

Rationale and Evidence for MELCS (Mable Early Language and Communication Screener)

What is the Mable Early Language and Communication Screener?

The 'Mable Early Language and Communication Screener' (MELCS) is a quick screening tool to support the identification of speech, language and communication difficulties. The MELCS is individually administered to reception aged/school entry children (4–5 year olds) and has been designed to identify which children within the tested cohort are at risk of developing SLCN (Speech, Language and Communication Needs) and should be referred to a SaLT (Speech and Language Therapist) for a thorough assessment of their needs. The screener has been specifically designed to identify those children who may be showing signs of Developmental Language Disorder (DLD) which is a specific type of SLCN. The screener tool will also offer targeted interventions for children who may need support but do not meet the criteria for a specialised service.

What is DLD?

Developmental Language Disorder (DLD) is a common childhood condition that can lead to difficulties with communication and language skills. DLD can impact a child's ability to understand and use vocabulary, as well as their ability to follow instructions and participate in conversations with their peers. DLD affects approximately 7.6% of all children in primary school (Norbury et al., 2016), therefore, early identification is essential. When early identification tools are in place, it ensures that children receive the support they need to improve their communication skills. We know that early language skills are the biggest predictor of later academic outcomes and success and that early vocabulary skills can predict academic achievement 10 years later (Bleses et al., 2016). Therefore, the development of these skills is more important than ever.

The Importance of Early Identification

Given the number of children who are affected by language difficulties, it is essential that these children are identified as soon as possible; using appropriate assessment tools throughout the diagnostic process. The SEND Code of Practice highlights that "it is particularly important in the early years that there is no delay in making any necessary special educational provision. Delay at this stage can give rise to learning difficulty and subsequently to loss of self-esteem, frustration in learning and to behaviour difficulties. Early action to address identified needs is critical to the future progress and improved outcomes that are essential in helping the child to prepare for adult life" (Department of Education, 2015).

Due to the long waiting lists for assessment and intervention, more and more schools are prioritising the speech, language and communication skills of children in their setting. The Bercow 10 Years On Report (Bercow, 2018) highlights that when schools prioritise speech, language and communication needs, there is evidence of improved outcomes for children due to effective identification and intervention. The School Starters Study adds to this by highlighting that the COVID-19 pandemic has intensified existing issues in language development and that it must be a key focus in education recovery plans (Tracey et al., 2022). Children entering Reception during 2020/2021 were found to require more support than their peers who entered school pre-pandemic; with 97.8% of schools having concerns regarding communication and language skills. After the third national lockdown, this figure reduced to 72.6%, however this only included children who were able to attend during lockdown.

Language Screening Tools

It is imperative that a comprehensive assessment of a child's speech, receptive and expressive language skills is completed prior to any diagnosis being made (Bernthal et al., 2012; Paul & Norbury, 2012). Full, standardised assessments delivered by Speech and Language Therapists can be used towards a diagnosis of DLD, however it can be challenging to know who to refer for assessment. There are a number of different assessment and screening tools available for education settings which assess a variety of aspects of language development but these can take time to administer. With schools becoming busier and busier, it is important for teaching staff to have access to a screening tool that is not only cost effective but can also be administered in a short amount of time.

The **Mable Speech and Language Screener, MELCS**, will reduce the time burden on teachers by automating the speech and language screening process. It will provide educators with quick, clear, and accurate results post-screening that will assist schools in allocating resources effectively by identifying children who need early support.

What research is the MELCS based on?

The MELCS combines the published research into which aspects of language can be used as predictors of DLD, with the clinical expertise of experienced Speech and Language Therapists, leading to a screening tool backed by a large evidence base.

According to a DLD Literature Review (Gaudette, 2022) only three key markers of DLD have been consistently reported across the literature. These are:

- 1. Difficulty in sentence repetition tasks**, reflecting deficits in short-term verbal memory, vocabulary knowledge, and grammatical skills (Archibald et al., 2009; Conti-Ramsden et al., 2001; Hesketh & Conti-Ramsden, 2013; Poll et al., 2010).
- 2. Deficits in nonword repetition** reflect short-term phonological memory and phonological processing difficulties (Poll et al., 2010; Thomas et al., 2019; Weismer et al., 2000).

3. Difficulties in grammatical sentence comprehension and production of verb morphology, such as tense and agreement, seem to be good predictors of DLD (Conti-Ramsden, 2003; Conti-Ramsden et al., 2001; Hendricks et al., 2019; Poll et al., 2010).

In addition, the use of non-word and sentence repetition tasks in the identification of language difficulties and acquisition of language development has gained wide acceptance over the years by a number of researchers (Coady, J. A et al, 2008). The MELCS has been largely based on previous studies which have concluded that proficiency in both of these tasks have a strong influence on vocabulary knowledge and learning in children aged between 4 and 5 years old. Skills within these tasks are also reliant on underlying syntactic knowledge, working memory, and short-term memory (Riches, 2012).

Given that the markers identified above have been consistently shown to be strong predictors of Developmental Language Disorder (DLD), the MELCS was developed with these indicators serving as the foundational basis of the screening tool. Individual subtests screening non-word repetition, sentence repetition, understanding of grammatical sentences and use of verb morphology were developed. When developing the specific questions for the subtests, previous studies were also used as reference points. Previous researchers selected their non-words and sentences using very specific criteria which focused on length and complexity of both non-words and sentences, so the same criteria were used in the development of the MELCS.

In addition to the language components of the MELCS, it also contains a speech sound subtest. This subtest uses Mable's own AI model, which has been specifically developed for analysing children's speech and identifying speech sound errors. This ensures that children's speech is accurately screened using criteria set by professional speech and language therapists.

The speech sound component is backed by the evidence base of speech sound developmental norms and resolution of phonological processes common in children's speech sound development (Dodd et al., 2003). The research is combined with the clinical expertise of experienced Speech and Language Therapists to ensure the clinical decision making is appropriate and relevant.

Key Components of the MELCS

The MELCS comprehensively screens speech sounds, language comprehension and use, and social communication skills. The following are the key subtests, each addressing a critical aspect of language development:

Speech Sound production	This subtest is designed to evaluate a child's speech sound production by analysing their verbal responses to visual stimuli. The child is shown an image and asked to name what they see. The response is then analysed by Mable's AI tool for accuracy, identifying both acceptable responses and errors in speech sound production. The AI can detect phonetic and articulation errors and identify error patterns consistent with known phonological process errors common in speech delay and speech disorder. This process continues with a series of images to comprehensively screen the child's speech sound capabilities. Difficulties in using speech sounds can impact on a child's ability to speak clearly and be understood by others, leading to possible communication breakdowns and frustration.
Nonword repetition	This subtest evaluates short-term phonological memory and processing capabilities, which are vital for learning new words. In this test, children listen to a nonsense word and are asked to repeat it. This requires the ability to recognise, retain, and reproduce phonological information, mirroring the process of acquiring new vocabulary. Difficulties in nonword repetition can be an indicator of an underlying language difficulty.
Sentence Repetition	The subtest requires the child to listen to a short sentence and repeat back the full sentence, targeting short-term verbal memory, vocabulary knowledge, and grammatical skills. Difficulties in this area can indicate broader language comprehension and expression challenges, including being a predictor of DLD.

Sentence Comprehension	This subtest focuses on sentence comprehension and the understanding of verb morphology and helps in understanding a child's grasp of grammatical structure. The child is shown a set of four pictures and simultaneously listens to a sentence. They are required to choose the picture that matches the sentence they have heard. Difficulties in this area can be an indicator of an underlying language difficulty, and can easily go undetected by others in everyday contexts. Therefore, specific screening of this area of language is essential.
Expressive Verb Morphology	This subtest evaluates a child's expressive morphology skills by analysing their verbal response to a visual prompt. It involves playing a short video followed by a question, with the child's response recorded and processed through advanced speech recognition and phonetic analysis. Difficulties in this area can indicate an underlying language difficulty, and can impact on a child's ability to express themselves, leading to communication breakdown.
Social Communication	Complementing the other subtests, there is a brief questionnaire for teachers to complete upon registering a child. This will address any concerns regarding the child's social communication abilities, providing a more holistic view of their language and communication skills. This digital questionnaire comprises a series of questions, intended to evaluate various aspects of a child's social behaviour and communication abilities.

Thresholds for Intervention

A critical component in the development of the MELCS involved establishing appropriate thresholds for identifying children in need of intervention. The determination of these cut-off points is essential, as they directly influence the sensitivity and specificity of the screener in distinguishing between children who require additional language support and those whose language development falls within typical expectations. Setting accurate thresholds helps ensure that children at risk of DLD are identified early and provided with timely intervention, while also reducing the likelihood of unnecessary referrals for children not in need of services. In order to define these intervention thresholds, the development process was guided by consultation of the existing evidence base, including published standardised assessments and existing research.

The outcome from consulting the evidence base was a set of thresholds individually tailored to each subtest of the screener. The thresholds were comparable to studies showing the prevalence of phonological and/or grammatical difficulties of the general population (Gardner et al., 2006) in reference to the proportion of children (as compared to their peers) who should be referred for further assessment.

For the speech sound production subtest, best practice guidance published by the RCSLT (Royal College of Speech and Language Therapists) based on the work by Dodd et al., 2003, was used to gain consistency in identifying the age thresholds for age appropriate acquisition of speech sounds, and elimination of phonological processes.

Overall, these all informed the thresholds of the RAG rating scale, which guides the school staff on the recommended actions from the screening process.

RAG Ratings

In order for the outcomes of the screener to be simple to use, a RAG rating was used. For each area of SLC assessed (speech sounds, understanding of language, expressive language and social communication skills) a RAG rating is given. From these 4 RAG ratings, an overall RAG rating is given for each child giving the next steps to the school.

The overall RAG ratings are:

Green	If a child receives a Green RAG rating across all areas of SLC, no further action is required. This indicates that the child's speech, language and communication skills appear to be developing in line with age-related expectations. All children, regardless of screening outcome, will benefit from high-quality universal support. This includes staff consistently using the strategies outlined in the Mable Universal course to continue to promote speech, language and communication development.
Amber	Children with an overall Amber RAG rating will have scored Amber in at least one area of speech, language and communication. This suggests a possible delay in that area. These children would benefit from some targeted intervention to support their SLC. The screener report will identify the specific area(s) of SLC requiring support. Schools are advised to implement the relevant Mable Targeted intervention for the identified communication area over a defined intervention block.

Red

If a child receives a Red RAG rating in one or more areas of SLC, this indicates that, based on their responses during the screener, they were unable to demonstrate age-appropriate speech, language and communication skills. Children with a Red outcome should be referred to a Speech and Language Therapist for further assessment to determine whether they have an unidentified SLCN.

Ongoing Development

Although the MELCS was developed on a foundation of robust empirical evidence and informed clinical expertise, efforts to maintain and enhance its clinical accuracy and integrity are ongoing. Continuous evaluation and refinement processes are in place to ensure that the screener remains aligned with current best practices and professional standards. These ongoing developments include the introduction of new features, methodological adjustments, and usability enhancements, all aimed at improving the efficiency and accessibility of the tool while ensuring that the results it generates are both reliable and valid for identifying children at risk of Developmental Language Disorder (DLD).

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