Is there a 'universal' core? Using semantic primes to select vocabulary across languages in AAC

Gloria Soto [a],* and Kerstin Tönsing[b]

[a] Department of Speech, Language and Hearing Sciences, and Department of Special Education, San Francisco State University, San Francisco, CA, United States;
[b] Centre for Augmentative and Alternative Communication, University of Pretoria, Pretoria, South Africa

*CONTACT Gloria Soto. Department of Speech, Language and Hearing Sciences, SFSU, 1600 Holloway Av., San Francisco,CA, United States. Email: gsoto@sfsu.edu

Abstract

Core vocabulary lists and vocabulary inventories vary according to language. Lists from one language cannot and should not be assumed to be translatable, as words represent language-specific concepts and grammar. In this manuscript, we (a) present the results of a vocabulary overlap analysis between different published core vocabulary lists in English, Korean, Spanish, and Sepedi; (b) discuss the concept of universal semantic primes as a set of universal concepts that are posited to be language-independent; and (c) provide a list of common words shared across all four languages as exemplars of their semantic primes. The resulting common core words and their corresponding semantic primes can assist families and professionals in thinking about the initial steps in the development of AAC systems for their bilingual/multilingual clients.

Keywords: Bilingual AAC; core vocabulary; semantic primes; vocabulary selection

Vocabulary learning is the cornerstone of language acquisition and plays a central role in other language-related skills such as learning to read (Hiebert & Kamil, 2005). Children with typical development learn new words rapidly throughout childhood – often without much direct instruction (e.g., Bloom, 2002). Vocabulary continues to develop throughout life – unlike other language domains (e.g., syntax, morphology) that are mostly fully developed by adulthood. Vocabulary is typically acquired through everyday interactions mediated by linguistically and socially more competent partners (e.g., Tomasello & Bates, 2001); however, children who are unable to spell and require augmentative and alternative communication (AAC) to express themselves must rely on others to give them access to relevant words in order to communicate their ideas (Bean et al., 2019; Beukelman & Light, 2020).

AAC professionals, often in collaboration with caregivers, are left with the critical task of identifying which words, from among the thousands of words that a child will need in their lifetime, should be included in their AAC system. They also need to decide how best to arrange those words on a board or across the pages of a speech generating device in order to be maximally usable (Beukelman et al., 1991). While resources and training around vocabulary selection have been developed over the years, it remains a complex process and an area of concern for persons who require AAC and their support team (Bean et al., 2019; Beukelman & Light, 2020). Among the issues that are persistent in discussions around vocabulary selection in AAC are (a) the vocabulary needs of different learners across different contexts and tasks

(e.g., Balandin & Iacono, 1999; Crestani et al., 2010), and (b) the number (e.g., Fried-Oken & More, 1992) and the particular words that should be taught initially (e.g., Laubscher & Light, 2020).

Vocabulary selection frameworks

What vocabulary to target in a comprehensive and balanced approach to language development has been the focus of much debate in the field of AAC over the last three decades (e.g., Beukelman et al., 1991; Fallon et al., 2001; Francis, 1990; Fried-Oken et al., 1992; Laubscher & Light, 2020). Different frameworks and approaches have been suggested to aid in the selection of vocabulary for children in need of AAC who are in the beginning stages of receptive and expressive language development (Bean et al., 2019). A functional approach to vocabulary selection emphasizes essential, individualized, and context-bound vocabulary that an individual needs to meet their specific communication demands (e.g., Whitton, 1995; Yorkston et al., 1988). A socio-cultural approach emphasizes the selection of vocabulary that would allow an individual to develop family and community affiliation and develop a sense of belonging and identity (Frick et al., 2022; Soto & Yu, 2014; Wofford et al., 2022). A developmental framework highlights the importance of selecting vocabulary that is aligned with the developmental stage of the learner and can serve as the foundation of further language development and subsequent academic achievement (e.g., Bracken & Crawford, 2010; Laubscher & Light, 2020; Semmler et al., 2023). A cognitive approach recognizes the impact of language on further cognitive and conceptual development (e.g., McCarthy et al., 2017). According to this approach, children who use AAC need vocabulary to express and comprehend cognitive activities, such as comparing, describing, evaluating, measuring, and categorizing (Cooper et al., 2023). These activities are essential to learn, reason, and discuss complex ideas.

A popular approach for vocabulary selection is based on frequency of word use. Borrowing from the fields of foreign language teaching (West, 1937) and applied linguistics (e.g., Brezina & Gablasova, 2015; Carter, 1987), AAC researchers have too compiled lists of 200-400 words that are frequently used in different contexts (e.g., preschool, school, workplace), modalities (e.g., written, spoken language), and by different aged speakers (e.g., Yorkston et al., 1988). These vocabulary lists are typically arranged in order of descending frequency and primarily consist of verbs and closed class words such as pronouns, auxiliary verbs, prepositions, determiners, and conjunctions that are presumed to 'equip learners with a survival kit of core words that could be used in virtually any situation…' (McCarthy, 1990, p. 49).

Although clinicians from various countries report to incorporate core vocabulary into AAC systems (Dada et al., 2017; Murray et al., 2019; Thistle & Wilkinson, 2015), the appropriateness of teaching core vocabulary to children who are at the beginning stages of language development has been recently called to question (see Laubscher & Light, 2020; Semmler et al., 2023). These authors have noted that the vocabularies of beginning communicators are typically much more noun-heavy than core word lists are. Frequency of use should not be the only criterion to establish the importance or usefulness of a word for an AAC system. McCarthy et al. (2017), for example, noted that many basic concepts that are important in preschool classrooms are not found in core vocabulary lists. Furthermore, differences in core vocabulary lists have also been noted across ages, settings and languages.

Core vocabulary across languages

Core vocabulary lists are not the same across languages (e.g., Lonsdale & Le Bras, 2009; Sharoff et al., 2014). Reasons for this include the semantic and syntactic differences between languages, as well as differences in the order of acquisition of different linguistic structures. Words in a specific language often represent the core values of the culture to which this language belongs, and some words are hardly translatable at all (Wierzbicka, 1985). Syntactically, languages differ in the way function words are used to express meaning. For example, pronouns are often necessary in English to designate the subject of a sentence, whereas this is not the case in other languages such as Spanish, Japanese, or Sepedi. Developmentally, the vocabulary used by young children differs across languages (e.g., Bornstein et al., 2004), and across variations of the same language (e.g., Díaz et al., 2011; Mariscal et al., 2007). Words frequently used by children in one language may have no translation equivalent or be developmentally inappropriate in another language. Function words such as pronouns, copulas, and auxiliary verbs may be acquired in a different sequence due to variations in grammatical structure in different language typologies (Bornstein et al., 2004; Łuniewska et al., 2016).

In recognition of the language-specific nature of core vocabulary and to address language diversity in the field of AAC, an increasing number of core vocabulary lists has been published recently, including Afrikaans (Hattingh & Tönsing, 2020), English for speakers of English as a second language (e.g., Boenisch & Soto, 2015), French Canadian (Robillard et al., 2014), German (e.g., Boenisch & Sachse, 2007), Hebrew (Savaldi-Harussi & Uziel, 2023), Korean (e.g., Kim & Han, 2016; Shin & Hill, 2016), Malay (Onwi, 2014), Mandarin (e.g., Liu & Sloane, 2006; Tsai, 2023), Sepedi (Mothapo et al., 2021), Urdu (Mukati, 2013), Yolŋu (Amery et al., 2023) and Zulu (Mngomezulu et al., 2019).

Vocabulary selection for the bilingual/multilingual child

Millions of children in the world who use or would benefit from using AAC are growing up in environments where more than one language is frequently spoken (see King & Soto, 2022; Tönsing & Soto, 2020). Vocabulary selection and instruction for the bilingual/multilingual child with AAC needs is arguably even more complex than for a monolingual child, as the number and choice of words for two or more languages must be considered (see Tönsing & Soto, 2020). Language is one of the most essential tools through which individuals are socialized into their cultures, and not having access to a bilingual system may further socially isolate our bilingual clients, create identity conflicts, and increase their sense of being different (Soto & King, 2022) Tönsing and Soto argued that vocabulary selection for a multilingual child should consider the way the individual uses their languages in the different contexts where they participate, as well as the lexical and grammatical structures necessary to do so. Careful consideration should also be given to the situations where code-switching and other translanguaging practices may be preferred, encouraged, and modeled (King & Soto, 2022). Professionals in the field of AAC need access to information and resources that would allow them to support all of their clients regardless of race/ethnicity and language background.

The AAC field is not alone in its interest in core vocabulary and its relevance to language learning and multilingualism (e.g., Levisen & Aragón, 2017; Youn et al., 2016). Attempts to define a core vocabulary for foreign language instruction can be traced back to the beginning of the 20th century (see Nava & Pedrazzini, 2012). In 2007, Goddard and Wierzbicka proposed that semantic primes should be selected and taught as a universal core vocabulary to teach

language to multilingual learners with typical development. According to them, semantic primes (aka conceptual primes) include a set of fundamental and universal concepts such as 'good' and 'bad'; 'true:, 'do', that are lexically encoded in every language of the world. Goddard and Wierzbicka argue that semantic primes can act as a universal core vocabulary and help learners make connections between concepts in two or more languages. The reasons behind their proposal are that semantic primes are (a) simple in meanings, (b) highly frequent, and (c) can be combined to explain more difficult concepts (Goddard & Wierzbicka, 2007; Wierzbicka, 2005). Moreover, there are only 63 semantic primes, which is a relatively small number of concepts, grouped in 16 categories (i.e., substantives; determiners; quantifiers; evaluators; descriptors; mental predicates; speech; actions, events and movement; existence and possession; life and death; time; space; logical concepts; intensifier, augmentor; taxonomy, partonomy; and similarity) (Goddard, 2012). An extensive body of cross-linguistic investigation led by Anna Wierzbicka and her colleagues confirms that these semantic primes have linguistic representation in most languages (for extensive review see Goddard, 2001, 2011; Goddard & Wierzbicka, 1994, 2007, 2014; Wierzbicka, 1972, 1984, 1985, 1996,2005, 2020; Youn et al., 2016).

Current study

Many children who need AAC are growing up in bilingual or multilingual communities (Tönsing & Soto, 2020). While bilingualism is the norm in many parts of the world, the AAC field does not reflect this fact in research or practice, and AAC services continue to be delivered mainly in the dominant language. Despite an increased awareness of the need to support and affirm the home language and culture of our bilingual clients (e.g., Soto & Yu, 2014), there is a paucity of resources to do so. In a recent survey of speech-language therapists serving bilingual children with AAC needs in the US (Ward et al., in press), respondents agreed with the statement that bilingual children who use AAC should be provided with bilingual services, yet they did not include their clients' home language in their practice. When asked about the reasons for this disconnect between beliefs and practices, respondents mentioned the lack of available resources as the main reason to provide services in English only (Ward et al., 2023).

Given the growing number of bilingual users of AAC and an increased focus on culturally and linguistically responsive intervention (King & Soto, 2022; Soto & Yu, 2014; Tönsing & Soto, 2020), it is imperative to provide professionals with resources and guidance to adequately meet the vocabulary needs of their bilingual and multilingual clients. The lack of resources for vocabulary selection may lead professionals working with bilingual clients to resort to practices that are neither linguistically nor developmentally sound (Ward et al., 2023). In their desire to meet the vocabulary needs of a bilingual child who uses AAC, professionals may, for instance, translate a core vocabulary board from English into another language, and attach two different glosses (one in each language) to the same picture symbol (e.g., Uys & Harty, 2007). This approach could be problematic as it assumes semantic and developmental equivalence between the two words, which may not always be the case (Slobin, 1985; Wierzbicka, 1985, 2004); however, there is limited literature on alternative and more defensible approaches of selecting vocabulary for bilingual and multilingual children. It is for this reason that semantic primes and their possible application to vocabulary selection across languages are discussed in this paper.

The ultimate purpose of this article is twofold: (a) to further the discussion in the field of AAC around issues of vocabulary selection for the bilingual and multilingual child; and (b) to provide some guidance for initial vocabulary selection for the bilingual child, especially in

situations when professionals and caregivers do not have access to readily available resources. To address these two aims we analyzed (a) the overlap between published English core vocabulary lists for children at the earlier stages of language development with lists from three other languages from different language families, namely Spanish, Korean, and Sepedi; and (b) whether the resulting list of overlapping words related to the semantic primes identified by Wierzbicka and her colleagues (Wierzbicka, 1985).

Method

Research design

The study used a descriptive qualitative comparative analysis design (Onwuegbuzie & Weinbaum, 2017) to (a) examine the overlap between published core vocabulary lists in English, Korean, Sepedi, and Spanish; and (b) compare the resulting list of overlapping words with a published list of semantic primes.

Procedures

Search methods and inclusion criteria

This study focused on four languages: English, Korean, Sepedi, and Spanish. We chose these four languages because they belong to four distinct language typologies: English (West Germanic), Korean (Koreanic), Sepedi (Niger-Congo), Spanish (Romance), and the authors had been directly or indirectly involved in the development of the Korean, Sepedi, and Spanish lists.

Six databases – PsychInfo, Educational Resources Information Center (ERIC), Linguistics and Language Behavior Abstracts (LLBA), JSTOR, PubMed, GoogleScholar – were searched using the following search terms: (a) 'core vocabulary' ('core vocabulary' OR 'core words'), (b) 'AAC' ('AAC' OR 'Augmentative and Alternative Communication'), and (c) 'Korean', 'English', 'Sepedi,' and 'Spanish.'

Core word lists in those languages were included in this study if they met the following criteria: (a) were published in a peer review journal, and (b) were developed for the purpose of assisting with vocabulary selection for children who use AAC who are 5 years of age or younger.

Core vocabulary lists

Eight core vocabulary lists met the inclusion criteria: Five in English (Banajee et al., 2003; Beukelman et al., 1989; Fried-Oken & More, 1992; Marvin et al., 1994; Trembath et al., 2007), one in Korean (Kim & Han, 2016), one in Sepedi (Mothapo et al., 2021), and one in Spanish (Soto & Cooper, 2021).

All of the lists varied with respect to their length: Seven had over 200 words: Marvin et al. (1994; $n = 332$); Trembath et al. (2007; $n = 263$); Beukelman et al. (1989; $n = 250$); Kim and Han (2016; $n = 248$); Mothapo et al. (2021; $n = 226$); Soto and Cooper (2021; $n = 218$); and Fried-Oken and More (1992; $n = 211$). The list in Banajee et al. (2003) had only 23 words. Table 1 lists source of the corpus (sampling context and activities), participant age and gender, unit of analysis (e.g., words, morphemes and/or lexemes), the total number of units (TNU) of the corpus analyzed, and length of the core vocabulary list established.

Table 1. Summary of Studies (English and Other) Included in the Comparison: Source of Corpus, Unit of Analysis, Details of Corpus and Details of Core List

English	Source of corpus	Unit of analysis	TNU	TNDU	TTR	Criteria for inclusion	Core units	Core coverage
Banajee et al. (2003)	Recordings of 50 toddlers (24–36 months)	Words	n/r	n/r	n/r	Words with a commonality score of 6, 5 and 4[b]	23	n/r
Beukelman et al. (1989)	Recordings of 6 preschoolers (3:8–4:9 yrs)	Words	17,810	n/r	n/r	Words with a frequency of at least 0.5‰	250	85%
Trembath et al. (2007)	Recordings of 6 preschoolers (3–5 yrs)	Orthographic words	18,000	1411	0.08	Words with a frequency of at least 0.5‰ and commonality of 50% or more	263	79.8%
Marvin et al. (1994)	Recordings of 10 preschoolers (4:0–5:2 yrs)	Words	43,968	6344	0.14	None given – lexemes ranked by frequency	332	64%
Fried-Oken and More (1992)	Parental reports and recordings of 30 preschoolers (3:0 – 6:3)	Words and some morphemes	36,000	2114	0.06	Top 10% of words occurring on at least 3 lists collected from 90 sources.	212	n/a
Other								
Mothapo et al. (2021)	Recordings of 6 preschoolers	Lexemes[a]	17,569	1023	0.06	Words with a frequency of at least 0.5‰ and commonality of 50% or more	226	88.1%
Soto and Cooper (2021)	Comparison of overlap between published databases and the IDCHD	Words and some lexemes	n/a	n/a	n/a	n/a	218	n/a
Kim and Han (2016)	Recordings of 90 preschool children with TD	Words and some lexemes	40,352	2115	0.05	Words used with a frequency of at least 0.5‰	248	82.44%

Note. TNU: total number of units; TNDU: total number of different units; TTR: type-token ratio; n/r: not reported.
[a]A lexeme is the basic word that underlies a set of words related through inflection. The English lexeme 'run,' for example, represents the words 'run,' 'runs,' 'running,' and 'ran.'
[b]This commonality score was calculated not across children like in the rest of the lists but across usage in contexts and days

Data analysis

Core vocabulary overlap

To determine the level of overlap between all lists, two trained graduate research assistants first developed a composite list in English that included all of the different words minus proper nouns included in all the English lists (Banajee et al., 2003; Beukelman et al., 1989; Fried-Oken & More, 1992; Marvin et al., 1994; Trembath et al., 2007). The final composite English list consisted of 516 different words. The research assistants compared this list of 516 words to the English equivalents of the Korean (Kim & Han, 2016), Sepedi (Mothapo et al., 2021), and Spanish (Soto & Cooper, 2021) lists, respectively, and noted the words that appeared in all lists (i.e., common core words). The English equivalents to the Korean and Sepedi words were available in their publication. Both research assistants and the first author are native speakers of Spanish and bilingual in English. They provided the English equivalents to the Spanish list.

A word was overlapping when it was present in the composite English list and in the other lists, even if it was in a different inflection (e.g., singular/plural or infinitive/present tense). Both authors and the research assistants reviewed the original lists and the overlapping list, discussed discrepancies, and reached consensus for all of the discrepancies.

Overlap between common core and semantic primes

To determine whether the resulting list of common core words were related to the semantic primes identified by Goddard and Wierzbicka (1994), the two research assistants developed a spread sheet with the semantic primes and classified each overlapping word onto a corresponding semantic prime (grouped into 16 categories; see Table 2). Both authors, along with the research assistants, reviewed this categorization, noted discrepant classifications, and reached consensus for all of the discrepancies.

Results

Vocabulary overlap

To address the first aim of the study, we compared the English composite list ($n = 516$ words) to the Korean (n = 248 words), Sepedi ($n = 226$ words), and Spanish ($n = 218$ words) lists. We found that 81/248 (33%) Korean words, 90/226 (40%) Sepedi words, and 136/218 (62%) Spanish words overlapped with the English composite list. Only 56 words appeared in all four lists (i.e., common core). These words, grouped by grammatical class, are included in Appendix A. Verbs accounted for the largest number of common core words ($n = 25$), followed by 10 nouns, seven pronouns, five adverbs, four adjectives, two conjunctions, and one preposition, interjection, and numeral each. Those 56 words represented only 11% of the English composite list, 26% of the Spanish list, 25% of the Sepedi list, and 23% of the Korean list.

Table 2. Overlapping Vocabulary Classified According to Semantic Primes

Categories	Primes	Identical words from overlapping lists	Words that share a conceptual overlap with the semantic prime
Substantives	I	I	my
	you	–	–
	someone	–	who
	people	–	sister, man, mom, boy, friend
	something/thing	–	it, what, bath, car, dog, water
	body	–	foot
Determiners	this	this	that
	the same	–	–
	other	–	–
Quantifiers	one	–	–
	two	two	–
	some	–	–
	all	–	–
	much/many	many	–
Evaluators	good	good	–
	bad	–	–
Descriptors	big	big	–
	small	–	–
Mental predicates	think	–	–
	know	know	–
	want	want	–
	feel	–	–
	see	see	look
	hear	–	–
Speech	say	–	call
	words	–	–
	true.	-	–

Actions, events, and movement	do	do	eat, give, wash, wait, play, open, make, show, sleep, bring
	happen	–	–
	move	–	come, put, stop, go
Existence and possession	there is	there is	be
	Have	have	–
Life and death	live	–	–
	die	–	–
Time	when/ time	when	–
	now	–	–
	before	–	–
	after	–	–
	a long time	–	–
	a short time	–	–
	for some time	–	–
	moment	–	–
Space	where/place	where	–
	here	here	–
	above	–	–
	below	–	–
	far	–	–
	near	–	–
	side	–	–
	inside	–	at
	touching (contact)	–	–
Logical concepts	not	–	yes, but
	maybe	–	–
	can	–	–
	because	–	why
	if	–	–
Intensifier, augmentor	very	–	–
	more	more	and
Taxonomy, Partonomy	kind of	of	–
	part of	–	–
Similarity	like	like	–

Relationship between overlapping vocabulary and semantic primes

To address the second aim of the study, we classified these 56 common words into 63 semantic primes (see Table 2). All 56 common core words (100%) could be considered either an identical match to a semantic prime or a lexical exponent (an expression or manifestation) of a semantic prime. Yet, there were 34 semantic primes that were not represented by any word on the list. When looking at the 16 categories of semantic primes, the common core words were distributed across 15 of the 16 categories. Most of the common core words fell into the categories (a) Substantives (15 words) and (b) Actions, events, and movements (15 words), in accordance with the high proportion of verbs and nouns in the common core vocabulary. In contrast, the categories Time and Space, which contain eight and nine semantic primes each, only were represented by three common core words (when, where, and here). No common core words corresponded to the category 'life and death.' Details of the overlap are provided in Table 2.

Discussion

Examining the overlap across core vocabulary in four different languages

This study explored the overlap between core vocabulary lists in four languages belonging to four different language typologies. When comparing the Korean, Sepedi, and Spanish lists to the composite English list, different degrees of overlap was found, confirming the assertion that core vocabulary lists are language-specific (Soto & Yu, 2014). The Korean list had the lowest percentage of overlapping words, followed by Sepedi, while the Spanish list had the highest percentage of overlapping words. One reason for a higher degree of overlap between the English and Spanish lists may be that both these languages belong to the Indo-European language family (although to different branches – Germanic and Romance, respectively), while Sepedi belongs to the Niger-Congo group, and Korean has been classified as a language isolate unrelated to other languages (Eberhard et al., 2022). Language similarity is partly related to geographical location and possibly also to cultural and contextual similarities. These factors may all have contributed to the overlap in frequently used words.

Only 56 words appear in all core vocabulary lists in the four languages. Of these 45% are verbs, 18% are nouns, 9% are adverbs, and 7% are adjectives. Verbs, nouns, adverbs, and adjectives are considered content words. Content words are referential and used to label and describe perceptive entities (e.g., objects, events, properties) (Tomasello, 2005). According to Tomasello (1992), the child lives in a sensory-motor world of objects and events and therefore learns to use words to describe them, their properties, as well as the spatial, temporal, and causal relations among them. Function words such as articles, prepositions, and pronouns tend to be grammatical markers that mostly serve to provide linguistic specificity to content words and tend to appear later in typical development (see Semmler et al., 2023 for a discussion on the relationship between core vocabulary and language development milestones). Not surprisingly, we found less overlap in function words, which tend to be acquired later in development and are language-specific (Shi et al., 2006; Slobin, 1985). In English, for example, possession may be indicated by the preposition 'of' or by the use of an apostrophe (sometimes followed by 's'). In Sepedi, possession is indicated by a concord, the surface structure of which depends on the noun denoting the possession (Demuth, 1992; Kosch, 2006). When comparing lists of individual words, such morphosyntactic language differences become apparent.

A total of 25 verbs were found in all four languages. Most of the verbs denote a range of actions related to movement (e.g., go, come), actions on objects (e.g., put), the senses (e.g., look, see) and activities of daily living (e.g., eat, sleep, wash). Children from all four language backgrounds often spoke about such activities – activities which arguably most children engage in every day (see Slobin, 1985). 'Play' was also found to be a common core word, and denotes a common childhood activity (Drewes, 2005). It has been noted that activity verbs are central to early sentence production (Hadley et al., 2016) and their high number in the common core vocabulary seems to suggest that this is true across the four languages investigated (Choi & Gopnik, 1995; Rojas Nieto, 2003).

There are 10 nouns that are common across all languages. Five of them refer to people, including four gendered words (mom, man, sister, boy). Interestingly, the two nouns referring to females denoted kinship, whereas the two nouns referring to males did not. When looking at the comparative data, the words 'dad' and 'brother' occur in the English, Korean, and Spanish lists but not in the Sepedi list. This may denote differences in gender roles of adults with respect to their involvement in the lives of young children. For instance, studies have shown that, due to a variety of reasons connected to the unique history of apartheid, such as migrant labor systems and higher death rates of men due to violence and injury, many south African children grow up in homes without adult males (Richter & Morrell, 2008). Other nouns refer to essential commodities such as 'water' and 'food', and social affiliation such as 'friend.'

Most of the common function words were interrogative pronouns (e.g., who, where), whereas two were demonstrative (this, that). The use of these pronouns may indicate that children who are learning those languages use questions to seek information and engage the adult in labeling objects and events around them for which they do not yet know the word (James & Seebach, 1982). The only personal pronouns that were included were 'I' and 'it.' The personal pronouns 'he' and 'she' are rarely used in Korean (Kim & Slobin, 1997; Shin & Hill, 2016) or Sepedi. In Sepedi, these concepts are expressed by a range of words that differ depending on the noun that is denoted (Prinsloo, 2016).

Examining the relationship between the overlapping core and the semantic primes

We also compared the list of common core words against a list of so-called universal semantic primes. Every word in the list could be associated with a semantic prime category, and all but one category of semantic primes (life and death) had a lexical manifestation in the list of common words. This suggests that semantic primes can be found across languages and furthermore suggests that certain primes are frequently used by children from various language backgrounds (Goddard & Wierzbicka, 2007; Wierzbicka, 2004, 2005).

In the current study, 34 of the 63 semantic primes were not represented by any lexical exponent in the final list of 56 words. This may have been due to various reasons. It is possible that certain primes are used by children from all four language backgrounds, yet they may not be used with sufficient frequency or commonality to have been included in the core list compiled for that specific language. For example, the concept 'live' did not appear in any core word list included. Although this may be a word that children at age five may reasonably be expected to know, it may not be used frequently. On the other hand, children may have used different words or words that are not translation pairs to denote the same semantic prime. An example can be made of the semantic prime 'moment.' Instead of saying 'in a moment' a child may say 'in a little while.' The use of 'moment' and 'little while' interchangeably may have diluted the frequency count of these words in the core vocabulary, and, as a result, there is no word in the

common core that aligns with the prime 'moment.' It is important to note that semantic primes are more conceptually based and sometimes represented by phrases rather than only words (e.g., 'a long time'), whereas core vocabularies are usually established based on frequency and commonality counts of words and lexemes, and the conceptual nature of the word or lexeme is not considered.

According to Goddard (2012), one might expect some differences in the production sequence of semantic primes across languages due to cultural, and linguistic factors. He argues that the lexicalization of conceptual primes in early language development follows a consistent and stable pattern of acquisition having to do with cognitive developmental processes, and notes that for instance 'MORE, NO and THIS may occur so early because they can be used as single words and still convey a functionally useful message. KNOW, HEAR and BECAUSE may appear only relatively late in production because to manipulate these terms in production requires command over complement and adjunct structures, which may present too much of a processing problem for the child' (p. 217). According to Goddard, by age 4, children have acquired lexical exponents for two-thirds of the conceptual primes.

Implications for practice

The problem of vocabulary selection for a multilingual speaker is not purely academic. It is a problem of great practical significance. Professionals often grapple with the questions of where to start and how to find resources for languages that they do not speak themselves and for which there may not be readily available resources. The idea that there might be a set of core words at the heart of any language has appealed to language educators for decades (e.g., Kilgarriff et al., 2014). But the fact that the methods to elaborate core vocabulary lists vary greatly in participant age, gender and ability level, setting, eli task, and language makes it difficult to adopt large-scale corpora to fit the needs of all learners (Prinsloo, 2016). Our findings confirm that core vocabulary lists are language-specific and it would be inappropriate to translate them across languages for the purpose of vocabulary selection.

The 56 words presented in Appendix A represent the intersection of four lists of high-frequency words used by young children in four languages from different language families. The list includes basic conceptual categories that have been identified as developmentally appropriate in the earlier stages of language acquisition (Goddard, 2012). We believe this list and their corresponding semantic primes illustrate the fact that even among languages from very different language families, there may be a set of common semantic primes that are lexicalized across all of them.

The list of common semantic primes can serve as a starting point for conversations between caregivers and professionals to think of words that would represent those concepts and as a first step in the selection of a beginning lexicon for children who need bilingual AAC in languages for which resources are scarce. It is important to note that the use of semantic primes had already been proposed as an approach to developing core vocabulary for AAC systems in Mandarin (Baker & Chang, 2006; Liu & Sloane, 2006) and Zulu (Mngomezulu, 2017).

Most of the words in the common word list refer to content words, which can be used in single-word messages and in word combinations. The significance of content words in the earlier stages of language development is that they can increase a child's ability to convey information (see Eisenberg's 2020 for a discussion on the importance of communicative informativeness as a central goal of the intervention, even before grammatical correctness, for bilingual children

in early stages of language development). Because of the interdependence between lexical and grammatical domains in typical and atypical language development, function words will become more and more relevant as the child language expressive skills increase (see Soto & Clarke, 2017; Soto et al., in press).

The 34 semantic primes that did not have a representation in all four core vocabulary lists may still be considered by clinicians a source for vocabulary selection. According to researchers working in this field, semantic primes represent simple concepts that are frequently communicated and can be combined to generate more complex meanings (Goddard & Wierzbicka, 2007; Wierzbicka, 2005). As such, they seem useful to guide vocabulary selection for AAC systems; however, more research may be needed to understand which factors should guide the introductions of such primes and the specific words associated with them for different languages.

Limitations and future directions

The findings and implications put forth in this paper should be interpreted with caution because of its limitations. The core word lists that were compared differed on several aspects, for example, the sources from which they were compiled (e.g., language sampling during routine or researcher-facilitated activities), the unit of analysis (orthographic words and/or lexemes), the inclusion criteria for the compilation of the list (e.g., frequency and/or commonality criteria), and the number of children that were sampled. Also, while a composite list based on different studies was compiled for English, the word lists in the other languages were based on more limited data. Such factors may have influenced the overlap between lists.

Furthermore, semantic primes may be more conceptually based, whereas the common word list was compiled by comparing word lists – some translated into English – without considering the conceptual nature of those words. This may have led to an underestimation of semantic primes present in the expressive vocabularies of children from the four language groups. Additionally, the research on the use of semantic primes for teaching the same concept across languages has been conducted mainly with bilingual children without disabilities (Shailat et al., 2022). Future studies should explore the appropriateness of using semantic primes for teaching vocabulary to bilingual children with disabilities.

Comparing word lists between languages means that comparisons remain on a semantic individual-word level. Similarities and differences on a syntactic and morphological level are therefore not considered. Such differences may also play a role in vocabulary selection for bilingual children and may need to be taken into account. For example, the English verb ‘look’ is often followed by the preposition ‘at.’ When the verb ‘look’ is included in the English section of a bilingual system, the word ‘at’ may be included too, although this word may not be considered a core word or have a direct translation in another language.

As previously noted, a word list based on frequency, commonality, and overlap between languages should not be assumed to be the only relevant resource to guide vocabulary selection for young children in need of bilingual AAC. Other sources also need to inform this process, notably, the contexts in which each language may be used (e.g., school, home).

This paper is intended to stimulate further discussion on vocabulary selection for the bilingual child. Future research studies should explore the overlap between core vocabulary and semantic primes across languages belonging to the same and different language families, with lists

elaborated with older participants, different settings, and using the same criteria for the inclusion of words.

Conclusion

Vocabulary selection should be guided by two main principles: the need to convey essential messages within all the contexts where the child participates, and the need to support development of cognitive and linguistic skills (Beukelman & Light, 2020; Laubscher & Light, 2020; Semmler et al., 2023). The 56 words presented in Appendix A and their corresponding semantic primes may be helpful in guiding caregivers and professionals in selecting an initial vocabulary for children who need bilingual AAC in languages for which limited resources exist.

Although helpful, published word lists can never provide the complete solution to vocabulary selection for any child monolingual or bilingual. Our list should always be used in conjunction with other vocabulary selection strategies (Bean et al., 2019; Trembath et al., 2007). Caregiver and informant interviews, peer observations, natural language samples, and developmental language guides can be used to ensure that the vocabulary selected is relevant and tailored to each child's needs and stage of language development, personality, interests, and contexts in which they interact (Trembath et al., 2007).

Each vocabulary selection framework named earlier (developmental, functional, cognitive, high frequency, etc.) will lead to the selection of different types of words and word classes, and no single approach can produce a sufficiently diverse and useful lexicon to meet an individual's communication demands. All frameworks should be intertwined to provide a robust vocabulary that meets the participation, developmental and cognitive needs of each child.

Family members and caregivers are the child's most significant communication partners and, as such, they are key informants for selecting vocabulary that is relevant to their child. Professionals should partner with caregivers to develop vocabularies that include culturally relevant concepts and messages that facilitate the child's participation in meaningful family activities. Tools such as vocabulary inventories in their home language and family interview guides can be used to identify that kind of lexicon.

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