

Dialectally-sensitive norms of the Spanish version of Main Concept Analysis (Span-MCA) for quantifying neurogenically impaired spoken discourse

Anthony Pak-Hin KONG¹

Recibido 4 de junio de 2020 / Primera revisión 9 de julio de 2020 / Aceptado 18 de septiembre de 2020

Abstract. Aphasia is an acquired language impairment caused by damage in the regions of the brain that support language. The Main Concept Analysis (MCA; Kong, 2016b) is a published formal assessment battery that allows the quantification of the presence, accuracy, completeness, and efficiency of content in spoken discourse produced by persons with aphasia (PWA). It utilizes a sequential picture description task (with four sets of pictures) for language sample elicitation. The MCA results can also be used clinically for targeting appropriate interventions of aphasic output. The purpose of this research is to develop a Spanish adaptation of the MCA (i.e., Span-MCA) by establishing normative data based on native unimpaired speakers of Spanish from four different dialect origins (Central American Caribbean, Andean-Pacific, Mexican, and Central-Southern Peninsular regions). A total of 91 unimpaired participants that consisted of different age groups, education levels, and dialect origins were recruited to establish four sets of dialect-specific norms and scoring criteria of Span-MCA, including target main concepts and corresponding lexical items related to the picture sets. The Span-MCA was also applied to one pilot native Spanish PWA. The normative data suggested that speakers who were younger or with a higher level of education produced significantly more accurate and complete main concepts in their spoken discourse. The application of Span-MCA to the pilot native Spanish PWA successfully identified impaired performance, as compared to the dialectally-sensitive norms established in this study. This study highlighted the clinical value of Span-MCA as a supplement to evaluate spoken discourse and target intervention by speech-language pathologists and related healthcare practitioners.

Keywords: Aphasia; Main Concept Analysis; spoken discourse; Spanish; Dialectally-sensitive norms.

[es] Normas dialectales de la versión española del Análisis de Conceptos Principales para cuantificar el discurso hablado de personas con alteración neurológica

Resumen. La afasia es una alteración adquirida del lenguaje causada por un daño en las regiones del cerebro que se encargan del procesamiento del lenguaje. El Main Concept Analysis (MCA; Kong, 2016b) es una evaluación formal publicada que permite la cuantificación de la presencia, la precisión, la integridad y la eficiencia del contenido en el discurso hablado producido por las personas con afasia. Esta prueba utiliza una tarea de imágenes secuencial (utilizando 4 conjuntos de imágenes) para provocar una muestra de lenguaje. Los resultados del MCA se pueden utilizar clínicamente para orientar las intervenciones adecuadas de la producción afásica. El propósito de esta investigación es desarrollar una adaptación al español del MCA estableciendo datos normativos basados en hablantes nativos de español sin discapacidades de cuatro orígenes dialectales diferentes (regiones del Caribe centroamericano, andino-pacífico, mexicano y centro-sur peninsular). Se reclutaron un total de 91 participantes de diferentes grupos de edad, niveles de formación y orígenes dialectales para establecer cuatro conjuntos de normas específicas para cada dialecto y criterios de puntuación, incluyendo los conceptos principales objetivo y los elementos léxicos correspondientes relacionados con los conjuntos de imágenes. También se aplicó el Span-MCA a una persona con afasia en un estudio piloto. Los datos normativos sugirieron que los hablantes más jóvenes o con un mayor nivel educativo producían conceptos principales significativamente más precisos y completos en su discurso hablado. La aplicación del Span-MCA a la persona con afasia identificó con éxito un rendimiento deteriorado, en comparación con las normas dialectalmente sensibles establecidas en este estudio. Este estudio pone de manifiesto el valor clínico del Span-MCA como complemento para evaluar el discurso hablado y orientar la intervención de los logopedas.

Palabras clave: Afasia; Análisis de Conceptos Principales; Discurso hablado; Español; Normas dialectalmente sensibles.

Sumario: Introduction, Aims, Method, Results, Discussion, Acknowledgment, Bibliography, Appendix A, Target main concepts of Spanish version of MCA across dialect groups, Appendix B, Lexical items that are accepted as alternatives in the Spanish version of MCA across dialect groups.

Como citar: Kong, A. P.-H. (2021). Dialectally-sensitive norms of the Spanish version of Main Concept Analysis (Span-MCA) for quantifying neurogenically impaired spoken discourse. *Revista de Investigación en Logopedia* 11(2), e69932. <https://dx.doi.org/10.5209/rlog.69932>

¹ School of Communication Sciences and Disorders, University of Central Florida.
antkong@ucf.edu

Introduction

Spanish is the second most spoken language in the world (Hawkes, Ameriso, & Willey, 2015). It is spoken in many countries by more than 470 million individuals worldwide (Rydgren, 2020). Within the United States, the population of Spanish speakers is expanding by the growth of immigration. Spanish is now commonly spoken in cities where English is the official language, such as Miami, New York, Los Angeles, and Orlando. The Spanish language originally derived from Latin and about 70% of Spanish words contain Latin roots. Many variations between meanings of lexical items are noticed in standard Spanish. Geographical location has a significant impact on discourse. The Spanish language consists of many layers of complexity; therefore, it is necessary for an individual to have a linguistic understanding to achieve communicative competence (Arteaga & Llorente, 2009). Specific dialects, which are generally defined as varieties of a language that have different pronunciation, grammar, or vocabulary than the standard language of the culture, are influenced from many regions that include the Central America and Caribbean (e.g., Puerto Rico, Costa Rica, Honduras, Dominican Republic, Caribbean Mexico and Gulf Coast Mexico, and Cuba), Mexican (i.e., Mexico), Andean-Pacific (e.g., Colombia, Peru, Bolivia, and Andean Venezuela), and Central-Southern Peninsula (e.g., cities such as Madrid or Toledo, and region of La Mancha in Spain). In particular, the dialect from speakers within the Central Caribbean regions is heavily influenced by the surrounding areas of Puerto Rico, Cuba, Costa Rica, Nicaragua, Honduras, El Salvador, and Guatemala. According to an article regarding multicultural topics in communication sciences and disorders (Gildersleeve-Neumann, 2019) that discussed Puerto Rican Spanish, native speakers from the Central Caribbean are seen to produce discourse that is influenced by speakers from the islands, and is more casual and informal compared to other Spanish regions. The discourse elicited in Central Caribbean has been seen to commonly exclude syllables and consonants and contain lexical variations that are different from other dialects.

Oral discourse is fundamental to everyday communication and is an increasing focus of clinical assessment, intervention, and research. The damage in the regions of the left hemisphere that causes aphasia can affect the information a speaker communicates in discourse (Pritchard, Hilari, Cocks, & Dipper, 2017). This effect in monologic discourse influences social participation and engagement which is important to maintain and to avoid loss of overall communication skills in persons with aphasia (PWA). Monologic discourse is typically elicited within aphasia assessment and treatment as well as research somewhat artificially using probe questions and specific resources (Linnik, Bastiaanse, & Höhle, 2016), such as picture-description tasks. A few standardized aphasia batteries have been adopted into Spanish, including the Western Aphasia Battery (WAB; Kertesz, Pascual-Leone, & Pascual-Leone, 1990) and the Boston Diagnostic Aphasia Examination (BDAE; Goodglass & Kaplan, 1972), but these translated tests generally do not include a comprehensive and objective measure for spoken narratives. This is also the case for Bilingual Aphasia Test (BAT; Paradis & Libben, 1987) that contains a section of story-telling (elicited using a cartoon strip) to estimate the amount and overall quality of the output. Muñoz and Marquardt (2008) have described the use of the short version of the Spanish-English BAT and its use to determine the performance of bilingual PWA whose proficiency in English and Spanish differed.

To adequately and systematically address any post-sentential spoken discourse performance related to aphasia, various quantification frameworks for analyzing neurogenic disordered output have been reported. Kong (2016a) and Linnik et al., (2016) have provided details of these systems that contain evidence-based findings highlighting their validity and reliability to evaluate connected speech in PWA. Some examples include the following: (a) the Yorkston and Beukelman's method (1980) to quantify and compare the amount (e.g., content units) and efficiency (e.g., syllables or content units per minute) of information produced by PWA's description of the BDAE Cookie Theft picture, (b) the Quantitative Production Analysis (Saffran, Berndt, & Schwartz, 1989) to evaluate the grammatical, morphological, and structural disruptions of PWA output upon a telling task of the Cinderella story, (c) Nicholas and Brookshire's measurement (1993, 1995) of intelligibility, informativeness, and accuracy of communication in PWA's description of four single pictures and production of personal and procedural information (using indices of word count, correct information units; CIUs, words per minute, percent of CIUs, and CIU per minute), or (d) the use of percent CIU and percent complete utterances (Obermeyer & Edmonds, 2018) to determine the degree of content accuracy, relevancy and informativeness within a sentence. More recently, Stark et al. (2020) have proposed and recommended standardization procedures of spoken discourse assessment.

The Main Concept Analysis (MCA; Kong 2009) is an objective assessment designed to evaluate aphasic connected speech production collected from a sequential picture description task. Specifically, it utilizes four sets of black-and-white sequential line drawings² to elicit stimulus-specific main concepts (or statements that contain one

² The administration of each picture set was done in a sequential manner beginning with Set 1, 'Cooking in a kitchen', which shows an old lady cutting carrots in the kitchen. The old lady cuts her finger while slicing up some carrots and she then proceeds to acquire a first-aid kit and place a bandage on her wound. Picture Set 2 is titled 'Waking up late for work', where a man is shown waking up late. He then brushes his teeth and combs at the same time before getting dressed. The man then notices he is wearing a pair of socks that do not match. Picture Set 3, 'Buying ice-cream', shows a mother buying ice cream with her daughter in an ice-cream parlor. The mother pays the salesman for the ice-cream and the salesman begins preparing the ice-cream. After the salesman gives the ice-cream to the girl, she is shown dropping the ice-cream on the floor and beginning to cry. The salesman sees the girl and gives her a new ice-cream. Finally in picture Set 4, 'Helping an old man', the picture depicts an old man carrying a grocery bag. A father and son are shown walking on the opposite direction of the old man. Next, some oranges fall from the old man's grocery bag. The son sees that the oranges have fallen and begins to help pick the oranges up. The old man acknowledges a job well done and thanks the boy for his help.

main verb and other relevant pieces of essential information), which are then quantified in terms of the output's presence, accuracy, and completeness of information, as well as efficiency of the output. The MCA has now been adopted, validated, and/or translated in US English (Kong, Whiteside, & Bargmann, 2015), Irish English (Kong, Ross, & Pettigrew, 2012), Mandarin Chinese spoken in Taiwan (Kong & Yeh, 2015) and mainland China (Gao, Kong, & Lau, 2016), Cantonese Chinese (Kong, 2009, 2011), Japanese (Yazu, Yoshino, & Kong, 2018), and Korean (Kong, 2018). Although the same picture stimuli are used across these different language versions, each of them contains a set of culturally appropriate lexical items and geographically-specific main concepts, obtained through careful analyses of normative samples from native speakers of different countries, that are related to characters depicted by the stimuli for subsequent scoring of performance. The MCA quantification system involves six indices including number of concepts that are (1) accurate and complete (AC), (2) accurate but incomplete (AI), (3) inaccurate (IN), or (4) absent (AB), as well as (5) a total main concept score, calculated using a formula of $3 \times AC + 2 \times AI + 1 \times IN$, and (6) an efficiency measure of AC concepts produced per minute (AC/min) (see scoring details in Kong, 2016b). Results from the above-mentioned MCA studies have revealed the MCA to be suitable for assessing the presence and degree of aphasia in adult speakers suffering from stroke, dementia, and/or acquired brain injuries. The good to excellent inter- and intra-rater reliability of the tool (e.g., Kong, 2018) as well as its applicability to monitor changes or stable discourse performance (e.g., Kong, 2011) further indicated the MCA to be a useful clinical battery for assessing high-level functioning PWA. A study by Rivera, Hirst, and Edmonds (2018) has applied the scoring principles and criteria of MCA to examine the impacts of language dominance on unimpaired Spanish/English bilingual speakers' production of main concepts in spoken discourse. In particular, 83 bilingual young adults were asked to describe the stimuli in Nicholas and Brookshire (1993, 1995) in Spanish and English; both sets of transcripts were analyzed using the MCA indices and other microlinguistic measures. It was concluded that participants' speaking proficiency was highly correlated to production of main concepts. Microlinguistic measures focusing on participants' lexical retrieval (e.g., CIUs and naming) were also predictive of main concept production in both Spanish and English.

Aims

Linguistic analysis of spoken discourse in Spanish can provide valuable information regarding the many variations seen specific to dialect regions (see, for example, Brown & Cortés-Torres, 2013). However, there is currently a critical lack of studies in aphasic discourse production within the literature of Spanish aphasiology. While the above-mentioned standardized aphasia assessment options in Spanish allow clinicians to identify the presence of acquired language impairments in Spanish-speaking PWA and their overall severity levels, the lack of comprehensive and objective assessment batteries beyond the single word and sentence level and, more critically, the lack of tests that consider Spanish dialectal varieties can hinder the management of PWA in countries/regions with Spanish speakers. This is especially true in the context where evaluating discourse production requires one to attend to the culturally specific phonetic, semantics and syntactic characteristic across various Spanish dialects (i.e., the marked differences in the pronunciation of various Spanish dialects, with some differences in vocabulary use but relatively similar syntax and grammar).

The first objective of this study was to establish a Spanish version of the Main Concept Analysis (i.e., Span-MCA) to allow evaluation of spoken responses by native Spanish PWA. Due to a shortage of assessment batteries for measuring discourse in PWA, a culturally appropriate Span-MCA version would allow clinicians to evaluate a greater population of disordered clients. Given the variations of different Spanish dialects and realizing the potential lexical variations that can influence more directly the discourse analyses conducted in Span-MCA, geographically-specific norms of the MCA picture description among speakers of Spanish influenced by different geographical origins of the language (i.e., distinctive dialectal regions) would be established.

Based on the normative data collected, the second aim of this study was to investigate preliminarily whether speakers' age and education level would have an effect on main concept production. With reference to the previously established MCA results (e.g., Kong & Yeh, 2015), it was hypothesized that more accurate and complete (AC) main concepts would be produced by participants who were younger or with a higher level of education.

The third aim was to apply the dialect-specific Span-MCA, with reference to the scoring criteria established from the first aim in this study, to a speaker with acquired deficits of spoken discourse to determine how clinically useful the newly developed Span-MCA was for reflecting features from PWA.

Method

Participants

A total of 91 unimpaired native Spanish speakers were recruited in the United States (Orlando and Miami, Florida) and Spain (Santander). They included 45 speakers from the Central American Caribbean, 20 from the Ande-

an-Pacific, 12 from the Mexican, and 16 from the Central-Southern Peninsular regions³. As listed in Table 1, the great majority of them were born in a country with Spanish as the official and national language, which is widely spoken by most of the population. Those who were born in the US confirmed that Spanish was their mother tongue. Each participant also provided a self-rating on his/her proficiency of Spanish and English, respectively, in each of the four modalities of speaking, understanding, reading, and writing. Specifically, a rating of “0” indicated no knowledge of the language at all; otherwise, the proficiency scale ranged from “1” indicating “not-fluent, only know several words or a few simple sentences” to “7” indicating a competency of “fluent, completely comfortable, a native speaker”. As shown in Table 1, all dialect groups demonstrated a higher proficiency in Spanish as compared to the English skills.

Table 1. The summary of birth place and rated overall proficiency in English and Spanish of unimpaired Spanish speakers.

Dialect groups	Number of participants born in USA	Proficiency in English ¹	Proficiency in Spanish ¹
1. Central American Caribbean	6 out of 45	5.73, 1.70 (1-7) ²	6.68, 0.71 (3.75-7)
2. Andean-Pacific	6 out of 20	5.78, 1.91 (1-7)	6.60, 0.71 (4.50-7)
3. Mexican	0 out of 12	4.78, 1.68 (2-7)	6.45, 0.94 (4.13-7)
4. Central-Southern Peninsular	0 out of 16	4.23, 1.81 (0-6)	7.00, 0.00 (7-7)
Overall		5.39, 1.83 (0-7)	6.68, 0.70 (3.75-7)

Note: ¹ average of self-rated proficiency in the four modalities of speaking, understanding, reading, and writing, “0” indicating no knowledge of the language, “1” indicating “not-fluent, only know several words or a few simple sentences” to “7” indicating “fluent, completely comfortable, a native speaker”; ² in the order of mean, standard deviation (range)

The participants were further divided into three age groups, including the young (18 to 39 years), middle-age (40 to 59 years), and older (60 years or above) groups (see Table 2), and two education levels (see Table 3) using completion of high school (or twelve years of education) as the cut-off for ‘low’ and ‘high’ groups. All speakers reported a lack of history of head injury(ies), neurological disease(s), or medical condition(s) that might affect their language performance. None of them showed inadequate auditory comprehension ability that would hinder their understanding of the task instructions or any form of visual deficits that would affect their scanning of pictorial stimuli used in the present study.

Table 2. The summary of age of unimpaired Spanish speakers (with additional information of education) across dialect groups.

Dialect groups	Young (18-39 years)	Middle-age (40-59 years)	Older (60 years or above)
1. Central American Caribbean	22.56, 4.97 (18-36) ¹ 5M + 13F ² <i>Edu</i> ³ : 15.56, 1.62	50.82, 4.72 (43-59) 5M + 12F <i>Edu</i> : 14.12, 2.09	72.6., 6.43 (66-86) 4M + 6F <i>Edu</i> : 10.90, 3.90
2. Andean-Pacific	22.46, 4.59 (19-35) 4M + 9F <i>Edu</i> : 14.77, 1.83	45.6, 7.44 (40-58) 1M + 4F <i>Edu</i> : 13.60, 3.85	61.5, 0.71 (61-62) 0M + 2F <i>Edu</i> : 14.00, 2.83
3. Mexican	23.88, 3.23 (21-30) 2M + 6F <i>Edu</i> : 14.13, 2.36	44.75, 3.77 (40-49) 3M + 1F <i>Edu</i> : 8.75, 2.75	---
4. Central-Southern Peninsular	25.08, 6.13 (20-38) 3M + 9F <i>Edu</i> : 18.50, 3.15	44.00, 0.00 (44-44) 0M + 1F <i>Edu</i> : 16.00, 0.00	62.00, 0.00 (62-62) 0M + 1F <i>Edu</i> : 10.00, 0.00
Overall	23.33, 4.94 (18-38) 14M + 37F <i>Edu</i> : 15.82, 2.67	48.70, 5.64 (40-59) 9M + 18F <i>Edu</i> : 13.30, 3.12	70.08, 7.35 (61-86) 4M + 9F <i>Edu</i> : 11.31, 3.68

Note: ¹ in the order of mean, standard deviation (range); ² M=male, F=Female; ³ Edu= mean and standard deviation of education (in number of years)

³ The participants in the Central American Caribbean group included those who spoke a Spanish dialect originated from (or influenced by) Puerto Rico, Costa Rica, Honduras, Cuba, Nicaragua, and Dominican Republic. All speakers in the Mexican and Central-Southern Peninsular groups were from Mexico and Spain, respectively. As for the Andean-Pacific group, the Spanish dialect originated from (or influenced by) Colombia, Venezuela, Ecuador, Brazil, and Peru.

Table 3. The summary of education in number of years of unimpaired Spanish speakers (with additional information of age) across dialect groups.

Dialect groups	Secondary or below (low)	Post-secondary (high)
1. Central American Caribbean	10.38, 2.79 (2-12) ¹ 5M + 8F ² Age ³ : 61.46, 17.87	15.44, 1.41 (13-19) 9M + 23F Age: 37.41, 17.24
2. Andean-Pacific	11.33, 1.63 (8-12) 2M + 4F Age: 38.83, 17.99	15.71, 1.20 (13-18) 3M + 11F Age: 29.29, 13.36
3. Mexican	9.86, 2.41 (6-12) 4M + 3F Age: 37.14, 10.01	15.80, 0.45 (15-16) 1M + 4F Age: 22.00, 1.41
4. Central-Southern Peninsular	10.00, 0.00 (10-10) 0M + 1F Age: 62.00, 0.00	18.31, 3.09 (15-26) 3M + 10F Age: 26.54, 7.87
Overall	10.44, 2.39 (2-12) 11M + 16F Age: 50.15, 19.42	16.11, 2.09 (13-26) 16M + 48F Age: 32.22, 15.02

Note: ¹ in the order of mean, standard deviation (range); ² M=male, F=Female; ³ Age= mean and standard deviation of age (in number of years)

In relation to the third aim of this study, a 85-year-old Spanish-speaking female with aphasia secondary to a stroke (with a post onset time of more than 1.5 years) was recruited from an adult day-care center in Orlando. With reference to the results of the Spanish version of WAB (Kertesz, Pascual-Leone, & Pascual-Leone, 1990), this PWA achieved an aphasia quotient of 65.8 and had a syndrome of anomic aphasia. She was born in Puerto Rico and her mother tongue was a Spanish dialect with influence from her birth place. She also spoke English pre-morbidly, but her caregiver reported a higher proportion of premorbid use of Spanish at home as well as in the work and social contexts.

Data collection

All unimpaired participants passed a language and cognitive screening using the short form⁴ of Spanish version of Cognitive Linguistic Quick Test (CLQT; Helm-Estabrooks, 2001) and completed a questionnaire regarding their language origin and history of using Spanish. They then completed the MCA sequential picture description in Spanish by telling what was happening in each picture set, with their responses recorded. The participants did not need to arrange the sequence of the four single line-drawings in each picture set, but if required, they were given general prompts, such as “Tell me what is going on in the pictures” or “How about here?”, to ensure they could provide a more elaborated description. The orthographic transcriptions were subsequently used to determine the target main concepts, their corresponding lexicons, and MCA scoring criteria that were specific to the four dialect groups.

As for the female PWA, she was administered the Spanish version of the CLQT to determine the type and degree of cognitive impairments. This was followed by the MCA description task with the same elicitation method mentioned above.

Data analysis

To ensure a high degree of fidelity, all orthographic transcriptions were cross-analyzed by the at least one independent research personnel to ensure accuracy of the verbatim transcripts (i.e., 100% matching of each audio file and words in the text). With reference to the 26 target main concepts in English (Kong et al., 2015), the main concepts mentioned by each speaker were extracted and tallied. Following the procedures in Kong (2009), main concepts that appeared in at least 70% of the total participants in each dialect group were included in the final list of main concepts for each corresponding dialect group. Main concepts that were new or different from the 26 original target main concepts in English meeting the 70% criteria, if any, were also added to the new Span-MCA list. Another step to determine dialect-specific scoring criteria was to identify specific semantic items (i.e., lexicons or pieces of essential information) that made-up the target main concepts in each set of Spanish-MCA dialect norms. Furthermore, throughout the transcripts in each dialect group, any lexical items that were judged to be appropriate and accurate substitutions of an element of any of the target main concepts were identified.

Next, with reference to the dialect-specific main concepts, each speaker’s transcript was analyzed using four MCA indices to determine the overall discourse performance. Specifically, the following concepts were tallied by dialect groups: (1) # of Accurate and Complete (AC) concepts, (2) # of Accurate but Incomplete (AI) concepts, (3) # of Inaccurate (IN) concepts, and (4) # of Absent (AB) concepts.

⁴ The following sections of CLQT were administered: Personal facts, Confrontation naming, Story telling, Auditory comprehension, and Generative naming.

The PWA participants' performance on the standardized assessments (i.e., WAB and CLQT) and Span-MCA was recorded and analyzed. The normative data based on performance of unimpaired speakers in dialect group 1 were used to qualitatively compare how far PWA was impaired in spoken discourse.

Statistical analysis

The internal consistency of measuring the four types of main concepts in Span-MCA was examined with Cronbach's alpha. A one-way ANOVA was administered to evaluate whether the factor of age had any effects on the production of main concepts that were accurate and complete among all the 91 participants as a whole. This was repeated for the factor of education. In addition, 81 out of the 91 transcripts (about 85% of the total sample size) were re-scored on the number of AC concepts to determine the intra-rater reliability of Span-MCA with an intraclass correlation coefficient.

Results

Concerning the number of target main concepts across our four dialect groups, it was found that the same concepts as in the original English version were noted by the Spanish-speaking participants in this study across all four dialect groups. No new concepts (i.e., a novel concept other than those in the original list in Kong et al. (2015) that were mentioned by 70% or more of those within a dialect group) were identified, suggesting the cultural-appropriateness of the MCA picture stimuli for use here. As detailed in Table 4, while dialect groups 2 (Andean-Pacific) and 3 (Mexican) showed the same five, six, nine, and six target main concepts for sets 1 to 4, respectively, the other two groups had one target concepts less in picture set 3 'Buying ice-cream'. In particular, of the four sets of sequential pictures, only set 3 yielded relatively more variations in two ways: (1) the concept of 'The girl is smiling - La niña esta contenta' was not counted as a target main concept for speakers in groups 1 (Central American Caribbean) and 4 (Central-Southern Peninsular) because it did not meet the 70% criterion (based on the normative data), and (2) the concept of 'The mother is paying - La madre esta pagando' was mentioned by the majority of speakers in groups 2 in the form of 'The mother and the girl are buying ice-cream - La madre y la niña estan comprando helado'. Moreover, while the ideas of 'shocked' and 'late' in main concept 'The man is shocked/late - El señor esta retrasado/ se levantó tarde/ se despertó tarde' of picture set 2 'Waking up late for work' were used interchangeably by speakers in dialect groups 1, 2, and 3, the majority of group 4 speakers only mentioned 'The man is late - El señor está retrasado' (see details in Appendix A).

Table 4. Total number of target main concepts in English and Spanish.

	English (Kong et al., 2015)	Spanish Group 1 (Central American Caribbean)	Spanish Group 2 (Andean-Pacific)	Spanish Group 3 (Mexican)	Spanish Group 4 (Central-Southern Peninsular)
Set 1	5	5	5	5	5
Set 2	6	6	6	6	6
Set 3	9	8	9	9	8
Set 4	6	6	6	6	6
Total	26	25	26	26	25

Concerning the lexical items that could be accepted as alternatives in Span-MCA, the dialect normative sets indicated participants of group 1 (Central American Caribbean) had a higher lexical diversity in their production, which was reflected by a wider range of vocabulary mentioned in their transcripts (see the higher number of alternatives listed in Appendix B), potentially due to the fact that group 1 was the largest in terms of the sample size). For example, 'Man (señor)' in set 2 have been described as 'hombre, muchacho, tipo, nino, caballero, chico, or la persona', while another male character in set 3 have also been described as 'señor, panadero, trabajador, heladero, hombre, and joven tipo'. Participants of group 4 (Central-Southern Peninsular), on the other hand, demonstrated the lowest degree of lexical variations. Appendix B lists all the items that were deemed to be acceptable lexical replacements in the Span-MCA description.

Table 5 displays the normative data on Span-MCA performance among our participants across dialect groups. Performance pattern was consistent across dialects, as reflected by a high percentage of Accurate and Complete (AC) concepts, occasional use of Accurate but Incomplete (AI) concepts or occasional missing of target concepts (i.e., Absent, AB), and little or no Inaccurate (IN) concepts in all speakers' production.

Table 5. Normative data on Span-MCA performance among unimpaired Spanish speakers across dialect groups.

	Spanish Group 1 (Central American Caribbean)	Spanish Group 2 (Andean-Pacific)	Spanish Group 3 (Mexican)	Spanish Group 4 (Central-Southern Peninsular)
AC	22.36 (1.16), 20-24	23.23(1.17), 22-25	23.25 (1.36), 21-25	22.71 (1.27), 20-24
AI	1.71 (1.02), 0-5	1.46 (1.05), 0-3	1.75 (0.97), 0-3	1.43 (1.22), 0-4
IN	0.19 (0.63), 0-3	0.0 (0.00), 0-0	0.42 (0.79), 0-2	0.0 (0.00), 0-0
AB	0.74 (0.83), 0-2	1.31 (1.30), 0-3	0.58 (0.79), 0-2	0.86 (1.03), 0-3

Note. AC = Number of Accurate and Complete concepts, AI = Number of Accurate but Incomplete concepts, IN = Number of Inaccurate concepts, AB = Number of Absent concepts. The values are listed in the order "mean (standard deviation), range"

The Cronbach's alpha for measuring four types of main concepts in Span-MCA was 0.89. The results of one-way ANOVAs showed a significant effect of age [$F(2, 88) = 4.182, p < 0.01$] and years of education [$F(2, 88) = 6.524, p < 0.001$] on the production of AC concepts. Younger participants or those with a higher level of education had significantly more AC concepts in their descriptive output. Concerning the intra-rater reliability of Span-MCA, a high degree of reliability was found between measurements. The average measure intraclass correlation was 0.826, with a 95% confidence interval from 0.683 to 0.911 [$F(80, 240) = 0.437, p < 0.001$].

According to the CLQT, the PWA's performance indicated severe impairments across multiple cognitive domains (see Table 6). With reference to the PWA's premorbid pattern of language use, her bilingualism status was judged to be comparable to the bilingualism characteristics exhibited by the unimpaired speakers of dialect group 1. As reflected by her Span-MCA scores, the PWA's spoken discourse was significantly inferior than her unimpaired counterparts of dialect group 1 across all aspects of producing main concepts, i.e., fewer AC and more AB concepts, as well as lower efficiency (AC/minute) in her output.

Table 6. The performance on standardized assessments and Span-MCA of the female PWA participant.

	PWA's score	Maximum achievable score	Normative performance of unimpaired speakers in dialect group 1
Western Aphasia Battery			
Spontaneous Speech: Information content	5	10	---
Spontaneous Speech: Fluency, grammatical competence, & paraphasias	6	10	---
Auditory verbal comprehension	8.3	10	---
Repetition	10	10	---
Naming	3.6	10	---
Aphasia Quotient (AQ)	65.8	100	---
Cognitive Linguistic Quick Test			
Attention	9	215	---
Memory	34	185	---
Executive function	3	40	---
Language	15	37	---
Visuospatial skills	2	105	---
Composite severity rating (for 70-89 years)	1	4	---
Span-MCA			
AC	2	25	22.36
AI	5	25	1.71
IN	2	25	0.19
AB	16	25	0.74
Main Concept Score	18	75	70.69
AC per minute	0.41	---	7.72

Note. AC = Number of Accurate and Complete concepts, AI = Number of Accurate but Incomplete concepts, IN = Number of Inaccurate concepts, AB = Number of Absent concepts.

Discussion

Eliciting spontaneous verbal responses is important when one measures the oral discourse in individuals with acquired language disorders. Clinically useful quantitative analytic systems can be beneficial to language assessment and subsequent remediation (Kong, Linnik, Law, & Shum, 2018). There is currently a lack of post-sentence level assessment battery geared for Spanish speakers. This is particularly the case for discourse sampling, transcription, measurement, and analyses across varied Spanish dialects. Addressing the macro- and micro-features with analytic procedures appropriate to each dialectal population is also important. Previous studies have used picture stimuli as an opportunity to bypass the higher cognitive demands and initiate intuitive processing on PWA (Gates & Yoon, 2005). To facilitate speech-language pathologists to provide culturally and linguistically appropriate services of aphasia, the present study was conducted to analyze the dialectal variations of spoken discourse in Spanish, and to establish a translated discourse assessment battery namely the Spanish Main Concept Analysis (i.e., Span-MCA). The final deliverable of the present investigation became particular useful to the Hispanic population clinically given the reported higher occurrence of stroke and hence prevalence of aphasia (Dong et al., 2012), as compared to non-Hispanic Caucasian.

It was determined many native Spanish speakers do not share the same perception of spoken language across geographical locations (or various countries). For example, there is an evident linguistic separation between the peninsular and Argentinian Spanish (Fernández, 2015). According to Kong (2016a), the use of geographically sensitive normative data is crucial and a fundamental step to determine PWA's spoken output. Establishing the current normative dataset of Span-MCA across four major dialectal regions, therefore, allowed clinicians to consider the culturally and linguistically appropriate characteristics of the regional varieties of the Spanish language. Here we argue that specific scoring criteria appropriate for each dialect group, based on output from our unimpaired participants, are necessary for more sensitive and valid estimation of impaired language among Spanish speakers. Note that the target main concepts and acceptable lexical alternatives shown in Appendices A and B, respectively, did not demonstrate a huge lexical variation among dialect groups. One may argue that the examples given as dialectal variations (i.e., to be group specific) could have appeared in the other groups if the group sample size were larger. Some variations might also seem to be education-related or evidence of an influence of English in the Spanish spoken in the US. Therefore, this observed overlap among the four dialect groups may be seen as a strength for the Span-MCA.

In the present study, we have also illustrated how the Span-MCA was applied to our pilot PWA. With reference to the norms based on the group 1 unimpaired participants, preliminary comparison results revealed the tool's feasibility to highlight the PWA's predominant missing of target main concepts and lack of completeness of her content in spoken discourse. It was possible that the PWA's performance in the MCA description task had been confounded by her visuospatial deficits (as her cognitive screening evidenced deficits across several neuropsychological domains). Nevertheless, the Span-MCA results would still allow more informed planning of language remediation and directions of setting functional communication goals (Kong, 2009). A full scale and systematic examination involving more PWA is underway to provide further details of the validity of Span-MCA; this final product of content-based analysis will enable clinicians to expand their current scope of spoken discourse examinations that typically address the degree of grammar and syntax accuracy (e.g., Kong & Law, 2009) or phonemic problems (e.g., Hilger et al., 2014) of output.

The findings here relative to the age and education effects on producing main concepts echoed the conclusions by Kong and Yeh (2015), Yazu, Kong, Yoshihata, and Okubo (2021), and Yazu, Yoshino, and Kong (2019). Interestingly, apart from the observation regarding dialect-specific lexical items being found across the dialect groups, a closer look at the individual target main concepts mentioned also suggested that selection of words and sentence structures to express main concepts tended to be affected by speakers' education. For example, across all four dialects, participants with a higher education tended to use 'da las gracias' in the picture set 4 'helping an old man', a term that is more formal to refer to the man giving thanks to the boy; this was in contrast to participants in the low education groups whose the majority of them used a more informal version of 'dijo bien' (i.e., the man told him good, or good job). However, since the current participant pool was dominant by speakers who were in the younger group (and there were no older unimpaired participants in group 3), it remains inconclusive how age exactly played a role in word choice and/or syntactic features of the output. Moreover, as indicated in Tables 2 and 3, younger unimpaired speakers tended to be more educated; it warrants further investigations when more age- and education-balanced norms become available in the future, so that the possible covariates of age and education can be more suitably considered (or more adequately addressed using covariate statistical analyses).

As the Spanish-speaking populations with various acquired language impairments increase around the globe, speech-language pathologists must be prepared to serve these diverse populations with reference to their language needs. Similar to the conclusions of previous reports on MCA of other language versions, we argue that the Span-MCA is an important supplemental resource for healthcare professionals because it contains standardized and comprehensive procedures of language sample elicitation and scoring criteria that are clinically-friendly. With the dialectal variations of the Spanish language, the fact that much overlap existed in the vocabulary use across sets of Span-MCA pictures should be considered an additional strength of the test, because it allowed one to elicit and score discourse similarly for speakers of different backgrounds. Furthermore, Span-MCA facilitates practitioners to evaluate discourse production systemically and objectively (Kong et al., 2015) and to gain evidence-based insights for tar-

getting appropriate interventions of aphasic output. The clinical values of the tool will increase once an expanded and more balanced set of normative data on Spanish dialect-specific main concepts and disordered data become available.

Acknowledgment

The manuscript was prepared based on the honors undergraduate thesis of Karla Simonet completed in Summer 2019. This project received ethics approval from the University of Central Florida IRB Office (#SBE-18-14401). The author is grateful to Ms. Melinda Bonilla, Center Director of Share the Care (Winter Springs), for her help in recruiting the pilot PWA participant. The author also acknowledges the following student researchers for their contributions to the project: Ashley Aguiar, Betsali Cintron-Vargas, Jennifer Santana, Kassandra Capi, and Erica Reynoso.

Bibliography

- Arteaga, D., & Llorente, L. I. (2009). *Spanish as an international language: Implications for teachers and learners*. Tonawanda, NY: Multilingual Matters.
- Brown, E. L., & Cortés-Torres, M. (2013). Puerto Rican intensifiers: Bien/Muy variables. In A. M. Carvalho, & S. Beaudrie, (Eds.). *Selected proceedings of the 6th workshop on Spanish sociolinguistics* (pp. 11-19). Somerville, MA: Cascadilla Press.
- Dong, C., Rundek, T., Wright, C. B., Anwar, Z., Elkind, M. S., & Sacco, R. L. (2012). Ideal cardiovascular health predicts lower risks of myocardial infarction, stroke, and vascular death across whites, blacks, and Hispanics: The northern Manhattan study. *Circulation*, 125(24), 2975-2984. doi: 10.1161/CIRCULATIONAHA.111.081083
- Fernández, J. (2015). General extender use in spoken peninsular Spanish: Metapragmatic awareness and pedagogical implications. *Journal of Spanish Language Teaching*, 2(1), 1-17.
- Gao, G., Kong, A., & Lau, K. (2016). Production of main concepts by Mandarin-speakers with traumatic brain injury in China: A pilot study. *Frontiers in Psychology*. doi: 10.3389/conf.fpsyg.2016.68.00005
- Gates, L., & Yoon, M. G. (2005). Distinct and shared cortical regions of the human brain activated by pictorial depictions versus verbal descriptions: An fMRI study. *NeuroImage*, 24(2), 473-486. doi: 10.1016/j.neuroimage.2004.08.020.
- Gildersleeve-Neumann, C. (2019). Puerto Rican Spanish. Retrieved from <https://www.pdx.edu/multicultural-topics-communication-sciences-disorders/puerto-rican-spanish>
- Goodglass, H., & Kaplan, E. (1972). *Boston diagnostic aphasia examination*. Philadelphia, PA: Lea and Febiger.
- Hawkes, M. A., Ameriso, S. F., & Willey, J. Z. (2015). Stroke knowledge in Spanish-speaking populations. *Neuroepidemiology*, 44(3), 21-29. doi: 10.1159/000381100
- Helm-Estabrooks, N. (2001). *Cognitive linguistic quick test*. San Antonio, TX: Pearson.
- Hilger, A., Ramsberger, G., Gilley, P., Menn, L., & Kong, A. P. H. (2014). Analysing speech problems in a longitudinal case study of logopenic variant PPA. *Aphasiology*, 28(7), 840-861. doi: 10.1080/02687038.2014.895974
- Kertesz, A., Pascual-Leone, P., & Pascual-Leone, G. (1990). *Western Aphasia Battery en versión y adaptación castellana*. Valencia: Nau Libres.
- Kong, A. P. H. (2009). The use of main concept analysis to measure discourse production in Cantonese-speaking persons with aphasia: A preliminary report. *Journal of Communication Disorders*, 42(6), 442-464.
- Kong, A. P. H. (2011). The main concept analysis in Cantonese aphasic oral discourse: External validation and monitoring chronic aphasia. *Journal of Speech, Language, and Hearing Research*, 54, 148-159. doi: 10.1044/1092-4388(2010/09-0240)
- Kong, A. P. H. (2016a). *Analysis of neurogenic disordered discourse production: From theory to practice*. New York, NY: Routledge.
- Kong, A. P. H. (2016b). *Main Concept Analysis (MCA) for oral discourse production*. Hong Kong: The Commercial Press.
- Kong, A. P. H. (2018). Main Concept Analysis (MCA) for acquired deficits of spoken narratives: Preliminary data on inter-rater agreement and potential application to the Korean-speaking population. *Clinical Archives of Communication Disorders*, 3(1), 14-21.
- Kong, A. P. H., & Law, S. P. (2009). A linguistic communication measure for monitoring changes in Chinese aphasic narrative production. *Clinical Linguistics and Phonetics*, 23(4), 255-269. doi: 10.1080/02699200802673234
- Kong, A. P. H., Linnik, A., Law, S., & Shum, W. (2018). Measuring discourse coherence in anomic aphasia using Rhetorical Structure Theory. *International Journal of Speech-Language Pathology*, 20(4), 406-421. doi: 10.1080/17549507.2017.1293158
- Kong, A. P. H., Ross, A., & Pettigrew, C. (2012). A Main-Concept Analysis for aphasic discourse in Irish-English speakers: Adaptation and preliminary report. *Journal of Clinical Speech and Language Studies*, 19, 19-43.
- Kong, A. P. H., Whiteside, J., & Bargmann, P. (2015). The main concept analysis: Validation and sensitivity in differentiating discourse produced by unimpaired English speakers from individuals with aphasia and dementia of Alzheimer type. *Logopedics Phoniatrics Vocology*, 41(3), 129-141. doi: 10.3109/14105439.2015.1041551.

- Kong, A. P. H., & Yeh, C. C. (2015). A Taiwanese Mandarin Main Concept Analysis (TM-MCA) for quantification of aphasic oral discourse. *International Journal of Language & Communication Disorders*, 50(5), 580-592.
- Linnik, A., Bastiaanse, R., & Höhle, B. (2016). Discourse production in aphasia: A current review of theoretical and methodological challenges. *Aphasiology*, 30(7), 765-800. doi: 10.1080/02687038.2015.1113489
- Muñoz, M. L., & Marquardt, T. P. (2008). The performance of neurologically normal bilingual speakers of Spanish and English on the short version of the Bilingual Aphasia Test. *Aphasiology*, 22(1), 3-19. doi: <https://doi.org/10.1080/02687030600670742>
- Nicholas, L. E., & Brookshire, R. H. (1993). A system for quantifying the informativeness and efficiency of the connected speech of adults with aphasia. *Journal of Speech, Language, and Hearing Research*, 36, 338-350.
- Nicholas, L. E., & Brookshire, R. H. (1995). Presence, completeness, and accuracy of main concepts in the connected speech of non-brain-damaged adults and adults with aphasia. *Journal of Speech and Hearing Research*, 38(1), 145-156.
- Obermeyer, J. A., & Edmonds, L. A. (2018). Attentive reading with constrained summarization adapted to address written discourse in people with mild aphasia. *American Journal of Speech-Language Pathology*, 27, 392-405. doi:10.1044/2017_AJSLP-16-0200
- Paradis, M., & Libben, G. (1987). *The assessment of bilingual aphasia*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Pritchard, M., Hilari, K., Cocks, N., & Dipper, L. (2017). Reviewing the quality of discourse information measures in aphasia. *International Journal of Language & Communication Disorders*, 52(6), 689-732. doi: 10.1111/1460-6984.12318.
- Rivera, A., Hirst, J., & Edmonds, L. A. (2018). Evaluation of language predictors of main concept production in Spanish/English bilingual discourse using Nicholas and Brookshire stimuli. *American Journal of Speech-Language Pathology*, 27(1), 52-70. doi: https://doi.org/10.1044/2017_AJSLP-15-0186
- Rydgren, E. (2020). Spanish language. *Salem Press Encyclopedia*, Item: 87324954, 1-2.
- Saffran, E. M., Berndt, R. S., & Schwartz, M. F. (1989). The quantitative analysis of agrammatic production: Procedure and data. *Brain and Language*, 37(3), 440-479. doi:10.1016/0093-934x(89)90030-8.
- Stark, B. C., Dutta, M., Murray, L. L., et al. (2020). Standardizing assessment of spoken discourse in aphasia: A working group with deliverables. *American Journal of Speech-Language Pathology*. Advance online publication. doi: https://doi.org/10.1044/2020_AJSLP-19-00093
- Yazu, H., Kong, A. P. H., Yoshihata, H., & Okubo, K. (2021). Adaptation and validation of the Main Concept Analysis of spoken discourse by native Japanese adults. *Clinical Linguistics & Phonetics*. ePub ahead. <https://doi.org/10.1080/02699206.2021.1915385>
- Yazu, H., Yoshino, M., & Kong, A. P. H. (2018). A Japanese version of Main Concept Analysis: Preliminary report. In B. Rapp (Ed.), *Frontiers in Human Neuroscience*. <https://doi.org/10.3389/conf.fnhum.2018.228.00079>
- Yazu, H., Yoshino, M., & Kong, A. P. H. (2019). Validation of the Japanese version of Main Concept Analysis (J-MCA). *Frontiers in Human Neuroscience*. <https://doi.org/10.3389/conf.fnhum.2019.01.00031>
- Yorkston, K. M., & Beukelman, D. R. (1980). An analysis of connected speech samples of aphasic and normal speakers. *Journal of Speech and Hearing Disorders*, 45(1), 27-36. <https://doi.org/10.1044/jshd.4501.27>

Appendix A

Target main concepts of Spanish version of MCA across dialect groups

	English (original)	Spanish Group 1 (Central American Caribbean)	Spanish Group 2 (Andean-Pacific)	Spanish Group 3 (Mexican)	Spanish Group 4 (Central-Southern Peninsular)
Set 1 'Cooking in a kitchen'					
MC1	The old lady is <u>cutting</u> up carrots	Una señora está <u>cortando</u> zanahorias			
MC2	The old lady <u>cuts</u> her finger	La señora se <u>cortó</u> el dedo			
MC3	The old lady's <u>finger</u> is <u>bleeding</u>	El <u>dedo</u> de la <u>señora</u> está <u>sangrando</u>			
MC4	The old lady is <u>looking for</u> something in a first-aid box	La <u>señora</u> está <u>buscando</u> algo en el botiquín de primeros auxilios			
MC5	The old lady is <u>sticking</u> a Band-Aid	La señora se está <u>poniendo</u> una curita	La señora está <u>poniéndose</u> una <u>tirita</u>		
Set 2 'Waking up late for work'					
MC1	The man <u>wakes up</u>	El señor se <u>levanta</u>			
MC2	The man is <u>shocked/late</u>	El señor está <u>retrasado/ se levantó tarde/ se despertó tarde</u>			---
	The man is <u>late</u>	---			El señor está <u>retrasado</u>
MC3	The man is <u>brushing</u> his teeth	El señor se está <u>cepillando/ lavando</u> los dientes			
MC4	The man is <u>combing</u> his hair	El señor se está <u>peinando</u> / El señor se está <u>peinando</u> el pelo			
MC5	The man is <u>putting on</u> his pants	El señor se está <u>poniendo</u> los pantalones			
MC6	The man is <u>wearing</u> a pair of <u>socks</u> that are different/wrong in color	El señor <u>tiene</u> calcetines de <u>diferentes colores</u>			
Set 3 'Buying ice-cream'					
MC1	The mother and the girl <u>approach</u> an ice-cream store	La madre y la niña <u>van a comprar</u> un helado			
MC2	The girl <u>asks for/wants</u> an ice-cream	La niña <u>pide/quiere</u> un helado			
MC3	The mother is <u>paying</u>	La madre está <u>pagando</u>	---	La mamá está <u>pagando</u>	La mamá está <u>pagando</u>
	The mother and the girl are <u>buying</u> ice-cream	---	La madre y la niña están <u>comprando</u> helado	---	---
MC4	The man is <u>scooping</u> an ice-cream cone	El señor está <u>sirviendo</u> el helado en un cono			
MC5	The girl <u>dropped</u> the ice-cream on the floor	A la niña se le <u>cayó</u> el helado en el piso			
MC6	The girl is <u>craving/unhappy</u>	La niña está <u>llorando/triste</u>			
MC7	The man <u>looks at</u> the girl from behind	El señor <u>mira</u> que está pasando			
MC8	The man <u>gives</u> the girl another ice-cream cone	El señor <u>le dá</u> otro helado a la niña			
MC9	The girl is <u>smiling</u>	---	La niña está <u>contenta</u>	Ella está <u>contenta</u>	---
Set 4 'Helping an old man'					
MC1	The father and the son are <u>walking</u> on the street	El padre y su hijo están <u>caminando</u> en la calle/ El padre y el niño están <u>caminando</u> en la calle			
MC2	The old man is <u>carrying</u> a grocery bag	El señor está <u>llevando</u> sus bolsas			
MC3	The oranges <u>fall</u> on the floor	Se <u>cayeron</u> las cosas / las naranjas/ las frutas			
MC4	The boy <u>sees</u> the incident	El niño se <u>dió cuenta</u>			
MC5	The boy is <u>helping</u> the old man	El niño está <u>ayudando</u> al señor			
MC6	The old man is <u>praising</u> the boy	El señor <u>le agradece</u> al niño/ <u>le dice gracias</u> al niño			

The main verb for each main concept is **bolded and underlined**. All the essential information within a main concept is underlined.

Appendix B

Lexical items that are accepted as alternatives in the Spanish version of MCA across dialect groups

Lexical items in Spanish	Lexical items in English	Spanish Group 1 (Central American Caribbean)	Spanish Group 2 (Andean-Pacific)	Spanish Group 3 (Mexican)	Spanish Group 4 (Central-Southern Peninsular)
Set 1 'Cooking in a kitchen'					
señora	Old lady	(abuelita, viejita, ella, señora mayor, anciana)	(viejita, abuelita, ella, anciana)	(ella, abuelita, viejita)	(anciana)
Cortando	Cutting	(picando)	(picando)	(picando, partiendo, rebanando)	---
Zanahorias	Carrots	(vegetables, zanahorias)	(zanahoria)	(vegetales)	---
el dedo	Finger	(mano, dedo, dedito)	(dedo, mano)	---	---
Sangrando	Bleeding	(botando sangre, sangrando)	(sangrando)	---	---
Buscando	Looking for	(buscando, agarrando)	(sacando, buscando)	(agarrando, tomando)	---
botiquín de primeros auxilios	First-aid box	(botiquín, gabinete de la medicina, equipo de primero auxilios)	(botiquín de primeros auxilios, gabinete de medicina)	(maletín, caja de primeros auxilios, gabinete, gabinete de las medicinas)	---
Poniendo	Sticking	(poniéndose, se puso)	(poniéndose, colocando)	---	---
Curita	Band-Aid	(medicamento, Band-Aid, cura, bandita)	(una cura, una tirita)	---	(tirita)
Set 2 'Waking up late for work'					
Señor	Man	(hombre, muchacho, tipo, niño, caballero, chico, la persona)	(hombre, muchacho, niño, chico, la persona)	(muchacho)	(hombre)
Levanta	Wakes up	(despertó, levantó)	(despertó, levantó)	(despierta)	---
Asustado	Shocked	(asustado, gritando, en shock)	(asustado)	---	---
Cepillando	Brushing	(lavándose)	(lavándose)	(lavando)	---
Peinando	Combing	---	---	(arreglándose)	---
Poniendo	Putting on	(listando, cambiando, vistiendo)	(cambiando, vistiendo)	---	---
Pantalones	Pants	(ropa, pijamas, pantalón, los pantalones)	(pijamas, pantalón, los pantalones)	---	---
calcetines de diferentes colores	Two socks that are different in color	(medias de diferente color, diferentes calcetines, una media negra y una media blanca, medias equivocadas, medias al revés)	(medias de diferente color, diferentes medias, una media de un color y la otra de otro)	(medias equivocadas)	---
Set 3 'Buying ice-cream'					
madre	Mother	(mujer, señora, mamá)	---	(señora)	(mamá, señora)
Niña	Girl	(hija, nena)	(hija)	(hija)	---
van a comprar	Approach	(fueron a comprar, mirando a comprar, tratando comprar)	(fueron, van)	(fueron a comprar)	---
helado	Ice cream store	(heladería, tienda, mantecado, nieve)	(una heladería)	(donde venden helado)	---
pide/ quiere	Asks for	(escojiendo, mirando, pidiendo)	(pidiendo)	(escoge)	---
pagando	Paying	(comprando, dando el dinero, pagando, ordenando)	(pagando, compra)	(entregándole)	---
señor	Man	(panadero, trabajador, heladero, hombre, joven, tipo)	(heladero, trabajador)	(hombre)	(hombre)

Lexical items in Spanish	Lexical items in English	Spanish Group 1 (Central American Caribbean)	Spanish Group 2 (Andean-Pacific)	Spanish Group 3 (Mexican)	Spanish Group 4 (Central-Southern Peninsular)
sirviendo	Scooping	(preparando, dando, despachando, cojiendo, sacando, echando, arreglando, sirviendo)	(sirve)	---	---
llorando	Crying	(media triste)	(triste)	---	---
cayó	Dropped	(terminó, caído)	(se cayó)	(tiró)	---
en el piso	On the floor	---	(piso)	(al suelo)	---
mira	Looks at	(mirando, miro con preocupación, vio, dio cuenta, le interesa)	(lo vió, se dió cuenta)	(viendo)	---
le da	Gives	(le dio, dale, regalo, volvía)	(dió, dando)	(regala, prepara)	---
contenta	Smiling	---	(feliz)	---	---
Set 4 'Helping an old man'					
padre	Father	(hombre, abuelito, señor, papá)	(hombre, señor)	(señor)	(hombre)
niño	Son	(nene, nieto, hijo)	---	---	---
caminando	Walking	(andando, pasando, llendo, van, salieron)	(pasando)	(van)	---
señor	Old man	(viejo, señor mayor, hombre)	(abuelo, viejito, señor mayor)	(vejito)	(anciano)
llevando	Carrying	(tiene, con sus bolsas, caminando)	(cargando, llevaba)	(cargando, con)	---
naranjas	Oranges	(objetas, frutas, pelotas, chinas)	(frutas, pelotas)	(fruta, pelotas, mercancia, mandados)	---
cayeron (en el piso)	Fall (on the floor)	(se rompió la bolsa, salen, se rompe la bolsa, cayendo)	(cayeron, se le caen)	---	---
vio	Sees	(voltea a mirar, miró, se ve, mirando)	(miró)	(mira, ve)	---
ayudando	Helping	(ayudando)	(ayudar)	---	---
da las gracias	Praising	(agradecido, feliz, le da las gracias)	(agradecido)	(dijo bien, agradece)	(le da las gracias)