participants.	3	4%
Doubts about reliability of MLU-w and the ways it can be used.	12	17%

In response to the question "With which age groups do you use MLU-w?" almost all respondents (69 SLTs, 97%) reported toddlers, pre-schoolers, pre-primary students. Two participants (3%) mentioned using MLU-w with primary school students.

For the question asking SLTs whether they thought MLU-w should be included in everyday practice, the majority (60 participants, 85%) agreed. Alongside these responses, some diverse opinions were voiced and these are presented as positive and negative traits in Table 3.

Most respondents (66 SLTs, 93%) were in favour of SLTs having training in the use of MLU-w, with only a few (five participants, 7%) disputing the necessity for training and answering negatively. According to the responses, sixty participants (85%) felt that there was a crucial need for a standard language assessment protocol and a consistent method of collecting, recording, transcribing, and analysing language samples.

Regarding whether other language measures were useful, the key finding was that all participants replied positively. A number of respondents (22 SLTs, 31%) reported the importance of using measures of lexical diversity in conjunction with MLU-w for better describing language performance, and specifically, five participants (23%) (out of the 22 participants) included using Number of different words (NDW). Some emphasised the importance of using LSA measures as being more appropriate for dialects, while other respondents indicated informal articulation tasks,

expressive and receptive vocabulary tasks, informal comprehension tests, tasks of grammatical completion and grammatical understanding.

Table 3. *Participants' Statements Related to Inclusion of MLU-w in Everyday Practice.*

Descriptive themes	Quotes	Numbers of participants	Percentage
Positive traits	If MLU-w is included in everyday practice it would be used to describe a child's language—it would not be used for a conclusive assessment.	69	97%
	MLU-w is not a substitute for standardised language tests but should augment existing measurement techniques.	42	59%
	The negative bias of standardised tests sometimes causes SLTs to misdiagnose language impairment, and so it is necessary to use alternative assessment tools.	2	3%
	MLU-w can be considered to be a nonbiased language assessment tool.	2	3%
	MLU-w is less affected by dialect variations and cultures.	4	6%
Negative traits	The lack of any language sample analysis computer programs in CYG could be a considerable problem for including MLU-w in everyday practice.	3	4%
	The lack of a referenced MLU-w database of CYG typical language developing children could lead to inconsistent interpretation of results.	2	3%
	Uniform test conditions are necessary to ensure that a child's performance is not affected by the conditions.	3	4%

4. Discussion

The aim of the study presented in this paper was to investigate SLTs' perceptions regarding MLU-w and its use in the Cypriot education system. The results of this study were essentially very positive regarding the use of MLU-w as a supportive tool for use by SLTs in the diagnostic process in pre-school CYG speaking children. They also revealed some concerns regarding LSA procedures, specifically, the need for SLTs to undergo more specialised training in order to use MLU-w effectively. The notion that MLU-w could be combined with semantics for a better description of language performance proposed the need for further research.

Although MLU-w has fundamental methodological flaws (poor validity and reliability), there are some possible reasons to explain why the outcomes of this study pointed to a favouring of MLU-w use. A possible explanation may be related to the characteristics of LSA measures themselves. As mentioned in the literature, language sampling has the advantage of sampling a natural behaviour of children, while formal testing may ask children to engage in activities that are foreign to their experience [28].

Furthermore, having in mind that the main linguistic variety used in the Republic of Cyprus is CYG, it could conceivably be hypothesised that SLTs in the Cypriot education system have reported positive attitudes regarding using MLU-w because it is considered to be less vulnerable to dialect and cultural variations than traditional formal tests [38]. Another possible explanation for this might be the lack of any formal standardised language assessment tools regarding CYG; thus SLTs may consider measures such as MLU-w, which is using natural language samples, as a good proxy for language performance of children.

Overall, study results underscore that many SLTs in the Cypriot education system reported positively when asked about the use of MLU-w in their everyday practice. Many were of the opinion that it can be a supportive tool in the diagnostic process in CYG-speaking children. SLT respondents in the study recognised that there are issues of concern regarding LSA procedures(e.g., collecting data, transcription, analysing data, and scoring), the need to have more specialised training with regard to employing the MLU-w as well as expanding their knowledge concerning the use of LSA.

5. Conclusions

The study provided an initial analysis of SLTs' perceptions of MLU-w and its use in the Cypriot education system. Although it is clear from the findings of the study that SLTs are positive regarding the use of MLU-w as a supportive tool in diagnostic process in pre-school CYG-speaking children, the complexity of MLU-w and related decision making have been highlighted.

To date, no other research has been carried out in this specific area, and as such, this study forms an important first step in clarifying SLTs' thoughts and concerns regarding MLU-w and their language assessment practices. There are some points that should be made in terms of the extent to which the implications drawn from this study may be generalised. Although the results offer valuable insights related to school-based SLTs' practices, their perceptions may not be representative of SLTs employed in other clinical settings (e.g. SLTs working in hospitals, university clinics, and in academic settings), or for that matter, those SLTs working in schools in other countries.

The findings have confirmed that further research is needed in the area of MLU-w and LSA measures in the Cypriot education system. Future research will be helpful in providing more clarity in the key points found in the current study and can assist SLTs in addressing the challenge of assessing pre-school children's language performance. In conclusion, the value of this study lies in the exploration of an under-researched area of SLTs' practice in the Greek

Cypriot education system, which could be generalised to other countries that deal with forms of linguistic varieties.

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