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Early lexical expression in typically developing Maltese children: implications for the identification of language delay

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Abstract
Limited word production may be the first indicator of impaired language development. The unavailability of normative data and standardized assessments for young Maltese children hinders the identification of early language delays. This study aimed to document Maltese children's expressive vocabulary growth and accompanying range of variation, to assist identification of children at risk for language impairment. The expressive vocabularies of 44 typically developing children aged 12–30 months were measured through caregiver report. Mean scores at each age point were characterized by substantial individual variation. Gender was not related to mean growth in vocabulary production. Minimum scores were compared to clinical thresholds for English-speaking children. Results emphasized the assessment- and language-specific nature of identification criteria. Nevertheless, established thresholds may be referred to when normative data for particular languages/language pairs are limited. In such contexts, the consideration of other risk markers gains importance in supplementing findings on lexical expression.

Keywords: early lexical expression, language delay, caregiver report

Introduction

Lexical acquisition is a core component of language learning which supports phonological, semantic and syntactic development. A delay in lexical development therefore has implications for language acquisition (Chiat, 2000). Delayed production of first words translates into late onset of expressive language development, which has been identified as the most prominent warning signal for primary language delay (Adamson-Macedo, Patel, & Sallah, 2009). In the latter, children's development of language skills is slower than their peers' in the absence of an evident cognitive, neurological or sensory cause. Failure to speak or limited word production are likely to be the first concerns that parents register about their child's language development in the context of otherwise typical development (Ellis & Thal, 2008; Paul & Roth, 2011). The identification of primary language delay thus relies heavily on evidence of constrained vocabulary production. In fact, restricted expressive

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vocabulary size is commonly adopted as a marker to identify children who are at risk for later language difficulties (Reilly et al., 2009).

Outcomes of vocabulary delays

A range of outcomes have been reported for early vocabulary delays. For example, Rescorla, Mirak, and Singh (2000) found that children who used fewer than 50 words at 24 months but rapidly increased their vocabulary to more than 100 words at 30 months caught up by 36 months. In contrast, 24-month-old late talkers who continued to show small vocabularies at 30 months were still remarkably delayed at 36 months. In a sample of 802 twins identified with vocabulary delays at two years, Dale, Price, Bishop, and Plomin (2003) reported that 44.1% continued to present as delayed at three years while 40.2% showed persisting difficulties at four years. For a substantial proportion of children, language delay resolved spontaneously by three or four years of age. Both studies concur on the fact that early vocabulary delays may resolve spontaneously or persist. With persistent difficulties, the degree of impairment may become more marked as children grow older (Hick, Joseph, Conti-Ramsden, Serratrice, & Faragher, 2002; Rutter, 2008). Children with persistent language impairments are at high risk for long-term consequences (Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998), although children with early delays who catch up may also continue to show subtle deficits in adolescence (Rescorla, 2005; Tomblin, 2008). Delays in early expressive vocabulary may therefore be a significant predictor of continuing language impairment.

The range of outcomes reported for children with primary language delay bears witness to the heterogeneity of this population. The notion that normal variation in language development and primary language impairment co-exist along a spectrum (Rescorla, 2005; Rutter, 2008) shows consideration for this diversity. From the spectrum perspective, children performing at the lower end of normal variation in expressive vocabulary may go on to present with mild or more severe language impairment, although complete recovery is also possible. The diverse developmental trajectories of young language-delayed children point toward a difficulty in determining whether an early expressive vocabulary delay will resolve or persist (Reilly et al., 2009). The complexity of predicting outcomes of language delay is compounded by the immense variability characterizing the earliest stages of language acquisition (Bates et al., 1994). Taken together, these facts presuppose that smaller-than-average lexicons may eventually grow appropriately or indicate a language learning difficulty by continuing to run low. Early vocabularies that fall at the lower end of normal variation are therefore best regarded as a potential clinical marker of persistent language impairment.

Identifying early vocabulary delays

Timely detection of language delay can lead to decisions regarding the provision of early intervention services. Very often, early vocabulary delays are identified through parental reports of expressive vocabulary skills. When parents or other caregivers report on children's language and communicative abilities, they draw on insight and knowledge of relevant skills observed across a variety of daily situations (Feldman et al., 2005). Unsurprisingly, language measures generated by parental report have sometimes been met with skepticism. For instance, Stiles (1994) noted that parents engage in subjective decision-making as they report on their children's language abilities, filtering the information they provide. In a longitudinal case study, Robinson and Mervis (1999) reported that parental report identified only a proportion of the expressive vocabulary items recorded using a diary method. The discrepancy between findings increased as the child's vocabulary size grew with age, suggesting that parental report may underestimate the range of expressive vocabulary available to the child. Nevertheless, the availability of parent-based screening and assessment instruments that have been normed on substantial samples of children greatly facilitates the process of

identification. Ample evidence documenting the validity and reliability of the Language Development Survey (LDS) (Rescorla, 1989) and the MacArthur-Bates Communicative Development Inventories (CDIs) (Fenson et al., 2006) makes them highly popular in the assessment of young children's lexical expression for clinical and research purposes. The LDS vocabulary checklist consists of 309 words spanning 14 semantic categories. Words in the child's expressive vocabulary that are not on the form may be added. The vocabulary checklist included in the CDI: Words and Gestures (CDI: WG), designed for use with infants 8–16 months of age, consists of 396 items. Parents are asked to tick the words their child "understands" or "uses and understands". The CDI: Words and Sentences (CDI: WS) focuses on 16- to 30-month-olds and contains a 680-item word production checklist. Using the CDIs, language delay may be identified on the basis of vocabulary size falling below the 10th percentile at any age between 8 and 30 months. The LDS, on the other hand, has been most commonly used as a screening tool for 24-month-olds, identifying language delay in children who use fewer than 50 words or no word combinations.

The availability of developmental norms enhances the identification process by enabling the objective interpretation of assessment results. Norms can be constructed from data yielded by systematic studies of language acquisition or from standardization research aimed at developing norm-referenced tests. For several languages and for bi-/multilingual children, however, standardized instruments are unavailable (Thordardottir, 2005). Moreover, normative data for monolingual children should not be applied to bilingual children and vice versa, since rates and patterns of language development may vary (Grech & Dodd, 2008). Thus, the clinical thresholds available for English-speaking children cannot be simply applied to other languages or language pairs unless a normative reference base is available to support their use.

For young Maltese children, early language acquisition norms are inexistent, undermining the identification of language delays. This study forms part of a larger investigation that is the first to document the earliest stages of lexical acquisition in Maltese children. The current study outlines the considerations involved in identifying children at risk for later language difficulties within a population which lacks normative data. In this context, documenting the central tendencies and extent of variability in lexical expression is important because it makes available preliminary reference data that may support the early detection of vocabulary delays in Maltese children. This study also aims to compare lexical production data for Maltese children to established cut-offs for delay in English-speaking children in order to explore the specificity or universality of findings and the ensuing implications for identification practices. The following research questions are addressed:

- What is the mean expressive vocabulary size exhibited by typically developing Maltese children aged 12, 18, 24 and 30 months according to caregiver report?
- What is the range of variation that accompanies mean vocabulary growth?
- How do Maltese children's minimum vocabulary scores compare to established clinical thresholds for English-speaking children?
- What implications may be derived for the identification of early vocabulary delays in Maltese children?

Methods

Participants

The participants were 44 typically developing Maltese children aged between 12 and 30 months. This age span was selected since it typically represents the phase in language development when children progress from using words occasionally to combining them in simple grammatical constructions. The 18-month age range was split into six-month intervals, so that children recruited for the study were 12, 18, 24 and 30 months of age. There were eleven 12-month-olds (five

Table 1. Numbers of mothers and fathers for each participant age group in relation to parental education and occupation levels.

	Parental education level			Parental occupation level*								
Age in months (sample size)	Post-secondary	Tertiary	Post-graduate	1	2	3	4	5	6	7	8	9
12 (11)	7	9	0	0	2	3	1	1	1	0	2	6
18 (12)	10	6	0	0	2	2	2	1	1	1	2	6
24 (11)	8	2	0	0	2	3	4	1	0	0	1	2
30 (10)	8	3	2	0	1	0	4	0	3	1	1	5

*Occupation levels are based on the European Social Survey Round 5 Occupation Codes (Norwegian Social Science Data Services, 2010), where 1 = farm worker, 2 = unskilled worker, 3 = semi-skilled worker, 4 = skilled worker, 5 = service occupations, 6 = sales occupations, 7 = clerical occupations, 8 = higher administrator occupations, 9 = professional and technical occupations.
Figures for parental occupation level do not include 26 mothers who were housewives and one father who was unemployed at the time of data collection.

girls), twelve 18-month-olds (seven girls), eleven 24-month-olds (six girls) and ten 30-month-olds (five girls). The children participated in the study with their main caregivers, who were mothers for all except one 30-month-old boy who was mostly cared for by his grandmother. All the children's parents had completed secondary education. Table 1 shows the numbers of mothers and fathers who had reached post-secondary, tertiary and post-graduate levels of education for every age group. Six mothers of 12-month-olds, seven mothers of 18-month-olds, eight mothers of 24-month-olds and five mothers of 30-month-olds were housewives. The father of one 24-month-old was unemployed at the time of data collection. The remaining parents' occupations were coded on the basis of the European Social Survey Round 5 Occupation Codes (Norwegian Social Science Data Services, 2010) and are given in Table 1.

Seven participants were sampled randomly from the National Register of births in Malta, while the remaining children were identified through snowball sampling. Participant recruitment was regulated by two selection criteria. First, each child was primarily exposed to Maltese within the home context. This criterion was intended to ensure uniformity in participants' language-learning backgrounds. Maltese is the only national language in Europe having a Semitic origin (Cassola, 2000). It is characterized by a rich inflectional and derivational morphology, together with variable word order and non-obligatory subject forms (Borg & Azzopardi-Alexander, 1997). Since both Maltese and English are designated as Malta's official languages, bilingualism is widespread. As a result, Maltese families vary in their language use patterns, encouraging simultaneous bilingualism or paving the way for sequential bilingualism by promoting the predominant use of Maltese or English in the home (Camilleri, 1995). Recent Census data (National Statistics Office, 2007) showed Maltese to be the preferred home language for the absolute majority of the population, prompting the decision to address children from Maltese-speaking homes in the current investigation. This criterion did not preclude the possibility that children would be exposed to language mixing since the latter is a societal phenomenon in Malta (Borg, 1980, 1988; Brincat, 2006; Camilleri, 1995; Ellul, 1978; Sciriha & Vassallo, 2006). Moreover, child-directed input channeled through the Maltese language typically involves English content words embedded in Maltese utterances (Borg, 1988). The language exposure criterion required that Maltese was the language employed for family members' interactions, including those involving the child. In particular, it implied that the Maltese component was predominant in children's language input, outnumbering English elements. This selection criterion was established upon initial telephone contact with the main caregiver.

Children who received Maltese-dominant language exposure were included in the study unless they manifested features which clearly impaired their language development at the time of data

collection. This was the second selection criterion. Incidents in the child's development which could place language skills at risk, such as an eventful pre- or perinatal history and gross medical complications, were addressed in routine questions in an initial interview. Children who could be at risk for language problems were included in the participant sample since difficulties with language development could not be definitely predicted. No significant medical conditions were reported. Caregivers were also questioned about episodes of ear infections. Children were not eliminated from the sample on the basis of concerns about middle ear function, since middle ear infections are a common occurrence in early childhood.

Caregiver report

The participants' caregivers were asked to report on the children's vocabulary production using an adaptation of the MacArthur CDI: WS (Fenson et al., 1993) for Maltese-speaking children (Gatt, 2010). This adaptation consists of 916 words distributed across 24 semantic categories. Each semantic category includes a recall section where caregivers may supplement the standard list with additional words used by their child. Both Maltese and English words are included in the checklist, with Maltese lexical items making up 68.94% of the inventory and the English component amounting to 29.00%. This distribution of languages reflects the likelihood that Maltese-speaking children would employ a proportion of English lexical items alongside Maltese words, given the English lexical mixing present in Maltese child-directed speech (Gatt, 2007). The remaining 2.06% of lexical entries consists of words that cannot be clearly attributed to either Maltese or English, such as cognate terms and onomatopoeic words. Caregiver report was used alongside language sampling and picture naming, allowing validation of vocabulary measures obtained through each method. Given the purpose of the present study, only checklist data are reported here.

Caregivers were also given a Language Background Questionnaire (Gatt, 2010), through which they reported on the child's language exposure patterns. Specific questions addressed the language/s in which the child was spoken to by the main caregiver, mixing in the caregiver's input, the percentage of time during which the child was exposed to Maltese and English and the language/s used for day-to-day interactions by family members. The Questionnaire responses confirmed that the participants were exposed to a Maltese-dominant environment, ensuring uniformity in the language background of the participants.

Procedure

Data from each caregiver–child dyad were collected in the child's home. Two visits were carried out within four weeks of each other, so that the participants' target ages were adhered to. In general, the follow-up session took place one to two weeks after the first encounter. During the first session, caregivers were interviewed on the child's developmental history, siblings, family history of language impairment, parental education and occupation. Caregivers were then taken through the Language Background Questionnaire and vocabulary checklist, which they were asked to complete by the second session. Examples were given as necessary. It was emphasized that the vocabulary checklist was only intended to tap into words produced spontaneously by the children. Both forms were collected during the second visit, which also involved the caregiver–child dyads in language sampling and picture naming. The data generated by these procedures were not analyzed as part of this study.

Measures

The completed vocabulary checklists yielded two expressive vocabulary measures, Total Vocabulary (TV) and Total Conceptual Vocabulary (TCV), which are similar to Pearson, Fernández, and Oller's

(1993) checklist measures for bilingual vocabulary skills. The TV score represented the sum of words reportedly used by the child, which included Maltese and English lexical items as well as words that could not be clearly ascribed to either language. In the TCV score, Maltese and English equivalent terms were only counted once, so that this measure indexed the number of concepts that the words produced represented in the adult language. Both measures tallied the lexical items that caregivers ticked on the checklist as well as those they added on to the standard list of words.

Results

Descriptive statistics, including means, standard deviations (SD), minimum and maximum scores for TV and TCV are presented in Table 2. Considerable dispersion of scores was present across age groups. For the 30-month-old cohort, however, SD registered a minimal increase with respect to 24-month values for TV scores, while a decrease emerged for TCV scores. For both vocabulary measures, SD showed a relative decline with respect to mean scores when older children with larger vocabularies were considered. The lowering of TCV relative to TV mean scores showed that use of Maltese and English equivalents increased as children grew older, although not extensively. This outcome was more pronounced for girls than for boys. On average, females were also reported to use more different words and concepts than males in every age group, according to TV and TCV scores, respectively. Interestingly, none of the 12-month-olds was reported to produce no words at all, showing that a floor effect was not impacting on the minimum scores obtained at this age point. Also, the maximum TV score of 702 words reported for the 30-month-old group fell considerably short of the 916-word ceiling imposed by the checklist format.

Two-way analyses of variance highlighted a significant age effect for both mean TV ($F_{3,\ 36} = 24.69$, $p < 0.0005$) and mean TCV ($F_{3,\ 36} = 26.88$, $p < 0.0005$) scores. Gender was not a significant predictor for either mean TV ($F_{1,\ 36} = 2.41$, $p = 0.13$) or mean TCV ($F_{1,\ 36} = 2.27$, $p = 0.14$). Similarly, no significant effect resulted for the interaction term (age × gender) for TV ($F_{3,\ 36} = 0.13$, $p = 0.94$) and TCV ($F_{3,\ 36} = 0.07$, $p = 0.98$) mean scores. So age was the only factor that exerted a significant influence on the developmental change in the size of lexical and conceptual repertoires, irrespective of gender. This implies that the consistent female advantage in mean TV and TCV scores was not sufficient to produce a statistical effect on the measures.

The minimum scores obtained by Maltese girls and boys were compared to clinical thresholds established for the MacArthur CDIs (Fenson et al., 1993) and the LDS (Rescorla, 1989). With

Table 2. Means, SD and ranges for TV and TCV.

Sample characteristics		TV		TCV	
Age (months)	Gender (sample size)	Mean (SD)	Range	Mean (SD)	Range
12	Girls (5)	35.40 (28.22)	8–76	35.20 (27.86)	8–75
	Boys (6)	8.67 (9.61)	3–28	8.50 (9.20)	3–27
	Total (11)	20.82 (23.66)	3–76	20.64 (23.39)	3–75
18	Girls (7)	86.14 (94.05)	13–238	84.43 (91.67)	13–232
	Boys (5)	42.60 (14.67)	18–57	42.40 (14.43)	18–56
	Total (12)	68.00 (73.52)	13–238	66.92 (71.61)	13–232
24	Girls (6)	257.67 (166.53)	146–581	234.67 (137.33)	140–498
	Boys (5)	185.40 (164.85)	52–402	177.60 (155.79)	51–382
	Total (11)	224.82 (161.74)	52–581	208.73 (141.51)	51–498
30	Girls (5)	476.00 (171.55)	266–702	424.80 (138.04)	254–596
	Boys (5)	390.00 (162.40)	183–637	359.40 (132.00)	180–550
	Total (10)	433.00 (163.87)	183–702	392.10 (131.91)	180–596

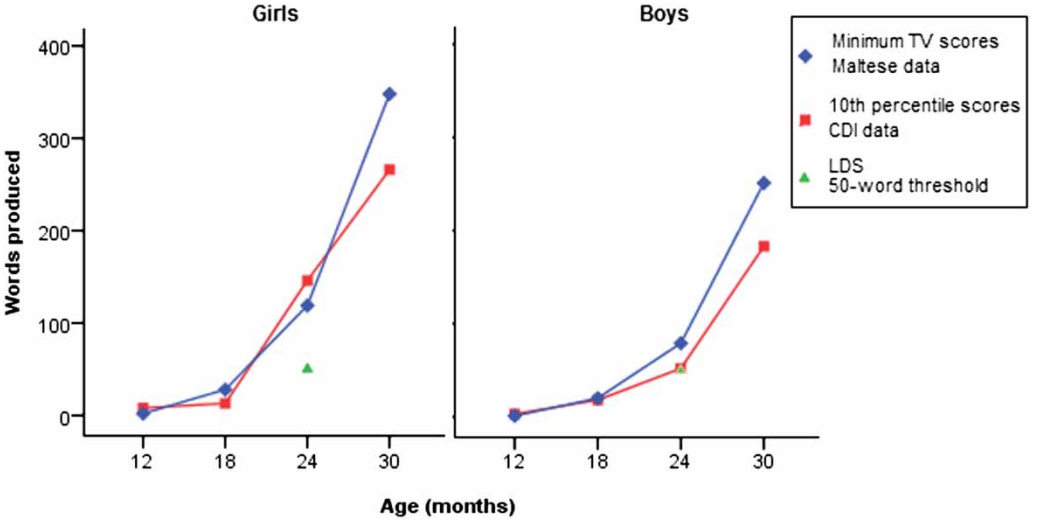

Figure 1. Comparison of minimum TV scores for Maltese children and clinical thresholds for language delay established for English-speaking US children.

the former, 10th percentile scores obtained by English-speaking males and females at the age points targeted by the present study were evaluated in relation to the lowest scores obtained by the Maltese cohort. The LDS cut-off for delay of 50 words at 24 months (Rescorla, 1989) was compared to the minimum scores for Maltese girls and boys at the same age. TV scores were employed for this analysis. It was deemed important to consider the totality of the expressive vocabulary employed by the Maltese participants without going into the merits of which lexical items were equivalent or otherwise. As Patterson and Pearson (2004) point out, translation equivalents are not necessarily employed by children as cross-language synonyms. In view of this, counts of the words, rather than concepts, used by Maltese children were employed for equitable comparisons with lexical measures obtained for English-speaking US children using the CDI and LDS.

Figure 1 compares the minimum TV scores obtained by the Maltese participants, the 10th percentile scores reported for the norming sample of the CDI vocabulary checklist at the corresponding age points and the LDS 50-word threshold at 24 months. CDI 10th percentile scores closely approximated minimum TV scores for 12-month-old Maltese girls and 12- and 18-month-old boys. There was a trend toward increasing differences between scores as children grew older, with the largest disparity being 82 words for 30-month-old girls. Both sets of scores were highly and significantly correlated ($r = 0.978$, $p < 0.0005$ (one-tailed)), indicating a close correspondence between them. The minimum score obtained by 24-month-old Maltese boys marginally exceeded the LDS 50-word threshold. At the same age point, however, the lowest performing Maltese female was reported to use 146 lexical items, implying a 96-word difference with respect to Rescorla's (1989) vocabulary cut-off criterion.

Discussion

The purpose of this study was to explore expressive vocabulary growth and the accompanying range of variation in young typically developing children who were primarily exposed to Maltese in their homes. The lowest scores identified for this study's participant group were compared to vocabulary thresholds for language delay established for English-speaking US children in order to explore the similarities and differences between them. This exercise aimed to establish whether the identification

of vocabulary delay in Maltese children may rely on the comprehensive lexical production data available for English or should favor the limited information specific to Maltese-speaking children.

The current investigation and the larger study of which it is a part were primarily motivated by the need for normative data which could guide the identification, assessment and management of young Maltese-speaking children with potential language delays. Since the establishment of the speech-language therapy service in the Maltese Islands in the 1980s, there has been an inevitable reliance on developmental norms established for the English language. By making available a series of mean, minimum and maximum vocabulary scores obtained by typically developing children aged 12, 18, 24 and 30 months, this study presents objective guidelines for gauging lexical production in young language-learning children who are predominantly Maltese-speaking. Clearly, the reported scores are not relevant to young Maltese-English simultaneous bilinguals or Maltese children learning English as their first language. In addition, the present findings cannot be treated as normative data. Standardization research involving more extensive sample sizes would be necessary to generate norms for lexical production in Maltese children. Nonetheless, the reported developmental profiles for lexical expression may assist in determining whether the onset of word production is following a typical course. A child aged 12, 18, 24 or 30 months whose lexical development appears concerning can be assessed through caregiver report and outcomes compared to the mean scores reported in this study. Separate descriptive statistics for expressive vocabulary scores obtained by males and females may be consulted. The growth in vocabulary production evidenced with age in Maltese children was accompanied by substantial individual variability, consistent with a widely cited claim in the literature (Fenson et al., 1994). Girls showed higher vocabulary scores than boys on all measures, but the difference in scores was not sufficient to produce a significant gender effect, implying that the variability in vocabulary scores remained unexplained by gender. The score ranges accompanying mean values give an indication of the range of variation that can be expected at specific ages. On their own, these results are not intended as cut-off points for delay and precocity but as preliminary indicators of the child's lexical status. Children's performance at the lower end of the range would indicate the need for further assessment and follow-up, in order to determine whether smaller-than-average lexicons eventually catch up or go on to manifest a delay.

Instances of overlap between the lowest vocabulary scores obtained for Maltese children and the clinical thresholds relevant to the CDIs and the LDS suggest the operation of universal mechanisms on expressive lexical growth across languages. At the younger age points, differences between minimum vocabulary counts achieved by Maltese children and 10th percentile scores reported for the CDIs are mostly negligible. The growing discrepancies with age may be due to the growing dispersion in expressive vocabulary scores accompanying age increase. As Maltese children grew older and advanced their lexical expression, each age point was characterized by a wider range of vocabulary scores, except at 30 months. Similarly, Fenson et al. (1994) noted increasing variability at monthly intervals in their samples of 8- to 16-month-olds and 16- to 30-month-olds, although a ceiling effect at 30 months reduced the separation between the median and the highest reported scores. Although Maltese children's maximum scores at 30 months fell short of the checklist ceiling, a decrease in the range of vocabulary scores relative to younger age groups may have been an outcome of the substantial growth in expressive lexicons occurring by that age. This made it increasingly difficult for caregivers to report accurately on their children's word production. The generally wider variability with age would be expected to reduce the probability that minimum scores for both the Maltese and the US datasets would match. Nonetheless, a highly significant statistical correlation resulted between minimum vocabulary counts achieved by Maltese children and 10th percentile scores reported for the CDI. This implies that if, hypothetically, children performing at the lower end of the normal range were tested using both checklists, they would achieve the lowest scores on both. A potential vocabulary delay would therefore be identified similarly using both

assessments, although this scenario is unrealistic given that, strictly speaking, Maltese and English would both need to have the status of first languages for the child.

In a study by Rescorla, Bernstein Ratner, Jusczyk, and Jusczyk (2005), expressive vocabulary for the same group of children was assessed using both the CDI and the LDS. Although mean vocabulary scores were very different on both measures, they were strongly correlated in terms of overall vocabulary scores and semantic category counts, indicating similar rank ordering of vocabulary scores. Moreover, 80% of the 239 children were placed in the same percentile category on both measures. This suggests that children failing the 50-word threshold on the LDS are likely to fall within the 10th percentile on the CDI norms. Therefore, the arbitrary 10th percentile cut-off of the CDI was found to be similar to Rescorla's (1989) empirically derived threshold for language impairment. Simultaneously, Rescorla et al.'s (2005) findings show that 20% of the participants did not remain in the same percentile rank, revealing differences in the classification accuracy of both assessments. This fact draws attention to the divergences accompanying the gross similarities identified by the present study in the lowest scores reported across languages and assessment measures. For example, the lowest vocabulary score reported for the 24-month-old cohort was 52 words, although closer inspection shows that the lowest scoring Maltese girl produced 146 words. This represents a substantial discrepancy with respect to the 50-word cut-off established for the LDS, which is not gender-specific. Such differences merit consideration since a small number of words may tip the balance in favor of a particular lexicon size being smaller-than-average or otherwise.

The available evidence documenting young Maltese children's lexical acquisition is limited to small sample sizes at four age points, restricting the extent to which objective identification criteria may be relied upon. The comparison between minimum scores obtained by Maltese children and thresholds established for English-language instruments yielded similarities and differences. The question that follows is whether, for children learning Maltese as a first language, the identification of potential vocabulary delays should rely on thresholds derived for other assessments and languages because of the absence of established norms and given the limited availability of lexical acquisition data.

The first aspect worthy of consideration is the assessment-specific nature of identification criteria. Scrutiny of the CDI norms shows children performing at the 10th percentile at 24 months to use just under 100 words, according to fitted median values (Fenson et al., 1993). This threshold is substantially different from the 50-word criterion proposed by Rescorla (1989). This divergence emerges despite the language variable being held constant, in that both assessments are standardized on US English-speaking children. In fact, Rescorla and Alley (2001) regard the differences in parental estimates of vocabulary size across the CDIs and LDS as an effect of checklist length. With a longer inventory, as in the case of the CDI: WS, parents tend to report more words. Similar conclusions were drawn by Klee, Robertson, Howard, and Gavin (2000) following a comparison of British versions of the CDIs and LDS. In the light of differing clinical thresholds for the CDIs and LDS, evaluation of early expressive vocabulary may lead to a child being diagnosed differently according to the assessment tool employed. This suggests that thresholds for delay are assessment-specific. For children tested using the Maltese adaptation of the CDI: WS vocabulary checklist, lexical scores reported by caregivers are again dependent on the number of checklist entries. It follows that checklist length is also likely to influence the range of variation emerging in word production skills of Maltese children.

The discrepancies between the CDI and LDS identification criteria may also be accounted for by considering the prevalence of primary speech and language delay. Drawing on a systematic review of relevant literature, Law, Boyle, Harris, Harkness, and Nye (2000) proposed a median prevalence estimate of 5.95%, which suggests that the 10th percentile threshold may be over-sensitive. Indeed, the CDI cut-off for vocabulary delay is arbitrary in nature, similar to others that have been used across assessments in the absence of a definitive gold standard (Spaulding, Plante, &

Farinella, 2006). Nonetheless, adopting the 10th percentile as a clinical threshold is temporarily useful until the sensitivity and specificity of the relevant vocabulary measures is established. Testing the Maltese adaptation of the CDI: WS vocabulary checklist on an extensive sample would enable standardization of the tool, providing percentile scores that would enhance identification of language delay in children having Maltese as their first language. Percentile cut-offs thus derived would enable comparison with the minimum scores reported in this study, verifying whether these preliminary clinical thresholds hold true for a normative dataset. Further longitudinal research using the same tool would allow the identification of individual trajectories of language development together with predictors of persistent language impairment.

The identification criteria for language delay posited by the CDIs and LDS are also language-specific in nature and applicable to the English-speaking US childhood population on which they were standardized. The literature suggests that identification criteria for vocabulary delays need to be directly relevant to the language/s being learnt and the children's language-learning environment (Grech & Dodd, 2008; Thordardottir, 2005). It follows that lexically based markers for delay in young Maltese children must be specific to the Maltese childhood population, reflecting the structural characteristics of Maltese and the varying degrees of language contact in young children's communicative environments. Until a normative reference base for young children brought up in Maltese-speaking families is set up, the reported descriptive statistics can be used as reference measures when children aged 12, 18, 24 and 30 months are assessed using the same method and tool employed in this study. Beyond this, clinical thresholds identified for English using specific tools may be consulted at specific ages not covered by the proposed reference measures. Nevertheless, established vocabulary delay cut-off points for English-language assessment tools cannot be used to determine the presence of language delay in Maltese children. They merely point toward the need for further follow-up and assessment.

Moving beyond expressive vocabulary and taking into account other risk markers for language impairment is an important notion, especially when considering the preliminary nature of the present results. Within a context of dubious vocabulary delay, the presence of other clinical markers may substantiate the evidence for language-learning deficits. Current research advocates a holistic consideration of every child in an attempt to elucidate the probable developmental trajectory of early language difficulties. The presence of additional risk markers may shed light on the likely evolution of early vocabulary delays, guiding decisions regarding the provision of clinical intervention (Ellis & Thal, 2008). It is recommended that "very early processing skills", namely joint attention, social responsiveness, symbolic understanding and word/non-word repetition (Chiat & Roy, 2006, 2008; Roy & Chiat, 2005), are taken into account. Bortolini et al. (2006) also proposed non-word repetition as a potential clinical marker for language impairment in Italian children, suggesting the cross-linguistic relevance of this measure. Furthermore, a child's risk for persistent language delay is said to increase further in the event of a positive family history of language impairment or early language delay (Ellis & Thal, 2008). The child's use of communicative gestures and receptive language are also important pieces of information that help build a detailed picture of the child's linguistic and communicative functioning (Desmarais, Sylvestre, Meyer, Bairati, & Rouleau, 2010; Fenson et al., 1994; Thal & Tobias, 1994). Interestingly, the CDI: WG, intended for children aged 8–16 months, addresses the use of gestures and receptive language abilities alongside word production. Moreover, the CDI: WS and the LDS include a focus on word combinations. Although these aspects of language and communication development are not addressed in the CDI adaptation for Maltese children, their measurement through other means is recommended because of their relevance to the identification of potentially persistent language impairment. Supplementing information on expressive vocabulary abilities with findings on other risk markers for language impairment is especially important when normative data on language acquisition are unavailable.

Conclusion

For Maltese children, establishing the range of normal variation in vocabulary production at specific ages is clinically important. Not only does it acknowledge the massive individual differences associated with the development of early verbal expression but it also allows the identification of children performing at the lower end of the range who are at risk for continuing language difficulties. Caregiver-based assessment of expressive vocabulary skills must recognize the assessment- and language-specific nature of clinical thresholds. For languages and language pairs lacking normative and standardization research, cut-off criteria for language delay established for other tools and languages cannot be used indiscriminately. At most, they may be employed with caution to guide rather than regulate identification practices. Further, consideration of additional risk factors may help to better predict the developmental trajectory of identified expressive vocabulary delays, or even to support identification when clinical vocabulary thresholds are minimal or lacking. Together, these considerations hope to facilitate the identification and management of late-talking children who are exposed primarily to Maltese or to other languages/language pairs which lack norms and standardized instruments that address early lexical development.

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