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RESEARCH REPORT

Dynamic assessment of multilingual children's word learning

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Abstract

Background: Teachers and clinicians may struggle to provide early identification to support multilingual children's language development. Dynamic assessments are a promising approach to identify and support children's language development.

Aims: We developed and studied a novel word learning task that is dynamic and language neutral. It makes use of multilingual children's abilities to apply language transfer, fast mapping and socially embedded language to the learning of new words.

Methods & Procedures: A total of 26 children attending kindergarten in French participated in this study. Within this group, 13 different home languages were spoken. Children took part in a dynamic assessment task of their word learning that consisted of a test–teach–retest task. Children's scores on this task were compared with their language abilities reported by their parents, amount of language exposure and scores on standardized tests of vocabulary. All tasks were delivered in French.

Outcomes & Results: Children had higher accuracy for known words as compared with new words in the task, which may suggest transfer of knowledge from their first language. They also showed increased accuracy in identifying and naming the new words across the three trials, suggesting fast mapping of these new vocabulary items. Finally, the scores on the dynamic task correlated to children's vocabulary scores on the standardized tests, but not parent report of language development, or the amount of exposure to the language of school.

Conclusions & Implications: This novel dynamic assessment task taps into the process of vocabulary learning, but is less influenced by prior language knowledge. Together, these findings provide insight into early word learning by young multilingual children and proposes a conceptual model for identifying strategies to support second language acquisition.

KEYWORDS
bilingualism, children, cross-linguistic, dynamic assessment, vocabulary

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What this paper adds

What is already known on the subject

- Many barriers exist with regards to assessing the language abilities of multilingual children when a clinician aims to assess their language abilities in both languages. An alternative approach is to measure children's language processing abilities.

What this paper adds to existing knowledge

- A novel dynamic and multilingual task was developed and implemented in this study. This task builds on children's word learning abilities that include cross-language transfer, fast-mapping, and socially imbedded learning. This multilingual task was found to tap into vocabulary learning but was not influenced by prior language knowledge.

What are the potential or actual clinical implications of this work?

- Applying a task that focuses on language processing abilities is a promising strategy to capture language abilities in multilingual children. In addition, the dynamic nature of this tasks allows a clinician to identify scaffolding strategies that best support children's word learning.

INTRODUCTION

For children who are emerging bilinguals, acquiring the language of school is a challenging but essential step towards academic success (e.g., Guhn et al., 2010; Halle et al., 2012). We use the term 'emerging bilingual' to refer to children who begin school with limited exposure to the language used at school, and who speak another language(s) at home. Unfortunately, because emerging bilinguals' exhibit diverse language skills, their teachers and speech–language therapists may not be able to differentiate learners and provide the educational supports they need. In their learning environment, it is as though learners are at the bottom of an academic cliff and asked to climb, with few toeholds available. Emerging bilinguals often cannot directly use their home language to learn words at school, yet most children are well equipped for the challenge and can use various strategies to learn the language of schooling including the use of transfer abilities from their first language representations (Kelley & Kohnert, 2012; Sheng et al., 2016), fast mapping abilities to link meaning to new phonological forms (Eviatar et al., 2018; Kaushanskaya et al., 2014; Kan & Kohnert, 2008), and their interest in social interactions (Chang et al., 2007). While these abilities have been identified as supporting second language learning, they have not been brought together in a single model. We propose that emerging bilingual children can leverage these three child-internal abilities to learn a second language (Figure 1), and that these abilities are further reinforced by environmental factors including amount and duration of exposure to the language (Hoff et al., 2012; MacLeod et al., submitted; Thordardottir, 2015) and socio-linguistic contexts of language learning (MacLeod et al., 2013, 2019). Tapping into these abilities may support all children's current learning, and potentially help speech language therapists (SLTs) differentiate learners who are typically developing from those with a language disorder. Thus, in the present study, we explore the use of a novel dynamic identification and naming task. Specifically, we seek to understand whether we will observe cross-linguistic transfer from children's first language to their second, whether children will demonstrate learning over time, and whether the task scores will be correlated with other factors.

Cross-language transfer

An initial strategy in early second language acquisition is transfer, a phenomenon that is well documented in adult second language learners (e.g., Rosselli et al., 2014). The transfer of linguistic knowledge from one language to the

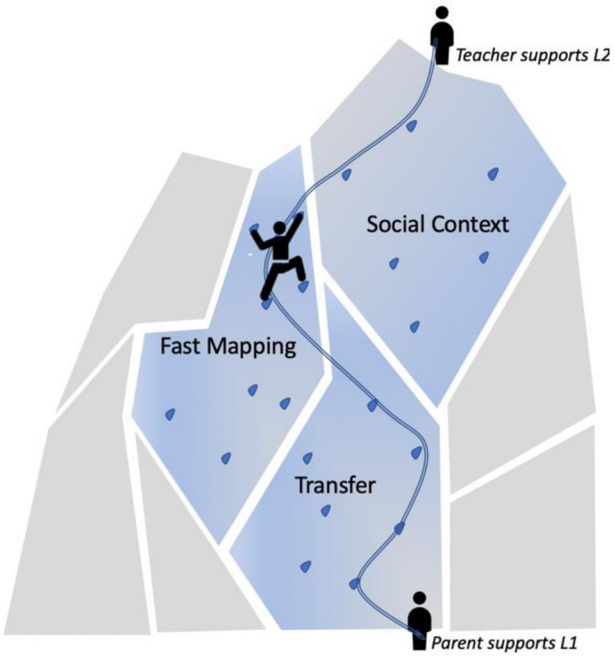

FIGURE 1 Illustration of how cross-language transfer, fast mapping and social context work together to support early language learning [Colour figure can be viewed at wileyonlinelibrary.com]

other can take place abstractly (e.g., knowledge of a concept, or a grammatical form) or be language specific (e.g., knowledge of adjective–noun ordering, permitted syllable shapes). In vocabulary, these two types of transfer can co-occur: a child may know the concept (e.g., 'table'—a surface supported by four legs at which one can eat or draw at), and the word may have a similar phonological form across languages and present as cognates (e.g., 'table' in English and French are spelled and pronounced similarly). Cognates refer to words that occur across languages that share the same source (Crystal, 2011), which includes both words shared within language families (e.g., English 'night' and German 'Nacht'), and words borrowed from one language to another (e.g., 'emoji' borrowed from Japanese).

Research has shown that children learn new words that are cognates (e.g., 'Nacht' in German) more quickly than words that are not cognates (e.g., 'Fraulien' in German versus 'girl'), but that linguistic distance between languages may also need to be considered. For example, in a study of Spanish–English bilingual children aged 8–13 years, the authors assessed children's expressive vocabulary on standardized tasks in English (Kelley & Kohnert, 2012). Overall, children scored higher on cognate words, but not all children showed this advantage; older children or children with lower English receptive vocabulary scores were more likely to show the advantage. These findings might suggest that a subset of children have used their first language knowledge more actively to complete the task, suggesting both an awareness of their limited English vocabulary and of a strategy to compensate for this limitation. In a study of young 4–7-year-old bilingual children, the role of cognates in a task was analysed by controlling for phonology, word frequency, and word length across the English–Spanish cognates and non-cognates (Sheng et al., 2016). Bilingual children from two backgrounds were compared in their ability to name pictures in English: Spanish–English bilinguals and Mandarin–English bilinguals. The authors observed a cognate effect for the Spanish–English bilinguals compared with their Mandarin–English bilingual peers (Sheng et al., 2016). In particular, results indicated that the phonological similarity between English and Spanish target words facilitated word learning of English words for the Spanish–English bilingual children, but not for the Mandarin–English bilinguals (Sheng et al., 2016). Together, these studies suggest that children can make use of knowledge in their first language when learning the second (Kelley & Kohnert, 2012; Sheng et al., 2016).

A factor that may support transfer is the linguistic distance between languages being learned. This area has been recently explored in language development research. Measuring 'linguistic distance' is complex and multiple proposals have been made (see Floccia et al., 2018, for overview). Floccia et al. (2018) developed a measure based on the lexical phonological similarity, grammatical distance, and morphological complexity of words on a commonly used screening tool in the UK (i.e., Oxford Communicative Developmental Inventory). In contrast, Blom et al. (2020) used normalized Levenshtein distance, which is based on comparing the orthographies of two words and calculating the number of changes needed for the words to match. Despite differences in the 'distance' metric, these authors found an advantage for learning languages that are close compared with those that are distant in toddlers learning expressive and receptive vocabulary (Floccia et al., 2018), and in school-aged children learning receptive vocabulary (Blom et al., 2020). Together, research suggests that cognates facilitate word learning in young children and exemplify the strategy of transfer, but this is not the only resource young language learners can use.

Fast mapping

A second important strategy in early second language learning is the ability to quickly map meaning onto a new phonological form, or fast mapping. Coined by Carey and Bartlett (1978), fast mapping refers to a process in early language development that supports vocabulary learning by rapidly associating sounds to meaning. Seminal work in early word learning has shown that the process relies on strategies that minimally include (1) using syntactic infor-

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mation from the context (Katz et al., 1974); (2) focusing on whole objects first, before object parts or qualifiers (Markman & Wachetel, 1988); and (3) learning names for new objects, before learning new names for objects that already have a name (Markman & Wachetel, 1988). Once the association has begun between sound and meaning, children can develop deeper knowledge of the language through repeated exposure or extended mapping (Carey & Bartlett, 1978; Carey, 2010). In monolingual studies of fast mapping, researchers have focused on acquisition of a small set of novel words ranging from one to five words (Kan & Windsor, 2010). For example, single word learning was introduced in Dollaghan (1985); two words in Horton-Ikard & Ellis Weismer (2007), four words in Gray and Brinkley (2011) and five words in Arvind et al. (2018). These novel words were presented in a play-based context during an exposure phase (e.g., 'This is a koob.') followed by a testing phase that focused on identification (e.g., 'Show me the koob.'), and finally a testing phase that focused on naming (e.g., What's this?) (Dollaghan, 1985; Horton-Ikard & Ellis Weismer, 2007; Gray & Brinkley, 2011; Arvind et al., 2018). Results indicated that children can learn to identify new words in these contexts, but that naming remains more challenging.

While the present study will not compare bilingual performance to monolingual performance, this comparison has been used in previous research and has highlighted bilingual children use fast mapping to support novel word learning in their second language. For example, Eviatar et al. (2018) showed an advantage in a fast mapping task for Hebrew–Arabic bilingual children compared with monolingual Hebrew-speaking children in kindergarten, even though the bilingual children had limited experience with Hebrew. The authors suggested that these bilingual children may have multiple factors that contribute to this stronger fast mapping, including memory, metalinguistic abilities, and language experience (Eviatar et al., 2018). In a study of bilingual experience on children's cognitive skill, 5–7-year-old monolingual and bilingual children attending a dual immersion program were evaluated on a number of tasks, including novel word learning (Kaushanskaya et al., 2014). The bilingual children were found to show advantages in novel word learning compared with their monolingual peers, and this advantage was most evident on picture identification tasks where the picture, or referent, was already known (e.g., animals) (Kaushanskaya et al., 2014). In a study with 3–5-year-old Hmong–English bilinguals, a significant relationship between fast mapping scores and vocabulary was observed for English, the second language, and a moderate relationship for Hmong, the first language (Kan & Kohnert, 2012). The authors suggest that this asymmetrical relationship across languages reflected both an earlier stage of language learning for the second language, and that children built on phonological representations of a language to support learning new words (Kan & Kohnert, 2012). In contrast, Hmong–English bilingual children aged 3–5 years performed marginally better in their first language, Hmong, than in English, and showed significantly better scores in identifying the new words than in naming them (Kan & Kohnert, 2008). The children's fast mapping scores were not related to age or existing vocabulary knowledge in the same language, but rather a relationship was found across languages: strong Hmong expressive vocabulary correlated with low fast mapping scores in English. The authors suggested that this finding may indicate a temporary cross-linguistic interference such that the cognitive processing cost required to limit interreference from the child's first language resulted in lower scores (Kan & Kohnert, 2008; Kohnert et al., 1999). Overall, studies suggest that bilingual children make use of their world and metalinguistic knowledge in fast mapping, and thus this ability offers emergin bilinguals another language learning strategy.

Socially embedded language

A third key strategy includes children's interest in language that is embedded in social interactions (Wong Fillmore, 1991). The language used at home tends to be highly contextualized, or related to the 'here and now', and is embedded in social interactions within the family (Rowe, 2013); while language used in the classroom is more decontextualized, it is has less clear context and can be more abstract (Dickinson & Porche, 2011; Justice et al., 2008). For a child who speaks the same language at home and at school, these language learning environments complement each other. In contrast, when different languages are used across home and school, the decontextualized environment of school can make learning the new language of school challenging. Thus, young emerging bilingual children need these social interactions with contextualized language opportunities in school.

Unfortunately, many kindergarten teachers struggle to include emerging bilingual children in learning activities that foster a range of language development (Williams, 2001), and many teachers feel unprepared for the challenge of supporting emerging bilingual learners (Sullivan et al., 2015). They struggle to include emerging bilingual children in learning activities that foster not only comprehension of directions, but also social language interactions (Piker & Rex, 2008; Williams, 2001). A case study observation of four children who were English language learners found that teachers used strategies to support interactions with these emerging bilingual children, but these strategies focused more on children's language comprehension than their

expressive language (Piker & Rex, 2008). In addition, they reported that these four children had limited interactions with peers due to their low English language proficiency and that their interactions were infrequently scaffolded by teachers. In another study, authors found that when a child's minority language was used by the teacher, a significant positive relationship was observed between the childs social and behavioural competencies (Chang et al., 2007). Together, this research highlights that although the classroom may have decontextualized language, providing opportunities for social interactions among emerging bilinguals, their teachers and their peers bolsters the language development of emerging bilingual children.

Summary

Emerging bilingual children can make use of these three key strategies to support the learning of the language of school. Cross-language transfer from the first language can accelerate word learning when languages are less linguistically distant. Fast mapping makes use of children's world knowledge and their metalinguistic skills to support the learning of the language of school. Social interactions provide a context to support and foster this language learning. While children make use of these three abilities, these abilities have not, to our knowledge, been explored together in multilingual children. The present study examines a dynamic multilingual assessment task that may provide a social context for observing the extent to which children make use of transfer from their first language, and fast map new phoneme sequences to new objects.

Assessing young language learners in the language of school

Professional associations indicate that children's language skills should be assessed in the languages spoken by the child (e.g., ASHA, 2010; RCSLT, 2007; SAC-OAC, 1997). Unfortunately, barriers exist that can make a dual-language assessment difficult to conduct. Across countries, SLTs report difficulties in obtaining a description of the child's home language, in locating language-specific assessment tools, hiring an interpreter, acquiring a budget to pay for these extra assessment expenses, and allocating sufficient time to conduct a dual-language assessment (e.g., Australia: Williams & McLeod, 2012; Canada: D'Souza et al., 2012; Germany: Rethfeldt, 2019; Singapore: Teoh et al., 2018; USA: Arias & Fribertg, 2017). With these widespread barriers in mind, alternative approaches to assessing children who are learning the language of school are needed, including tasks that focus on language processing.

Speech–language assessment aims to diagnose developmental disorders, provide access to services and inform treatment planning. Common practices include a focus on measuring and describing phonological, morphological, syntactic and lexical abilities, and comparing these abilities to developmental norms, developmental milestones and considering impacts on communication and participation. In monolingual settings, clinicians often use tasks that simultaneously assess a child's language specific abilities and their language processing. We argue that when working with emerging bilinguals, these skills need to be decoupled to more readily identify the presence of a communication disorder. As noted above, the challenge in building developmental norms across all languages, and all bilingual communities, is immense. An alternative approach is to focus on children's underlying language processing abilities: we know that children with developmental language disorders (DLD) and speech sound disorders (SSD) show difficulty in processing language input (Bishop et al., 2014; Dodd, 2014; Namasivayam et al., 2020). By developing tasks that are less tied to a specific language, it is possible to measure children's language processing and learning. Several studies have explored combining measures including parent report, non-word repetition, and narratives (e.g., Boerma & Blom, 2017; Bonifacci et al., 2020; Li'el et al., 2019; Paradis et al., 2013) to identify bilingual children with language disorder. Once a speech or language disorder is identified, results can be complemented with descriptive tasks that focus on language-specific abilities and strengths. Furthermore, a task that is more language neutral may offer efficacy in the identification of children with disorder, and efficiency in the testing process by reducing barriers such as those described above.

A successful example of a task that focused on language processing that aimed to be language neutral was the non-word repetition task developed by Chiat (2015). While non-word repetition is not linked to lexical representations, non-words could still be influenced by the phonology of the language due to the inclusion of phonemes that are uncommon across languages (e.g., /ɹ/), inclusion of complex syllable structures (e.g., consonant clusters in onsets or codas), and including multisyllabic words if uncommon in the language (Chiat, 2015). When a non-word repetition task contains many phonological features of a specific language, a young language learner may produce errors because they have not learned the phonology of the language, rather than having difficulty with short-term memory. Chiat developed a series of non-words using phonemes that are common across languages (i.e., 11 consonants (/p, b, t, d, k, g, s, z, l, m, n/) and three vowels (/a, i, u/)), which

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were combined in sequences from two to five syllables (Chiat, 2015). Boerma et al. (2015) administered this task to Dutch-speaking monolingual and bilingual children aged 5–6 years old with and without DLD. The authors found that the typically developing bilingual children performed similarly to their monolingual peers on the non-word repetition task, but were significantly weaker than their monolingual peers on Dutch language tasks. In contrast, bilingual children with DLD were found to be comparable to their monolingual peers with the same disorder in both types of tasks. These findings suggest that this non-word repetition task was sensitive to language disorders for these bilingual children, and bilingual speakers were not disadvantaged compared with their monolingual peers.

An alternative type of language processing task focusses on observing children's language learning in action through dynamic assessment. Dynamic assessment involves sampling a teaching and learning moment, by engaging the child in a mediated learning experience and measuring a child's ability to respond to instruction (Petersen et al., 2017; Vygotsky, 1978). Several dynamic measures have been developed to assess a range of skills in bilingual children including production of narratives (Petersen et al., 2017), development of word learning (Kapantzoglou et al., 2012), and skills across a language battery of phonology, vocabulary and syntax (Hasson et al., 2012). There are two primary types of dynamic assessment: a graduated prompt approach that includes simultaneous testing and teaching (Campione & Brown, 1987; Glaspey, 2019), and a test–teach–retest approach which breaks the learning situation into three phases of pre-testing, instruction, and post-testing (Lidz & Peña, 1996; Peña et al., 2014). The test–teach–retest approach is most commonly used in children from diverse language backgrounds (Peña, 2000; Peña et al., 2006, 2007) and has been found to support the identification of a language difference separate from a language disorder (Hasson et al., 2012). An innovative example of a dynamic task that focused on word learning was created by Kapantzoglou et al. (2012). Building on methods used in fast mapping research, they developed a Spanish-language task to investigate bilingual Spanish–English children's ability to learn new words. Their novel contribution was to extend the task to include a mediated learning context, rather than only exposing children to the novel words (Kapantzoglou et al., 2012). These authors examined whether the predominantly Spanish-speaking children with a developmental language disorder (DLD, $n = 13$) would score differently than typically developing children ($n = 15$) (Kapantzoglou et al., 2012). This task involved testing baseline skills, teaching three new non-words (i.e., 'fote, depa, kina') alongside three known Spanish words (one animal, food and toy) in a play-based task, and repeated testing to capture children's learning. The words were taught within a scripted scenario: a puppet was bringing presents (i.e., known and new word objects) to the birthday party of a second puppet. They also included two measures of modifiability: a modifiability scale and a learning strategies checklist. The two groups of children differed significantly in their ability to identify objects following the first trial, but no other group differences were observed in the following trials. Both groups of children had higher identification scores, and neither group reached ceiling in naming the new words accurately after the trials. They explored children's modifiability by scoring children on a scale (i.e., Peña, 2000) after the third trial, but the groups were not significantly different on this score. These results suggested that this task holds promise to identify bilingual children with weaker language abilities, but its use is limited to Spanish–English bilingual children.

These studies provide early indications that tasks can be developed and used to distinguish between bilingual children with typical development and bilingual children with developmental language disorders. Inspired by the works of Chiat (2015) and Kapantzoglou et al. (2012), we developed a multilingual, dynamic word learning task that could be language neutral and work across language backgrounds for broader applicability. The word-learning task was adapted from Kapantzoglou et al. (2012) and applied some of the principles used in identifying non-words by Chiat (2015). The aim of the task was not to estimate a child's receptive or expressive vocabulary, but rather to examine a task that provides a social context for learning, where children can make use of transfer from their first language, and fast map new phoneme sequences to new objects.

Current study

The goal of the present study is to explore the use of a dynamic assessment task to describe word learning abilities in emerging bilinguals. These children were emerging bilinguals from multilingual backgrounds attending kindergarten where the language of schooling was French. Within this context, we distinguish between non-words in French, referred to as 'new words', and French words that were selected to be likely known by the children, referred to as 'known words' (i.e., common words used home and at school by young children, and may be a cognate in French and their home language). We targeted three research questions:

- Was there a difference in accuracy between known words in the second language, and the new words

when identifying objects or when naming objects? More specifically, is there a difference in accuracy between known words in French (the second language) and the new words when naming objects or when identifying objects? While children may use their knowledge of French, we also hypothesize that higher accuracy for known words at the first probe compared with new words would suggest that the children could also use cross-language transfer to apply their prior knowledge to this task. The performance with the known words provides a baseline for interpreting learning of the new words.

- Will children show fast mapping by learning across time? In other words, are changes in identifying and naming of new words evident over the three test trials? While fast mapping has been demonstrated by bilingual children, we will focus here on whether we can observe learning of new words in the present task such that increases in accuracy in the children's identifying and naming are observed.
- Will the dynamic assessment task show a positive correlation with stronger first language abilities, early age of exposure to French, or higher vocabulary scores in the second language? If the task tapped into word learning processes rather than current knowledge of French, we expected the duration of exposure to French would not be correlated. We expect to find a positive correlation with scores and greater abilities for emerging bilinguals in their first language, and a correlation with scores and higher vocabulary in their second language.

METHODOLOGY

The present study took place in Montréal, Québec, and was conducted in collaboration with two inner-city schools. Children were recruited during spring of their first year in school, which was their kindergarten year. The study received ethics approval from both the Université de Montréal and the participating school board.

Participants

A total of 26 kindergarten children participated in the study. They ranged in age from 57 to 74 months (mean = 63.75 months), and 12 children were girls and 14 were boys. All children were attending French-language public schools, which is the default language of schooling in Québec. In these French-language public schools, English was not used in the classroom and was not a subject of instruction before Grade 4. While Montréal is a multilingual city in practice, it is subject to provincial laws that govern the use of French in schools, public services and workplaces. Teachers supported the recruitment of children for participating in the study by sending a letter of information about the study to children in their classroom who, to their knowledge, did not speak French at home. Children attended regular stream kindergarten classes and did not have a diagnosed developmental disability, including no identified hearing impairment, communication disorder or other diagnoses. These regular stream kindergarten classes were also attended by French-speaking children from the neighbourhood and French was the language of the classroom. No additional second-language supports were provided to the children either within or outside of the classroom.

Children's onset of exposure to French varied across participants, with 13 children first exposed to French upon entering school and 13 exposed to French in daycare (six before the age of 3, and seven between the age of 3 and starting school). The children's first language included Arabic, Bengali, English, Guajarati, Ilokano, Pashto, Punjabi, Spanish, Tagalog, Tamil, Twi and Urdu. In each family, at least one parent was not born in Canada. Among the participating children, 20 had at least one sibling, and 14 parents reported that their children used French amongst themselves in addition to the home language and English. No parents reported that only French was used at home, and only one family reported that French was used to speak to a parent, and in this case, it was only with the mother who used French in addition to the home language. All parents spoke a language other than French as their first language, and in only six families did parents report being proficient in French (two fathers and eight mothers). In addition to their first language, at least one parent in each family was proficient in English.

The children lived in a complex socio-economic context that is characteristic of many immigrant communities in Canada. Both schools were rated as being at 'high-risk' based on students' family SES information, specifically low level of mother's education and family revenue (i.e., score of 10/10 on the provincial *Indices de défavorisation*). Despite this high-risk, we observed that the participating children had at least one parent who had completed high school, and 16 mothers and 23 fathers had completed a post-secondary degree. A total of eight mothers and 24 fathers worked outside of the home. Among parents with degrees who worked outside the home, four of the mothers worked as cleaners or in a factory, and 18 of the fathers' work required manual labour. In the Canadian immigration context, these mismatches between education and employment often occur as immigration to Canada is facilitated by higher education, but an individual's education and credentials are not always recognized, and language abilities may limit opportunities for employment (Sharaf,

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2013). In sum, the children who participated in the study lived in a low socio-economic context but most had at least one parent with a post-secondary degree.

Development of the dynamic assessment task

We created a dynamic assessment task of word learning designed to be used with multilingual children (DAMC) that was adapted from a Spanish word learning dynamic assessment task that was successfully used with Spanish–English bilingual children (Kapantzoglou et al., 2012). This test–teach–retest dynamic assessment focused on identifying and naming common objects with known words, and identifying and naming novel objects with new words (i.e., non-words that were taught during the task). The multilingual word learning task was developed through an iterative process. We focussed on careful selection of real known words to provide a point of comparison for the learning of the novel new words, selection of novel new words, and composition of a mediated learning experience script. Consistent with previous research in fast mapping, we focused on a small set of three novel new words because when children were presented with a larger set of novel new words retention of these new words may be reduced (Horst et al., 2010).

Process to select the three 'known word' targets

A first concern in developing a multilingual adaptation was identifying known words that were likely to be known by children who spoke diverse home languages and who had limited exposure to French. A risk in developing the task was that the 'known words' in the task would not be known by the children, and thus all words would be 'new' to the children and no baseline for learning would be available. Our strategy to find possible known words was two-fold. (1) We chose words that were commonly used in French by children based on a review of the MacArthur–Bates Communication Development Inventory adaptation to French (Trudeau et al., 1999). (2) Within these commonly known words of French, we searched for words that were more likely to be cognates in the child's home language. A final criterion for our known words was their ability to be easily identified as a small object. From a list of common words in the three categories, we used web resources and dictionaries (e.g., Google Translate, InDifferentLanguages.com) and back translation to identify possible cognates. We developed a preliminary list of 'candidate words'. Candidate words included the following words in the animal category: koala, kangaroo, panda and elephant; in the food category: chocolate, kiwi, salad, banana, soup; and in the toy category: car, taxi, tractor, teddy, ball. The candidates were then narrowed to three words by eliminating words with dissimilar phonetic productions across languages (e.g., fewer phonologically similar words for 'tractor'). The first author had the opportunity to pilot the remaining words with children from similar backgrounds as the current study participants that allowed for the elimination of words that were less known by young multilingual children during informal play (e.g., 'kiwi' was not well known) and words likely to be mislabelled (e.g., 'panda' mislabelled as 'bear'). The final three candidates were kangaroo, banana and taxi (or 'kangourou', 'banane' and 'taxi' in the French-language context of the study). One extra word, ball ('balle'), was reserved for cases when the child was not able to identify one of the known words. Appendix A in the additional supporting information provides a broad phonetic transcription of these words in the languages spoken by children in the present study.

Process to select the three 'new word' targets

A second concern was identifying novel new words that would meet phonotactic constraints of a broad number of languages, and thus be plausible words. Phonological characteristics that are common across languages have been previously identified and our strategy was to draw from the two syllable non-words that are part of the Quasi-Universal Non-Word Repetition task (Chiat, 2015; Boerma et al., 2015). These non-words are built from 11 possible consonants (/p, b, t, d, k, g, s, z, l, m, n/) and three vowels (/a, i, u/) combined into CV structures that are more common cross-linguistically (Chiat, 2015). We included three items from the two-syllable list: 'lita', 'naki', 'sibo'. These new words were associated with objects that were not readily nameable by children in our piloting of the task with a similarly aged group of multilingual children. For the animal category, 'sibo' was associated with a small purple creature with four legs, two eyes and a mouth. For the food category, 'naki' was associated with a round, green object with three frills. For the toy category, 'lita' was associated with a short red stick with suction cups on both ends. The toys were drawn from a collection of small toys and were all approximately 10–15 cm in height (about 3–5 inches).

Process to compose the script

We developed a mediated learning experience that was adapted from Kapantzoglou et al. (2012). The instructional script included a doll's birthday party where Sammie was visiting Lucie and bringing her presents (the target words). In our adaptation, we developed a script for the task in

French, the language of schooling (see Appendix B in the additional supporting information). At the onset of the script, the examiner provided mediation of meaning of the task by emphasizing that the goal of the game was to learn new words; mediation of transcendence was provided by encouraging the child to draw on previous experience (i.e., learning words at home). The scenario followed the order of presentation proposed in the previous study: two known words (banana and kangaroo), two new words (naki, sibo) and one known word (taxi) and one new word (lita). Once all the words were presented, the examiner asked the child to name the presents that Lucie received. The child was then asked to point to the present named by the examiner.

Procedure

Three data collection sessions occurred. First, we met with parents for a structured interview prior to the child testing sessions to complete the parent questionnaires. The children were assessed in two sessions: one session for the dynamic assessment task, and the other for the additional static vocabulary measures. The order of these sessions was counterbalanced. The children were evaluated in a quiet room at their school by a trained research assistant with a background in speech–language pathology, psychology or early education.

Parent interview

Two parent questionnaires were administered through structured interviews with the parents: Canadian Questionnaire of Use and Exposure in Bilinguals (C-QUEB: MacLeod, 2021), and the Alberta Language and Development Questionnaire (ALDeQ; Paradis et al., 2010; French adaptation by first author). The interviews with parents were conducted in person and the language used was English or French. The C-QUEB asks questions to gather information about the family and child's language use and exposure at home and in their community. The information includes who the child communicates with, how often, and in what language. From this information, we calculated the percent of exposure to each language reported in the participant description and the age at which the exposure to French began reported as a variable in the analyses below. The ALDeQ focuses on the child's first language development. The questionnaire focuses on the child's early language developmental milestones, current first language abilities, behaviour patterns and activity preferences, and family history of communication delays or disorders. Based on the parent's response, it is possible to derive a score that indicates first language development and previous research has shown that low scores are consistent with language profiles of children with language impairment (Paradis et al., 2010).

Administration of the dynamic assessment task

The administration of the DAMC included a test phase followed by three teach–retest phases. The dynamic assessment script is included in Appendix B in the additional supporting information and the administration is summarized here. For the test phase, before starting the scenario, the examiner asked the child to identify each of the six objects by pointing to the object to verify that the child knew the known words but not the new words. If the child did not know one of the known words, the alternative 'ball' was available to use; however, all children were able to identify the known words. If a child identified one of the objects with the new words, we would have removed that word from the 'new word score'; however, children did not identify any of the new words. For the teach phases, the scenario began and provided three opportunities to learn the word in each scenario. As indicated in the script, children's correct answers were reinforced (e.g., 'Yes, it's a banana!'), and if the child used another word, the examiner would provide a cue and a second opportunity (e.g., 'It's a banana, what is it?'). In the second opportunity, the child was given the object to hold and observe. In the third opportunity, the examiner named and described the target word. Once these three opportunities were completed, the next target word was introduced. The script remained the same with the third opportunity adjusted to provide an appropriate description for the target word. Once all the words were presented, the examiner moved to the retest phase and asked the child to name the objects (i.e., the presents that Lucie received), then, the child was asked to point to the object named by the examiner. These responses at the end of the trial were used to calculate the score, such that each trial had a potential score of correct identification and naming of three new words.

The entire scenario for the six target words was repeated two more times for two main reasons. First, this repetition provided the children with opportunities to continue learning the new words and provide feedback and support through this process. Second, we aimed to replicate the methodology developed by Kapanzoglou et al (2012) to allow for comparisons as the present study used a different set of items and included a linguistically diverse group of participants. At the end of the three trials, the examiner rated the child's modifiability using a modifiability scale to rate the examiner's effort (four-point scale), the child's responsivity (four-point scale), and their transfer of the new skill (three-point scale) (Peña, 2000). A third of

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the sessions were independently rated using the recorded sessions by a second rater. The two raters agreed for 31 of 36 ratings across the three scales, and the 5 disagreements were one point higher or lower than the original rater.

Static assessment task

Children's language abilities in French, the language of school, was assessed with two commonly used standardized vocabulary assessment tasks. We measured receptive vocabulary using the *Évaluation de vocabulaire en images Peabody* (ÉVIP) (Dunn et al.,1993) and a clinical adaptation of the Expressive One Word Picture Vocabulary Test (Gardner, 1990) task to French (Groupe coopératif en orthophonie, 1995). We followed the standardized procedure in administering the vocabulary tasks with one caveat, we began with the first test item, rather than the first item recommended based on the age of the child. Based on the first author's experience working in this multilingual community, we have found that most children do not meet the floor requirements of eight consecutive correct answers when we begin at age level, and we need to work backward through the test to establish a floor, which often discouraged the child.

RESULTS

RQ1: Was there a difference in accuracy between 'known' words in the second language, and the new words when identifying objects or when naming objects?

The children's scores for correctly identifying and naming the three known words and the three new words were compiled after the first trial for a maximum of three correct answers for each category (Table 1). The results suggest that children responded differently to known words as compared with the new words (Figure 1). After the first trial, children were better able to identify new words. The mean of correctly identified known words was 2.77/3 versus 2.00/3 for new words. Since the assumption of homogeneity was not met, a Kruskal–Wallis analysis of variance (ANOVA) was conducted to explore whether children's performance for known versus new words differed. The results show that they were significantly more accurate in identifying known words ($H(1) = 7.96$, $p < 0.005$). A discrepancy between known words and new words was also observed in naming.

Outcomes of a Kruskal–Wallis ANOVA showed that children were significantly better at naming the known words, 2.62/3 versus 0.15/3 for new words ($H(1) = 40.00$, $p < 0.001$) (Figure 2). Looking in closer detail, the effect of the known words was also found for the number of children who were at ceiling for identifying and naming. Despite speaking a broad range of languages, 22 children were at the ceiling for correctly identifying the known words, and 19 children for naming known words. Within the known words, all children accurately named 'banana', one child had an error for 'kangaroo', and three children had an error for 'taxi'. This result suggests that children had either prior knowledge of these words in French, or were able to transfer knowledge from their first language(s). In contrast, children had low scores for naming new words, and 14 of 26 children showed early stages of learning with ceiling scores for identifying the new words.

TABLE 1 Overview of scores across tasks and subcomponents or trials

Task	Subcomponent or trial	Mean (SD)
Known words	Identification	2.77 (0.64)
	Naming	2.62 (0.74)
New words	*Identification*	
	Trial 1	2.00 (1.09)
	Trial 2	2.35 (0.89)
	Trial 3	2.5 (0.95)
	Naming	
	Trial 1	0.15 (0.40)
	Trial 2	0.38 (0.57)
	Trial 3	0.5 (0.65)
Modifiability	*Total*	5 (3–7)[a]
	Effort	3 (1–3)[a]
	Responsive	3 (0–3)[a]
	Transfer	0 (0–2)[a]
ALDeQ		0.83 (0.11)
Receptive vocabulary		23.90 (11.38)
Expressive vocabulary		20.9 (7.7)

Note: [a]Modifiability scores are reported as median and ranges.

RQ2: Will children show fast mapping by learning across time?

Children's correct identifying and naming scores at the end of the first, second and third trial were compared with explore whether they improved during the task and reported in Table 1. The results suggest that children showed learning across time (Figure 3). A repeated-measure ANOVA was conducted with the time as a repeated factor for each mode of response (naming or identification). The results indicate a significant main effect for

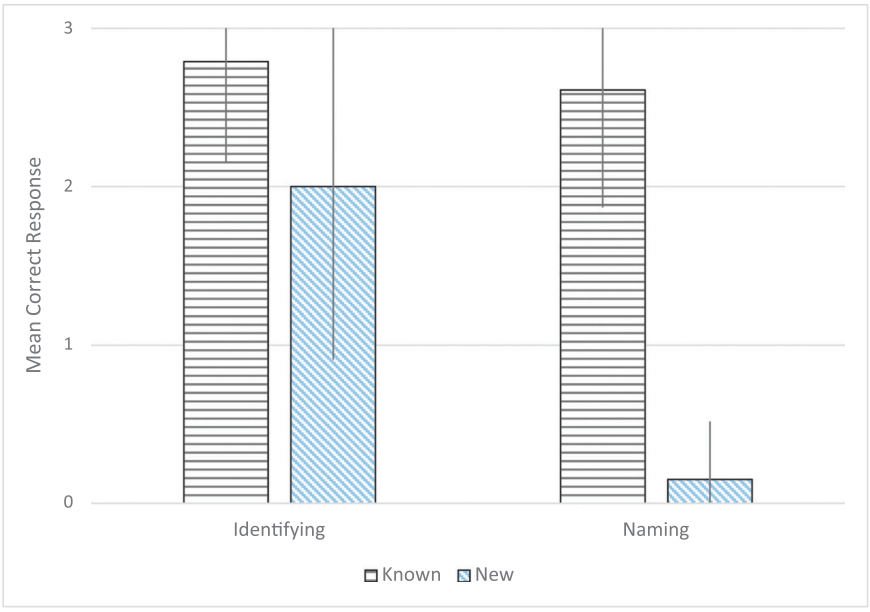

FIGURE 2 Comparison of mean correction response for known and new words following the first trial in identifying and naming [Colour figure can be viewed at wileyonlinelibrary.com]

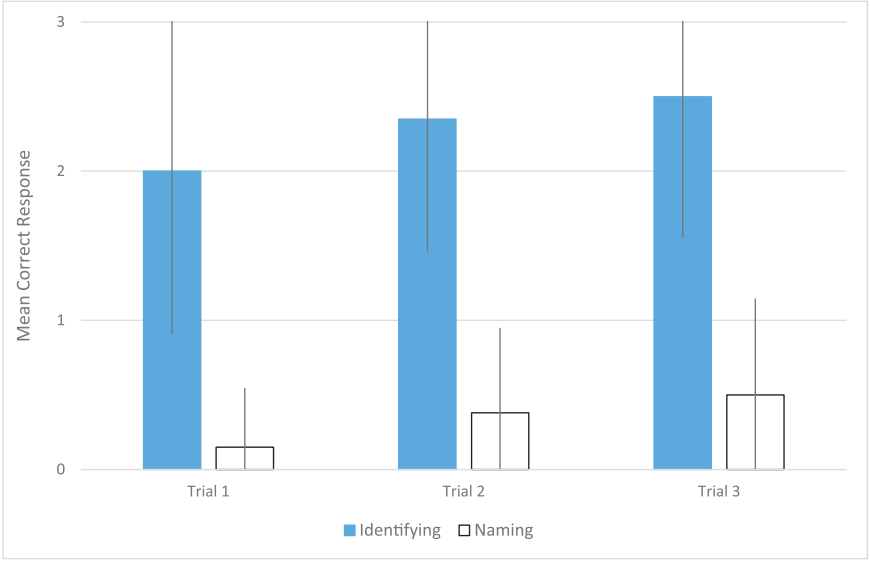

FIGURE 3 Comparison of mean correct response in identifying and naming new words across the three trials [Colour figure can be viewed at wileyonlinelibrary.com]

time for both naming ($F(1, 25) = 9.878$, $p < 0.004$, $\eta_p^2 = 0.283$), and identification ($F(1, 25)$, 7.22., $p < 0.013$, $\eta_p^2 = 0.224$). A series of follow-up analyses using paired *t*-tests with a conservative Bonferroni correction for the three timepoints (i.e., 0.017 alpha value for chance) revealed significant differences only between the first and the third time points in naming new words ($t(-3.143)$, $p < 0.004$) and for identifying new words ($t(-1.979)$, $p < 0.013$). As modifiability was based on a rating scale (0–3), the median and interquartile range (IQR) is reported. The median modifiability in the task was 5/9 (range of 3–7) as rated by the trained examiners. Children required slight effort from the examiner (median = 3, IQR = 0), were moderate to highly responsive (median = 3, IQR = 1), but showed little transfer (median = 0, IQR = 0). The IQR of 0 indicates no variability for the middle 50% of the data, while the value of 1 indicates that ratings varied by 1 unit within the middle 50% of the data.

RQ3: Will the dynamic assessment task show a positive correlation with stronger first language abilities, early age of exposure to French, or higher vocabulary scores in the second language?

The children's correct scores overall in naming and identification were compared with their scores on first language development via a parent questionnaire (i.e., the ALDeQ), the age of first exposure to French (i.e., obtained via C-

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TABLE 2 *R*-values from multiple correlation analysis of identifying and naming new words to the duration of exposure to French, score on ALDeQ, score on expressive vocabulary (EOWPVT) and receptive vocabulary (EVIP)

	Naming new word	ID new word	Exposure to French	ALDeQ	EOWPVT	EVIP
Naming new word	1	0.226	0.274	0.153	0.226	−0.023
ID new word		1	−0.180	−0.028	0.576**	0.475*
Exposure to French			1	0.094	−0.329	−0.108
ALDeQ				1	−0.366	−0.046
EOWPVT					1	0.457*
EVIP						1

Note: *Correlation is significant at the 0.03 level (two-tailed); and **correlation is significant at the 0.01 level (two-tailed).

QUEB), and the standard receptive and expressive vocabulary tasks (i.e., the EOWPVT and EVIP) (Table 1). Based on the parent report, the children's ALDeQ score was 0.83 (SD = 0.11), which is comparable to other second language learners of their age (Paradis et al., 2010) and all but one child were above the threshold of 0.66 suggested by Li'el for developmental language disorder. The children had a mean age of exposure to French of 36 months (SD = 16 months), and for 14 of the children the onset to French exposure coincided with entering kindergarten after their fourth birthday. When standardized, the children's vocabulary scores were low, but the raw score showed variability: a mean of 23.9 (SD = 11.38) for receptive vocabulary and 20.9 (SD = 7.7) for expressive vocabulary. Raw scores are used in the analyses as they better capture the range of scores, and because neither task was designed to assess the vocabulary of young emerging bilinguals. To illustrate the challenge faced by clinicians in this context, if these scores were converted to percentile ranks, the children's scores were well below the 'typical' range for monolingual peers: mean of sixth percentile rank (SD = 8) for receptive vocabulary and a 2.5 percentile rank (SD = 2) for expressive vocabulary.

The relationship between these measures and the dynamic assessment task (total naming and identifying scores) were explored through a correlation analysis and summarized in Table 2. Interpretation of the strength of correlations are made using recommendation of Evans (1996), such that $r < 0.20$ indicates a very weak correlation, 0.20–0.39 a weak correlation and 0.40–0.59 a moderate correlation. This more conservative interpretation and conservative alpha cut-off values for significance were applied to protect against Type 1 error due to the smaller sample size. The results indicate very weak correlations between the dynamic assessment task and the ALDeQ or the age of first exposure to French. Weak and very weak correlations were observed between the dynamic assessment task naming score and the French vocabulary tasks. In contrast, the dynamic assessment task identification score was moderately and significantly correlated with both the French expressive ($r = 0.576$) and receptive ($r = 0.475$) vocabulary tasks. Finally, the standard vocabulary tasks were moderately and significantly correlated to one another ($r = 0.457$).

DISCUSSION

This dynamic assessment task provides promise as a tool that can show short term changes in word learning that differentiates skills across bilingual learners, and provides opportunities for clinicians to observe how the cues used in the task support individual children in this learning process. The task provided opportunities for children to reveal their skills from early language learning: cross-linguistic transfer from their first language, fast mapping abilities and embedded learning in a social context. The study focused on three research questions: (1) Was there a difference in accuracy between 'known' words in the second language, and the new words when identifying objects or when naming objects? (2) Will children show fast mapping by learning across time? (3) Will this Dynamic Assessment of Multilingual Children (DAMC) task show a positive correlation with stronger first language abilities, early age of exposure to French or higher vocabulary scores in the second language?

The results for the first question indicated that there was a difference between known words in the second language, and new words in the second language as measured by the identifying and naming accuracy scores. In the first trial, children were significantly more accurate in identifying and naming the known words as compared with new words, thus establishing a baseline on which to compare the learning of new words. These results support our hypothesis that bilingual children may use cross-language transfer to more quickly acquire words in their second language. As noted above, a risk in developing this task for young second language learners was that the known words would not be known by the children. These children had

limited exposure to French and very low scores on standard vocabulary tasks in French. Despite these low scores on this static vocabulary task, the results in the DAMC suggest that children began the task with knowledge of the known words in French (i.e., taxi, banana, kangaroo) as reflected in high accuracy in the naming and identification scores. These words were carefully selected to likely occur in young children's home and school environment, and to likely be a cognate in children's home language. As a result, children may have quickly learned these words by previously transferring knowledge from their first language to the language of school during the first few months of kindergarten, or they may have exhibited a direct transfer of this knowledge from their first language during the dynamic task itself. We turned to the second research question that aimed to explore whether children would show learning over the three trials and to explore our hypothesis that these emerging bilinguals would make use of a second strategy, fast mapping. The children showed fast mapping, and thus early word learning, as evident by significantly higher accuracy in both identification and naming scores at the third trial as compared with the first trial. Because we did not see a significant increase after the second trial, this result suggests that repeated teaching of new words is needed to support the learning of new words, which were not demonstrated until after the third trial. Alternatively, the number of new word targets to assess word learning was limited and perhaps with more targets, a significant increase in accuracy would have been observed. However, the complexity of learning multiple new words in this short time period could also lead to confusion and errors. Overall, these data still show quick learning that occurred during a very brief period of time even though it was not yet significant until after the third trial.

Observing change over time offers the opportunity to observe and differentiate a range of learners from those who struggle to those who excel. For example, the change over time also provides a baseline to use to compare children who seem to be struggling with fast mapping to their peers who could correctly identify new words after the first trial. Throughout the task, we found that the children were active participants in the mediated learning experience. These children also demonstrated quite strong modifiability scores as related to less effort from the examiner and more child responsivity. Despite these strengths, they struggled to generalize their learning to the naming of the new words. These results suggest that the children had begun the process of fast mapping, and as was found in other studies research (e.g., Kapantzoglou et al., 2012; Kan & Kohnert, 2008, 2012), they were stronger in identifying words than in naming words. Due to differences across studies with regards to the number of words included in the fast mapping tasks, the opportunities to name and identify the words, and the tasks themselves (passive exposure versus dynamic), there are not clear indications regarding number of exposures required to achieve high naming and identification scores. However, a meta-analysis of fast-mapping studies in monolingual children with and without DLD showed that monolingual children without DLD outperformed their peers with DLD in identification and that the difference was less marked in production, possibly due to floor effects for both groups (Kan & Windsor, 2010). By observing children's word learning in the DAMC, clinicians and teachers can gain insight regarding the child's word learning process.

Finally, we explored whether children's scores on the DAMC correlated with children's first language development, their age of exposure to French, or their scores from static assessment of vocabulary in the second language. Overall, we were interested in the relationships among the test scores and participant language experience. First, as a group, the children's scores on the parent questionnaire of first language development (i.e., ALDeQ) were comparable to second language learners of English (Paradis et al., 2010), and were above the suggested cut-off for 'typical' development for all but one child (Li'el et al., 2019). While the children in the present study were attending school in French, the alignment with children learning English as a second language suggests commonalities across emerging bilinguals. However, scores on the DAMC showed weak correlations with scores on the ALDeQ, which suggests that these measures capture different information, particularly within a group of children that appear to have typically development. As we move forward and include children with suspected DLD, it is possible that we will observe correlations between the ALDeQ and the DAMC, as we hypothesize that the DAMC captures language processing abilities, likely to be weaker in children with DLD. Second, the age of exposure to French varied with half of the children first exposed to French upon beginning kindergarten, and the remaining children exposed to French in daycare prior to beginning school. We did not find a significant correlation between the DAMC and the age of exposure to French. This result suggests that the scores on DAMC are independent of the exposure to French. We hypothesize that the DAMC provides insight into a child's language processing abilities, which include their fast mapping and cross-language transfer, in a socially embedded context. Third, the children's vocabulary abilities measured in French were quite low, as expected due to their limited exposure to French, with a percentile rank of 6 for receptive vocabulary, and 2.5 for expressive vocabulary. When we explored correlations with the word

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learning task, we observed that the children's identification scores were significantly and positively correlated to the expressive and receptive vocabulary tasks, which suggests the potential of overlap in the underlying constructs across these tasks. We were surprised that the identification scores correlated with both the expressive and receptive vocabulary ability because this finding suggests that even if children have low accuracy in naming items in early second language learning, they are still engaged in learning.

Together these correlations suggest that the DAMC taps into abilities that are somewhat independent of children's first language development and exposure to their second language, but that are related to vocabulary learning. While the speech and language assessment of monolingual children has focused on using tasks that assess a child's language knowledge and their language processing together, bilingual assessments would benefit from assessing language processing separate from language knowledge. The incorporation dynamic assessments, such as the DAMC, in a language processing battery can help identify children with DLD, and provide insight with regards to the child's modifiability.

The results from this study provide immediate applications and potential future applications. First, the dynamic nature of this task provides insight into the child's language learning abilities, and the strategies the child uses when learning new words. For example, teachers and clinicians can gain a better understanding of what cues used in the teaching of the new words supported a child's learning: does the child benefit from added descriptions, or holding and observing the object, or multiple repetitions? They can also learn what remains challenging for the child, such as attending to the task, or incorporating feedback. By observing a child's learning over the three trials, a teacher or clinician could develop more specific strategies to support the child's learning in the classroom. More broadly, teachers and clinicians may be concerned by the very low vocabulary scores on the standardized expressive and receptive assessments; yet, with dynamic assessment, the children's skills can be identified early, which allows teachers and SLTs to provide more specific scaffolding and enhance the learning environment. Furthermore, these results expand the findings of Kapantzoglou et al. (2012) through a language neutral task that crosses languages in addition to Spanish. The DAMC offers efficiency in the assessment process by providing one measure that crosses multiple languages.

Within the DAMC, the social aspects of learning are built into the tasks through play, interactions and feedback and the task contributes to understanding a child's word learning skills; thus, teachers and clinicians may better differentiate children who need more supports from those who need less support to scaffold their learning. Despite very low scores on standard vocabulary tasks in the language of schooling, the DAMC shows that children have strong potential to learn new words, especially when this learning is scaffolded in a mediated learning task. This contrast in performance on static vocabulary task compared to the dynamic task highlights the limitations of using static assessment, particularly of a child's additional language. The next step to take with this task is applying it with multilingual children who have a known communication disorder. This information will provide insight with regards to the extent to which this task can be used to screen for communication disorders in multilingual children with limited proficiency in the language of school. We hypothesize that children with communication disorders who have difficulty with fast mapping, and thus have smaller vocabularies, will score lower on this task.

Limitations

While the DAMC is unlikely to be truly language neutral, we did find a clear difference between known words and new words. Children made use of their knowledge of French through listening to the scripts in French. Multiple repetitions of the scripts, the one-on-one administration, and the interactive nature likely supported their success in completing the task. Since children participated in this study during the Spring of their first year of school, they likely benefited from the exposure to French over the school year. Despite these months of exposure to French, they had very low scores on the standard vocabulary tasks in this language. It is not clear if the DAMC could be used with children earlier in the school year, but future research could shed light on this question. Further limitations are evident by the fact that these children were recruited only in Montreal and do not include children from other geographic locations. They were referred by their teachers, who may have held certain biases in their reasoning for referral for the study. It is also possible, that although the participants were not identified as having a communication disorder, that some may in fact have exhibited an unidentified communication disorder. Future studies may address these participant issues by expanding the geographic recruitment and including children who are receiving SLT. Dynamic assessment offers many benefits, however, there are also limitations within the administration process. For example, the task may take more time to administer and thus be challenging to incorporate in a battery of language assessments. Within the context of assessing multilingual children, however, there is a clear need to move away from standardized monolingual tasks to tasks that focus on language processing (Campbell et al., 1997),

such as the DAMC. Finally, dynamic assessment may be more challenging for clinicians to ensure that children are engaged in the assessment and it is dependent on the clinician's skill. However, the limitations are outweighed by the benefits of knowledge gained both with regards to the child's score, and also the knowledge gained regarding what cues support the child's learning. Future studies could consider a larger sample now that the task has been developed with a broader range of language backgrounds and across different degrees of bilingualism and language experience.

CONCLUSIONS

The DAMC fits within a new set of tasks that are designed to be used across languages and focus on children's language processing rather than their accumulated knowledge of a language. This is a task that takes into consideration the diverse language backgrounds of children within a school setting. Children who begin kindergarten with limited proficiency in the language of school face a sheer rock face, while their language proficient peers are quickly making gains. For these children, their climb has few toeholds and no clear path. Research has found that these emerging bilinguals can make use of three strategies to support their early second language learning: transfer from the first language, fast mapping, and the social context for language use. The present study explored the design of the DAMC, a new task that builds on these three skills to assess word learning. The 26 children in this study came from 13 different language backgrounds, and many of these languages have few assessment resources. The results of the study showed that we could document early word learning using this task, and that it provided insight into the processes that support children's learning. The DAMC has the potential to become a measure that can be used quickly and readily to contribute to identifying children's language learning needs, including additional supports. By integrating tasks that focus on language processing, as dynamic word learning, clinicians would be better equipped to support children from diverse language backgrounds.

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DATA AVAILABILITY STATEMENT

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data are not available.

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APPENDIX A

List of languages spoken by children in the study, the script and IPA for the three known words.

Language	banana		kangaroo		taxi	
	Script	IPA	Script	IPA	Script	IPA
Arabic	موز	/muzən/	كنغر	/kanghar/	تاكسي	/taksi/
Bengali	কলা	/kala/	ক্যাঙ্গারু	/kyangaru/	ট্যাক্সি	/tyaksi/
English	banana	/banana/	kangaroo	/kagaru/	taxi	/tæksi/
French	banane	/banan/	kangorou	/kãgoʁu/	taxi	/taksi/
Gujarati	કેળા	/kela/	કાંગારુ	/kangaru/	ટેક્સી	/teksi/
Hungarian	banán	/bʌnan/	kenguru	/kɛnguru/	taxi	/tɑksi/
Ilocano*	--	--	--	--	--	--
Panjabi	ਕੇਲਾ	/kela/	ਕੰਗਰੂ	/kagaru/	ਟੈਕਸੀ	/taikasi/
Pashtoo**	کیله	--	صحرايي	--	ټیکسي	--
Urdu	کیلا	/pila/	کنگارو	/kengaru/	ٹیکسی	/teksi/
Spanish	plátano	/platano/	canguro	/kanguro/	taxi	/taksi/
Tamil	வாழை	/valai/	கங்காரு	/kankaru/	டாக்சி	/tāksi/

APPENDIX B

DMINT Script—English-language version

The goal of this task is to teach the child 3 new words. Teaching is done in the context of play. The play sequence is done 3 times in a row.

**While working on the first familiar words, the examiner instructs the child to remember names of objects by commenting, for example, 'yes, taxi, just like that! Keep naming objects'.*

**In the script, there are boxes to check mark. Check the box that corresponds to the child's response. There is one box per sequence.*

To begin

Examiner: 'We are now going to play and learn new words. Try to remember the names of objects. This is like remembering the name of things you have at home. What kinds of things do you have at home? Do you have toys? What toys do you have? (If the child does not name objects, say, 'do you have toy cars? dolls?') You know their names! (Repeat some of the toys the child mentioned and say, 'these are the names of your toys').

Examiner: 'Let's look at these toys. Can you show me…

The banana?

The taxi?

The kangaroo?

The lita? /lita/

The naki? /naki/

The sibo? /sibo/'

Examiner: 'Now, I want you to remember the names of the things that we're going to see here. We are going to play and I will help you. Do your best. When we are finished, you can pick a sticker.'

It's Lucy's birthday! Her friend, Sammy, is coming to visit her and bring her gifts.

GO TO SCRIPTS: Banana, etc.
Script - banana
Knock, knock, knock!
Lucy: Who is it?
Sammy: It's Sammy!
Examiner: Sammy brought a BANANA! What is that?

Correct response	Incorrect response
Child : BANANA □ □ □ Yes, it's a BANANA!	_____ It's a BANANA. What is it? Child : BANANA □ □ □ Yes, it's a BANANA! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy wants you to look at her gift.

Lucy: 'Look at my BANANA!' Give the object to the child and let him/her hold the object for 5 seconds.

Examiner: Give Lucy the BANANA.

Lucy: 'Thank you!'

Examiner: What is that?

Correct response	Incorrect response
Child : BANANA □ □ □ Yes, it's a BANANA!	_____ It's a BANANA. What is it? Child : BANANA □ □ □ Yes, it's a BANANA! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy really likes the BANANA. We can eat BANANAS. They are yellow. The BANANA tastes good! Lucy can make a cake with it.

Examiner: What is that?

Correct response	Incorrect response
Child : BANANA □ □ □ Yes, it's a BANANA!	_____ It's a BANANA. What is it? Child : BANANA □ □ □ Yes, it's a BANANA! If the child responds incorrectly again, move on to the next item (without feedback).

Sammy: I brought you more gifts!

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Lucy: Oh! I'm so excited!

Script - kangaroo

Examiner: Sammy brought a KANGAROO! What is that?

Correct response	Incorrect response
Child: KANGAROO □ □ □ Yes, it's a KANGAROO!	_____ It's a KANGAROO. What is it? Child: KANGAROO □ □ □ Yes, it's a KANGAROO! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy wants you to look at her gift.

Lucy: 'Look at my KANGAROO!' Give the object to the child and let him/her hold the object for 5 seconds.

Examiner: Give Lucy the KANGAROO.

Lucy: 'Thank you!'

Examiner: What is that?

Correct response	Incorrect response
Child: KANGAROO □ □ □ Yes, it's a KANGAROO!	_____ It's a KANGAROO. What is it? Child: KANGAROO □ □ □ Yes, it's a KANGAROO! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy really likes the KANGAROO. The KANGAROO is an animal. It is soft! The KANGAROO jumps high! Lucy can touch it.

Examiner: What is that?

Correct response	Incorrect response
Child: KANGAROO □ □ □ Yes, it's a KANGAROO!	_____ It's a KANGAROO. What is it? Child: KANGAROO □ □ □ Yes, it's a KANGAROO! If the child responds incorrectly again, move on to the next item (without feedback).

Script - naki

Examiner: Sammy brought a NAKI! What is that?

Correct response	Incorrect response
Child: NAKI □ □ □ Yes, it's a NAKI!	_____ It's a NAKI. What is it? Child: NAKI □ □ □ Yes, it's a NAKI! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy wants you to look at her gift.

Lucy: 'Look at my NAKI!' Give the object to the child and let him/her hold the object for 5 seconds.

Examiner: Give Lucy the NAKI.

Lucy: 'Thank you!'

Examiner: What is that?

Correct response	Incorrect response
Child: NAKI □ □ □ Yes, it's a NAKI!	_____ It's a NAKI. What is it? Child: NAKI □ □ □ Yes, it's a NAKI! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy really likes the NAKI. We can eat a NAKI. It is green. The NAKI tastes good! Lucy can make soup with it.

Examiner: What is that?

Correct response	Incorrect response
Child: NAKI □ □ □ Yes, it's a NAKI!	_____ It's a NAKI. What is it? Child: NAKI □ □ □ Yes, it's a NAKI! If the child responds incorrectly again, move on to the next item (without feedback).

Script—sibo

Examiner: Sammy brought a SIBO! What is that?

Correct response	Incorrect response
Child: SIBO □ □ □ Yes, it's a SIBO!	_____ It's a SIBO. What is it? Child: SIBO □ □ □ Yes, it's a SIBO! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy wants you to look at her gift.

Lucy: 'Look at my SIBO!' Give the object to the child and let him/her hold the object for 5 seconds.

Examiner: Give Lucy the SIBO.

Lucy: 'Thank you!'

Examiner: What is that?

Correct response	Incorrect response
Child: SIBO □ □ □ Yes, it's a SIBO!	_____ It's a SIBO. What is it? Child: SIBO □ □ □ Yes, it's a SIBO! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy really likes the SIBO. The SIBO is an animal. It is purple! The SIBO is very small! Lucy can touch it.

Examiner: What is that?

Correct response	Incorrect response
Child: SIBO □ □ □ Yes, it's a SIBO!	_____ It's a SIBO. What is it? Child: SIBO □ □ □ Yes, it's a SIBO! If the child responds incorrectly again, move on to the next item (without feedback).

Script - taxi

Examiner: Sammy brought a TAXI! What is that?

Correct response	Incorrect response
Child: TAXI □ □ □ Yes, it's a TAXI!	_____ It's a TAXI. What is it? Child: TAXI □ □ □ Yes, it's a TAXI! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy wants you to look at her gift.

Lucy: 'Look at my TAXI!' Give the object to the child and let him/her hold the object for 5 seconds.

Examiner: Give Lucy the TAXI.

Lucy: 'Thank you!'

Examiner: What is that?

Correct response	Incorrect response
Child: TAXI □ □ □ Yes, it's a TAXI!	_____ It's a TAXI. What is it? Child: TAXI □ □ □ Yes, it's a TAXI! If the child responds incorrectly again, move on to the next item (without feedback).

Examiner: Lucy really likes the TAXI. The TAXI is a toy. It is yellow! The TAXI goes fast! Lucy can touch it.

Examiner: What is that?

Correct response	Incorrect response
Child: TAXI □ □ □ Yes, it's a TAXI!	_____ It's a TAXI. What is it? Child: TAXI □ □ □ Yes, it's a TAXI! If the child responds incorrectly again, move on to the next item (without feedback).

Script - lita

Examiner: Sammy brought a LITA! What is that?

Correct response	Incorrect response
Child: LITA □ □ □ Yes, it's a LITA!	_____ It's a LITA. What is it? Child: LITA □ □ □ Yes, it's a LITA! If the child responds incorrectly again, move on to the next item (without feedback)

Examiner: Lucy wants you to look at her gift.

Lucy: 'Look at my LITA!' Give the object to the child and let him/her hold the object for 5 seconds.

Examiner: Give Lucy the LITA.

Lucy: 'Thank you!'

Examiner: What is that?

Correct response	Incorrect response
Child: LITA ☐ ☐ ☐ Yes, it's a LITA!	_____ It's a LITA. What is it? Child: LITA ☐ ☐ ☐ Yes, it's a LITA! If the child responds incorrectly again, move on to the next item (without feedback)

Examiner: Lucy really likes the LITA. The LITA is a toy. It's red! The LITA is sticky! Lucy can touch it.

Examiner: What is that?

Correct response	Incorrect response
Child: LITA ☐ ☐ ☐ Yes, it's a LITA!	_____ It's a LITA. What is it? Child: LITA ☐ ☐ ☐ Yes, it's a LITA! If the child responds incorrectly again, move on to the next item (without feedback)

Place the 6 objects in the same order they were previously presented in front of the child.

Ask the child to name the toys.

Examiner: 'Lucy is lucky, she received many gifts! Do you remember their names? Try to tell me their names!'

☐ A banana	☐ A kangaroo	☐ A naki	☐ A sibo	☐ A taxi	☐ A lita
☐ A banana	☐ A kangaroo	☐ A naki	☐ A sibo	☐ A taxi	☐ A lita
☐ A banana	☐ A kangaroo	☐ A naki	☐ A sibo	☐ A taxi	☐ A lita

Examiner: Good job! Now, I'm going to tell you names. I need you to point or show me which toy it is (place the objects in the same order they were previously presented in front of the child).

Child points when the examiner names objects.

☐ A naki	☐ A taxi	☐ A banana	☐ A sibo	☐ A lita	☐ A kangaroo
☐ A naki	☐ A taxi	☐ A banana	☐ A sibo	☐ A lita	☐ A kangaroo
☐ A naki	☐ A taxi	☐ A banana	☐ A sibo	☐ A lita	☐ A kangaroo

Examiner: 'WOW! Good work! You are doing great and learning lots of new words! To learn them well, we're going to play this game again (one more time). Remember that you have to pay attention to the names of Lucy's gifts.'

DMINT Script—French-language version

Le but de cette tâche est d'apprendre à l'enfant 3 nouveaux mots. L'apprentissage se fait en contexte de jeu. La séquence du jeu est faite 3 fois : donc « 3 séquences » (on fait le jeu de la fête 3 fois de suite).

** Tout en travaillant sur les deux premiers mots familiers, l'examinateur a souligné aux enfants de se souvenir des noms des objets en donnant des commentaires en disant par exemple « oui, taxi, comme ça, continue à me donner les noms des objets ».*

** Dans le script vous avez des boites à cocher : cochez la boite qui correspond à la réponse de l'enfant. Il y a une boite par séquence.*

Pour commencer

Examinateur : « Maintenant, on va jouer et apprendre de nouveaux mots. Essaye de te souvenir des noms des choses. De la même manière qu'on se souvient des noms des choses que tu as à la maison. Quels types de choses as-tu à la maison? As-tu des jouets? Quels jouets as-tu? (Si l'enfant ne nomme pas d'objets, dites: 'As-tu des voitures? Poupées?') Tu connais leurs noms! (Répétez certains des jouets que l'enfant a mentionnés et dites: 'Ce sont les noms de vos jouets.') »

Examinateur : « Est-ce que tu peux me montrer…

La banane?
Le taxi?
La lita? /lita/
Le kangourou?
Le naki? /naki/
Le sibo? /sibo/ »

Examinateur : « Maintenant, j'aimerais que tu te souviennes des noms des choses qu'on va voir ici. On va jouer et je vais t'aider. Fais de ton mieux. Lorsqu'on a terminé, tu peux choisir un collant. »

C'est la fête de Lucie! Et son amie, Sammie, vient la visiter avec des cadeaux!
ALLEZ AU SCRIPT—Banane, etc…

Script-une banane
Toc-toc-toc. .
Lucie : « C'est qui? »

Sammie : « C'est Sammie! »

Examinateur : « Sammie a apporté une BANANE! C'est quoi ça? »

Bonne réponse	Erreur _____
Enfant : BANANE □ □ □ Oui, c'est une BANANE!	C'est une BANANE. C'est quoi? Enfant : BANANE □ □ □ Oui, c'est une BANANE! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur : « Lucie veut que tu regardes son cadeau. »

Lucie : « Regarde ma BANANE! » et donne l'objet à l'enfant pour que l'enfant le tienne durant 5 secondes.
Examinateur : « Donne la BANANE à Lucie. »

Lucie : « Merci! »

Examinateur : « C'est quoi ça? »

Bonne réponse	Erreur _____
Enfant : BANANE □ □ □ Oui, c'est une BANANE!	C'est une banane. C'est quoi? Enfant : BANANE □ □ □ Oui, c'est une BANANE! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur: « Lucie aime bien la BANANE. On peut manger la BANANE. Elle est jaune. La BANANE goûte bon! Lucie peut faire un gâteau avec la banane. »

Examinateur : « C'est quoi ça? »

Bonne réponse	Erreur _____
Enfant : BANANE □ □ □ Oui, c'est une BANANE!	C'est une BANANE. C'est quoi? Enfant : BANANE □ □ □ Oui, c'est une BANANE! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Sammie : « Je t'ai aussi apporté d'autres cadeaux! »

Lucie : « Oh! J'ai trop hâte! »

Script-un kangourou
Examinateur : « Sammie a apporté un KANGOUROU! C'est quoi ça? »

Bonne réponse	Erreur _____
Enfant : KANGOUROU□ □ □ Oui, c'est un KANGOUROU!	C'est un KANGOUROU. C'est quoi? Enfant : KANGOUROU □ □ □ Oui, c'est un KANGOUROU! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur : « Lucie veut que tu regardes son cadeau. »

Lucie : « Regarde mon KANGOUROU! » et donne l'objet à l'enfant pour que l'enfant le tienne durant 5 secondes.
Examinateur : « Donne le KANGOUROU à Lucie. »

Examinateur : « C'est quoi ça? »

Bonne réponse Enfant : KANGOUROU ☐ ☐ ☐ Oui, c'est un KANGOUROU!	Erreur _____ C'est un KANGOUROU. C'est quoi? Enfant : KANGOUROU ☐ ☐ ☐ Oui, c'est un KANGOUROU! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur: « Lucie aime bien le KANGOUROU. Le KANGOUROU est un animal. Il est doux! Le KANGOUROU saute haut! Lucie peut le toucher. »

Examinateur : C'est quoi ça?

Bonne réponse Enfant : KANGOUROU Oui, c'est un KANGOUROU!	Erreur _____ C'est un KANGOUROU. C'est quoi? Enfant : KANGOUROU ☐ ☐ ☐ Oui, c'est un KANGOUROU! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Script- le naki
Examinateur : « Sammie a apporté un NAKI! C'est quoi ça? »

Bonne réponse Enfant : NAKI ☐ ☐ ☐ Oui, c'est un NAKI!	Erreur _____ C'est un NAKI. C'est quoi? Enfant : NAKI ☐ ☐ ☐ Oui, c'est un NAKI! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur : « Lucie veut que tu regardes son cadeau. »

Lucie : « Regarde mon NAKI! » et donne l'objet à l'enfant pour que l'enfant le tienne durant 5 secondes.
Examinateur : « Donne le NAKI à Lucie. »

Examinateur : « C'est quoi ça? »

Bonne réponse Enfant : NAKI ☐ ☐ ☐ Oui, c'est un NAKI!	Erreur _____ C'est un NAKI. C'est quoi? Enfant : NAKI ☐ ☐ ☐ Oui, c'est un NAKI! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur: Lucie aime bien le NAKI. On peut manger le NAKI. Il est vert. Le NAKI goûte bon! Lucie peut faire une soupe avec le NAKI.
Examinateur : C'est quoi ça?

Bonne réponse Enfant : NAKI □ □ □ Oui, c'est un NAKI!	Erreur _____ C'est un NAKI. C'est quoi? Enfant : NAKI □ □ □ Oui, c'est un NAKI! Si l'enfant fait encore erreur, passez au prochain (pas de rétroaction).

Script- un sibo
Examinateur : « Sammie a apporté un SIBO! C'est quoi ça? »

Bonne réponse Enfant : SIBO □ □ □ Oui, c'est un SIBO!	Erreur _____ C'est un SIBO. C'est quoi? Enfant : SIBO □ □ □ Oui, c'est un SIBO! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur : « Lucie veut que tu regardes son cadeau. »

Lucie : « Regarde mon SIBO! » et donne l'objet à l'enfant pour que l'enfant le tienne durant 5 secondes.
Examinateur : « Donne le SIBO à Lucie. »

Examinateur : « C'est quoi ça? »

Bonne réponse Enfant : SIBO □ □ □ Oui, c'est un SIBO!	Erreur _____ C'est un SIBO. C'est quoi? Enfant : SIBO □ □ □ Oui, c'est un SIBO! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur: « Lucie aime bien le SIBO. Le SIBO est un animal. Il est mauve! Le SIBO est tout petit! Lucie peut le toucher. »

Examinateur : C'est quoi ça?

Bonne réponse Enfant : SIBO □ □ □ Oui, c'est un SIBO!	Erreur _____ C'est un SIBO. C'est quoi? Enfant : SIBO □ □ □ Oui, c'est un SIBO! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Script- le taxi
Examinateur : « Sammie a apporté un TAXI! C'est quoi ça? »

Bonne réponse Enfant : TAXI □ □ □ Oui, c'est un TAXI!	Erreur _____ C'est un TAXI. C'est quoi? Enfant : TAXI □ □ □ Oui, c'est un TAXI! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur : « Lucie veut que tu regardes son cadeau. »

Lucie : « Regarde mon TAXI! » et donne l'objet à l'enfant pour que l'enfant le tienne durant 5 secondes.
Examinateur : « Donne le TAXI à Lucie. »

Examinateur : « C'est quoi ça? »

Bonne réponse Enfant : TAXI □ □ □ Oui, c'est un TAXI!	Erreur _____ C'est un TAXI. C'est quoi? Enfant : TAXI □ □ □ Oui, c'est un TAXI! Si l'enfant fait encore erreur, passez au prochain (pas de rétroaction).

Examinateur: « Lucie aime bien le TAXI. Le TAXI est un jouet. Il est jaune! Le TAXI va vite! Lucie peut le toucher. »

Examinateur : « C'est quoi ça? »

Bonne réponse Enfant : TAXI □ □ □ Oui, c'est un TAXI!	Erreur _____ C'est un TAXI. C'est quoi? Enfant : TAXI □ □ □ Oui, c'est un TAXI! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Script-une lita
Examinateur : « Sammie a apporté une LITA! C'est quoi ça? »

Bonne réponse Enfant : LITA □ □ □ Oui, c'est une LITA!	Erreur _____ C'est une LITA. C'est quoi? Enfant : LITA □ □ □ Oui, c'est une LITA! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur : « Lucie veut que tu regardes son cadeau. »

Lucie : « Regarde ma LITA! » et donne l'objet à l'enfant pour que l'enfant le tienne durant 5 secondes.
Examinateur : « Donne la LITA à Lucie. »

Examinateur : « C'est quoi ça? »

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Bonne réponse Enfant : LITA ☐ ☐ ☐ Oui, c'est une LITA!	Erreur _____ C'est une LITA. C'est quoi? Enfant : LITA ☐ ☐ ☐ Oui, c'est une LITA! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Examinateur: « Lucie aime bien la LITA. La LITA est un jouet. C'est rouge! La LITA colle! Lucie peut la toucher. »
Examinateur : C'est quoi ça?

Bonne réponse Enfant : LITA ☐ ☐ ☐ Oui, c'est une LITA!	Erreur _____ C'est une LITA. C'est quoi? Enfant: LITA ☐ ☐ ☐ Oui, c'est une LITA! Si l'enfant fait encore une erreur, passez au prochain (pas de rétroaction).

Placez les 6 objets dans l'ordre qu'ils aient été présentés précédemment devant l'enfant.
Demandez à l'enfant de nommer les jouets.
Examinateur : « Lucie est chanceuse, elle a reçu beaucoup de cadeaux! Est-ce que tu te rappelles leurs noms? Essaie de me dire leurs noms! »

☐ une banane	☐ un kangourou	☐ un naki	☐ un sibo	☐ un taxi	☐ une lita
☐ une banane	☐ un kangourou	☐ un naki	☐ un sibo	☐ un taxi	☐ une lita
☐ une banane	☐ un kangourou	☐ un naki	☐ un sibo	☐ un taxi	☐ une lita

Examinateur : « Bravo! Maintenant je vais te dire les noms et tu me montres avec ton doigt! (mettre les jouets dans la séquence qu'ils aient été présentés). »
Enfant pointe lorsque l'examinateur nomme l'objet.

☐ un naki	☐ un taxi	☐ une banane	☐ un sibo	☐ une lita	☐ un kangourou
☐ un naki	☐ un taxi	☐ une banane	☐ un sibo	☐ une lita	☐ un kangourou
☐ un naki	☐ un taxi	☐ une banane	☐ un sibo	☐ une lita	☐ un kangourou

Examinateur: « WOW! Super! Tu te débrouilles très bien! Tu apprends des nouveaux mots! Pour bien les apprendre, on va jouer à ce jeu encore (une dernière fois). N'oublie pas, tu dois faire attention aux noms des cadeaux. »