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The Manifestation of Aphasic Symptoms in Spanish

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Abstract—Few systematic descriptions of aphasia characteristics are available about the Spanish language. Three different language aspects are examined in this paper: phonology, aphasic substitutions (paraphasias), and morphosyntax. It has been observed that phonological errors in Spanish speaking aphasics more frequently involve vowels than consonants. It is proposed that this is related to the salience of vowels observed in Spanish. Phonological paraphasias are about 10 times more frequent than verbal paraphasias in conduction aphasia. In Broca's aphasia, they are only five times more frequent, whereas in Wernicke's aphasia the number of phonemic and verbal paraphasias is roughly the same. It is difficult to know how well this distribution fits in other languages, due to the absence of cross-linguistic comparisons. Agrammatism in Spanish has certain distinguishing characteristics, particularly due to the significant flexibility of the word order in the sentence and the use of some preposition to distinguish the object from the subject. Certain aspects of Spanish grammar are relatively resistant in cases of brain pathology, such as the subject-verb concordance. Some relatively unusual types of sentences, such as passive sentences, are significantly impaired in cases of agrammatism. Obviously, those grammatical aspects that are stronger (i.e., more crucial to distinguish the agent and the patient, such as the use of the preposition "a") are also better preserved in cases of Broca's aphasia associated with agrammatism. It is concluded that, despite similarities with aphasia described in other Indo-European languages, certain aphasia features can be considered characteristic of the Spanish language.

Key Words: Spanish, aphasia, paraphasias, agrammatism

Acquired language disturbances correlate with specific language idiosyncrasies. Spanish, as any other language, possesses phonological, lexical, grammatical, and semantic peculiarities. Comparing aphasia symptomatology across different languages, some common characteristics, but also specificities, are expected. As an example, the article omissions represent the most evident sign of agrammatism in Spanish. Such sign is simply nonexistent in some other languages, such as Russian, simply because articles are nonexistent in Russian.

Unfortunately, few systematic descriptions of aphasia characteristics are available about the Spanish language. Even though the interest in aphasic disturbances is quite strong in the Spanish-speaking world, only a few aphasia analyses have been published. Departing from those few reports, in this paper an analysis of aphasias in Spanish

speaking individuals will be presented. Three different language aspects will be examined: phonology, aphasic substitutions (paraphasias), and morphosyntax.

Phonology

A few published journal articles have analyzed the phonological disorders in Spanish. Ardila, Montañes, Caro, Delgado, and Buckingham (1989) reported the phonological changes observed in a group of 37 Spanish-speaking aphasics (Table 1). Patients were divided into four groups: those with Broca's aphasia, conduction aphasia, Wernicke's aphasia, and anomia. It was found that vocalic changes are particularly infrequent in Spanish. In the motor types of aphasia (Broca's and conduction aphasia—conduction aphasia can be interpreted as a motor type of aphasia; Luria, 1976) vocalic changes represented less than 10% of the total number of substitutions. In Wernicke's aphasia and anomia they represented about 25%. Voiced/ voiceless changes in stop consonants were also rather infrequent. They represented less than 5% of the total number of changes in the motor types of aphasia and about 10% in Wernicke's aphasia and anomia. Most of the phonological or literal paraphasias were due to errors in the place of articulation, manner of articulation, or both. In motor aphasias, phonological paraphasias are due in about one-quarter of the cases to phoneme omissions. Phoneme metatheses (e.g., *mano* → *namo*) are particularly unusual in Spanish. In anomic aphasia they represent barely 5% of the aphasic phonemic substitutions.

Table 1. Characteristics of 744 phonological paraphasias in 37 Spanish-speaking aphasics. Different types of errors and mechanisms utilized are presented (Adapted from Ardila et al.1989)

	Broca (n=10)	Conduction (n=9)	Wernicke (n=8)	Anomia (n=10)
TYPE OF ERROR				
Manner of articulation	46	57	35	32
Place of articulation	13	11	9	22
Place and manner of articulation	28	23	19	16
Voiced/voiceless (oral stops)	4	4	8	8
Vocalic errors	9	5	29	22
MECHANISMS UTILIZED				
Substitution	62	52	72	78
Omission	20	25	12	2
Reduplicative substitution	8	15	8	10
Addition	5	4	6	5
Reduplicative addition	2	3	1	0
Exchange	1	1	1	5

It is interesting to emphasize the very low frequency of vocalic changes observed in Spanish-speaking aphasics. It may be assumed that they are due to the vocalic characteristics of Spanish. As a matter of fact, the vocalic system in Spanish is extremely simple and includes only five vowels. Syllables are formed around the vowels. Usually, vowels are not reduced in spontaneous language and vowels have a significant salience. That is, they are very clearly produced and easily heard. Furthermore, when learning to write, children present usually errors in consonants, not in vowels (Ardila, Rosselli & Ostrosky, 1996; Bravo-Valdivieso, 1982, 1988). In other words, vocalic errors are unusual not only in cases of acquired language disturbances, but also in other conditions.

Ardila and Rosselli (1992) analyzed language repetition errors in a group of 41 Spanish-speaking aphasics. The three repetition subtests from the Boston Diagnostic Aphasia Examination—Spanish version (Goodglass & Kaplan, 1979) were used (words, high probability and low probability sentences) (Table 2). Aphasic patients were divided into five groups: extrasylvian motor aphasia (i.e., transcortical motor aphasia or dynamic aphasia), Broca's aphasia, conduction aphasia, Wernicke's aphasia, and anomia. It was found that repetition errors were unusual in extrasylvian motor aphasia.

Some errors were recorded only in low probability sentences. Errors were due to word omissions and changes in word order. It should be noted that Spanish presents a significant flexibility in sentence word order. In their repetitions, extrasylvian motor aphasia patients tended to make sentences more usual and probable. In Broca's aphasia, errors were mainly due to phonological paraphasias (phoneme omissions, phoneme substitutions, and phoneme anticipations). Repetition of sentences was agrammatical with evident omission of grammatical connectors. Percentage of errors was similar under the three conditions (words, high probability sentences and low probability sentences). In conduction aphasia, phonemic errors, self-corrections and successive approaches to the target word were observed. A significant difference was observed between the high and low probability sentences. Repetition of high probability sentences (as well as simple spontaneous speech) can be relatively correct. Conversely, production of unusual phoneme sequences and unusual word sequences was abnormal. Phonological paraphasias were particularly evident. In Wernicke's aphasia phonological paraphasias were observed in word and in sentence repetition. Sentence repetition was notoriously harder than word repetition, probably due to limitations in verbal memory. In anomic aphasia, errors were found in sentence repetition, particularly in repetition of long sentences. Word omissions and semantic paraphasias were observed.

It was concluded that repetition errors are associated with perisylvian aphasias (Broca, conduction and Wernicke), but, all the aphasia groups, including extrasylvian (transcortical) motor aphasia, present some errors in language repetition tasks. Repetition errors, however, are not only quantitatively but also qualitatively different. Depending upon the repetition test, errors can be very evident or minimal and even absent in a particular group of aphasic patients. Different mechanisms can underlie errors in aphasia.

Table 2. Percentage of correct repetition in different types of aphasia in the three repetition subsets (words, high probability and low probability sentences) of the Boston Diagnostic Aphasic Examination (Adapted from Ardila & Rosseli, 1992).

	Extrasyllvian motor	Broca	Conduction	Wernicke	Anomia
	(n=6)	(n=5)	(n=6)	(n=13)	(n=4)
Words	98	46	63	74	100
High probability sentences	95	50	53.7	45	71.2
Low probability sentences	67.5	45	21.2	22.5	52.5

Paraphasias

In the aphasia domain, a significant effort has been devoted to the analysis of paraphasias. Jakobson (1964) interpreted paraphasias as paradigmatic errors in the phoneme or word selection process. Lecours and Lhermitte (1969) illustrated the existence of different types of errors in aphasics' language deviations and proposed to distinguish different types of paraphasias. Blumstein (1973) observed that substitutions represented the most common type of error found in phonological paraphasias, followed by simplification errors (omissions) and additions.

Lecours (1975) proposed the concepts of paradigmatic distance (formal similarity between the substituting and substituted units) and index of formal similarity (number of common phonemes between the substituting and substituted words). Several authors have introduced a difference between phonetic and phonemic changes (Blumstein, 1973; Lecours & Caplan, 1975; Lecours & Lhermitte, 1969; Ryalls et al., 1988). Phonetic (example., [t] → [t']) are not designated as "phonetic paraphasias" but as "phonetic deviations" (Ryalls et al., 1988). The name paraphasia is not used because they do not represent errors at a linguistic level. As a matter of fact, they result from an inappropriate realization of the phonemes. As a general rule, in motor aphasias, an abundant number of phonetic deviations are found. Some phonemic errors found in motor aphasias, however, could be the result of such significant phonetic deviations that are erroneously perceived as phonemic changes (Buckingham, 1989; Lecours & Caplan, 1975). In this regard, they represent phonemic changes for the listener, but phonetic distortions for the speaker (Buckingham & Yule, 1987). For the aphasic patient they represent a motor articulatory defect; for the listener they are phonemic paraphasias. Luria (1976) emphasized that the literal (i.e., phonemic) paraphasias observed in afferent motor aphasia (conduction aphasia), even though perceived as phonemic substitutions, are indeed articulatory substitutions.

Table 3 presents some examples in Spanish of the different types of deviations observed in aphasics' language.

Table 3. Examples of aphasic deviations in Spanish.

Type of deviation	example
Phonemic or literal paraphasias	
Omission	perder -> peder
Addition	camino -> carmino
Displacement	tortuga -> toturga
Substitution	mesa -> tesa
Verbal paraphasias	
Formal	cajetilla -> carretilla
Morphologic	nochemente
Semantic	
same semantic field	nariz -> oreja
antonymous	salir -> entrar
superordinate	caballo -> animal
proximity	papel -> lápiz
Unrelated	casa -> nariz
Sintagmatic paraphasias	el acuario del pez -> la jaula del león
Circumlocutions	
Description	moneda -> redonda, pequeña
Instrumental function	reloj -> para la hora
Neologisms	camisa -> surinjor

Ardila and Rosselli (1993) analyzed the frequency of different types of paraphasias in 30 Spanish-speaking aphasics. The sample was divided into five different groups: extrasylvian (transcortical) motor aphasia, Broca's aphasia, conduction aphasia, Wernicke's aphasia, and anomia. Three subtests from the Boston Diagnostic Aphasia Examination, Spanish version (Goodglass & Kaplan, 1979) were used: Oral description of Plate #1 (The Cookie Theft), repetition, and naming. A total of 833 errors were analyzed.

Table 4. Mean frequency of different types of paraphasias found in different aphasia types (standard deviations in parentheses). A total of 833 errors were analyzed (Adapted from Ardila & Rosselli, 1993).

	Extrasylvian Motor (n=5)	Broca (n=5)	Conduction (n=6)	Wernicke (n=11)	Anomia (n=3)
Phonemic paraphasias					
Omissions	-	8.4 (5.6)	3.0(2.3)	4.5(4.3)	-
Additions	-	1.8 (1.2)	1.3 (1.1)	1.4(1.2)	-
Displacements	-	1.0 (1.2)	1.7(0.9)	1.0(1.2)	-
Substitutions	-	7.4(6.2)	9.5(8.4)	9.6(5.4)	0.6(0.4)
Verbal paraphasias					
Formal	0.6(0.8)	1.0(1.0)	1.5(0.9)	4.6(4.5)	1.0(0.8)
Morphologic	-	0.8(0.4)	-	2.4(1.5)	-
Semantic					
semantic field	0.2(0.4)	2.2(1.7)	0.8(0.8)	5.1(2.4)	7.0(0.8)
antonyms	-	-	0.2(0.3)	0.5(0.9)	-
superordinate	-	-	-	1.5(1.9)	1.0(1.4)
proximity	-	-	-	0.2(0.3)	0.5(0.4)
Unrelated	-	-	0.2(0.3)	4.5(6.0)	3.7(5.1)
Syntagmatic	0.2(0.4)	-	-	0.5(0.8)	-
Circumlocutions					
Description	-	-	0.2(0.3)	1.2(2.0)	0.6(0.4)
Function	-	-	-	1.5(1.9)	0.6(0.9)
Neologisms	-	1.0(0.9)	2.3(3.5)	10.9(13.8)	-

Phonemic paraphasias were significantly associated with perisylvian aphasias (Broca, conduction and Wernicke). In extrasylvian (transcortical) motor aphasia, just a few verbal paraphasias were noted. In Broca's aphasia, the number of paraphasias was particularly high, as a result of phoneme omissions and substitutions. Sporadically, other types of paraphasias are also observed. Phonemic paraphasias were quite frequent in conduction aphasia, as a result of phoneme substitutions, but also phoneme omissions and displacements. Wernicke's aphasia patients present all the types of paraphasias mentioned above. The amount of literal and verbal paraphasias was roughly equivalent. Anomic patients present especially semantic verbal paraphasias due to substitutions within the same semantic field. Occasionally, superordinate words and circumlocutions are also found. Table 4 summarizes the frequency of paraphasias found in this group of Spanish-speaking aphasics. It is difficult to know how this frequency compares with the frequency found in other languages.

The ratio "phonemic paraphasia/verbal paraphasia" was calculated. It was found to be different in the different aphasia subtypes. In Broca's aphasia, literal paraphasias are about 5 times more frequent than verbal paraphasias. In conduction aphasia, this relation is 10:1. In Wernicke's aphasia the ratio "phonemic paraphasia/verbal paraphasia" is close to 1. This means that the amount of phonemic and verbal paraphasias is roughly the same. In extrasylvian motor aphasia literal paraphasias are virtually absent, and only sporadically verbal paraphasias are recorded. In anomia, literal paraphasias are practically non existing and the ratio "phonemic paraphasia/verbal paraphasia" is close to zero. As a matter of fact, the definition of anomia supposes the presence of verbal but not literal paraphasias.

In summary, even though some deviations tend to predominate in certain aphasia subtypes, the relationship between aphasia type and paraphasia type is not simple. Furthermore, the frequency of paraphasias analyzed above corresponds to Spanish. Nonetheless, it can be conjectured that Broca's aphasics in any language will present a significant number of phonemic paraphasias particularly as a result of phoneme omissions. By the same token, it can be anticipated that conduction aphasia patients will present a very high frequency of literal paraphasias, specially observed in repetition tasks, associated with self-corrections and approximations. In any language, it can be expected that Wernicke's aphasics will present a significant amount of both, phonemic and verbal paraphasias. In extrasylvian motor aphasia, only verbal changes are expected. In anomia, language deviation must correspond to semantic substitutions; this type of change is usually included in the definition of anomia.

Morphosyntax

To the best knowledge of the author of this paper, only three research studies dealing with agrammatism in Spanish-speaking aphasics have been published in the international literature (Reznik, Dubrovsky & Maldonado, 1995; Benedet, Christiansen & Goodglass, 1998; Ostrosky-Solis, Marcos-Ortega, Ardila, Rosselli & Palacios, 1999). Obviously, agrammatism in Spanish, as in any other language, has certain specific characteristics. There are grammatical aspects shared by every language, but also specific grammatical idiosyncrasies in every language. Intuitive clinical observations suggest the following comments:

1. In Spanish-speaking aphasics, article omissions represent the most evident sign of agrammatism. It is very easy to observe in spontaneous language, or even in naming tasks (Spanish speakers usually name using the article plus the name). It is interesting to note that patients with Wernicke's aphasia, even though unable to find nouns, may correctly select the article (in Spanish there are masculine and feminine nouns and corresponding articles) (e.g., they fail in naming *la mesa* -the table; but they know it is *la* -feminine, not *el* -masculine)
2. Spanish has flexible word order. However, in cases of agrammatism, flexibility in word order can be impaired. Patients with Broca's aphasia can produce and understand sentences with a canonical word order, but they fail with other non-canonical word orders.

Reznik, Dubrovsky, and Maldonado (1995) reported the case of a 55-year-old right-handed woman with a large right parietal-temporal, cortical-subcortical lesion extending

to the occipital and frontal lobes. Initially a severe aphasia and anarthria were found. It was assumed that the patient presented with a crossed aphasia. Three months later, a significant improvement was found. A diagnostic of Broca's aphasia was proposed. A 535-word oral language sample was analyzed. In this language sample, 51.03% of the words corresponded to open class (lexical items) and 48.97% to closed class words (grammatical elements). This distribution was similar to the distribution found in normal language. Two different types of defect, however, were found: (1) frequent omission of clitic pronouns, and (2) difficulty in producing sentences with a canonical order.

This is an extremely unusual case that in no way can be considered typical of Spanish agrammatism. The patient suffered an extensive right hemisphere lesion and three months later her language was nearly normal.

As a matter of fact, the patient did not present any evidence of agrammatism, and maybe she did not even present any evident aphasia. Word order in sentence is extremely flexible in Spanish. In cases of agrammatism in Broca's aphasia the opposite situation is usually found: only canonical order is accessible to the patient. Frequent production of a non-canonical order cannot be interpreted as agrammatism. Only clitic pronoun omission could be accepted as indicative of agrammatism. Nonetheless, it would be an extraordinary selective form of agrammatism that cannot be interpreted as the usual agrammatism found in Broca's aphasia (Benson & Ardila, 1996). Even if the patient presented aphasia and agrammatism, crossed aphasia is not a good model to study agrammatism.

Benedet, Christiansen and Goodglass (1998) selected six Broca agrammatic aphasics. A Spanish version of the Morphosyntactic Battery developed by Goodglass, Christiansen and Gallagher (1993) was administered. It was found that the relative order of difficulty in production as well as in comprehension of grammatical morphemes, was similar to that reported in English. Nonetheless, two significant exceptions were found: (1) Spanish-speaking aphasics had a better subject-verb concordance; and (2) comprehension of active and passive sentences was worse in Spanish than in English. In Spanish, a verbal form is more dependent on the pronoun than in English (e.g., *yo tengo, tú tienes, él tiene*, etc; *I have, you have, he has*, etc.). It seems understandable that the relationship between subject and verb can be stronger and more resistant in Spanish than in English. By the same token, passive constructions are more frequent in English than in Spanish. In consequence, it seems understandable that they are stronger and more resistant in English than in Spanish. Ostrosky et al. (1999) analyzed the syntactic and nonsyntactic strategies used for understanding sentences by Spanish-speaking Broca's aphasic patients. A linguistic instrument was applied to 10 patients with Broca's aphasia. A forced choice task was used in which the patient listened to 190 different reversible sentences and was asked to select one of four options presented on a plate; each option contained a pair of animals performing a specific act and only one option was correct. The results showed significant differences in the use of syntactic and nonsyntactic strategies. Broca's aphasic patients used only morpho-syntactic marks with high cue validity. No significant effects of word order were found. Different strategies were observed in understanding sentences. The first depends on grammatical knowledge of the function of the preposition "a" (to) as a sign of the direct object. Another strategy depends, it would seem, on intuitions concerning the canonical grammatical structure, and is observed in a tendency to interpret as a subject (agent) the nominal phrase that precedes the transitive verb, and as the object (patient), the one that appears immediately after the verb. However, when the word order is changed from SVO to VSO, the role of patient is assigned to the noun that follows the verb.

Spanish speaking patients with Broca's aphasia, unlike normal subjects, did not use structural strategies in active sentences, such as the canonical word order of the sentence. They used free functors such as articles. Nor could they process passive sentences. Neither syntax complexity nor canonical word order affected their performance. As long as the preposition "a" was present, the subjects performed at the same level on sentences in which the order was canonical (TV-Pat) or not (Pat-TV). Likewise, both in simple sentences such as active, and in pseudocleft sentences, the only significant factor was the uncontracted preposition, and there were no significant differences of order or definiteness. The absence of use of these other strategies produced comprehension alterations. However, even in active sentences containing a preposition, the performance of the aphasic patients was less efficient than that of normal subjects (70% accuracy vs. 98% in normals). This means that in Broca's aphasics, free functor morphemes are available for processing. However the patients do not process all the morphology because in passive sentences that contain two signs "*por*" and the verbal ending "*-ado*", the results obtain by chance. Nor was a significant effect found in the processing of sentences with the contracted preposition "*a'*", which suggests that the coalescence *a+el* could be affecting performance. Apparently the preposition "*a*" is resilient to brain damage because it is a crucial source of information for thematic assignment in Spanish.

In contrast to studies conducted in other languages with Broca's aphasics, Spanish-speaking patients use no principle of word order or surface markers such as the determiner. The fact that comprehension strategies are different seems to follow from this.

Conclusions

This paper has attempted to summarize the main studies dealing with aphasia in Spanish-speakers. As in any language, certain phonological, lexical and morphosyntactic idiosyncrasies are found in Spanish. Some tentative conclusions can be drawn:

1. Phonological errors in aphasia more frequently involve vowels than consonants. This is particularly true in motor types of aphasia. Reading and writing errors in normal subjects and disabled children are more unfrequently found in consonants than in vowels. This is related with the salience of vowels observed in Spanish. Syllables are assembled around the vowels.
2. Phonological paraphasias are about 10 times more frequent than verbal paraphasias in conduction aphasia. In Broca's aphasia, they are only five times more frequent, whereas in Wernicke's aphasia the number of phonemic and verbal paraphasias is roughly the same. In anomic patients, a significant number of verbal, especially semantic paraphasias are observed, whereas phonological paraphasias are virtually absent. It is difficult to know how well this distribution fits in other languages, due to the absence of cross-linguistic comparisons.
3. Agrammatism in Spanish has certain distinguishing characteristics, particularly due to the significant flexibility of the word order in the sentence and the use of some preposition to distinguish the object from the subject. Relatively significant morphological complexity may play a certain role in Spanish agrammatism. Certain aspects of Spanish grammar are relatively resistant in cases of brain pathology, such as the subject-

verb concordance. Some relatively unusual types of sentences, such as passive sentences, are significantly impaired in cases of agrammatism. Obviously, those grammatical aspects that are stronger (i.e., more crucial to distinguish the agent and the patient, such as the use of the preposition "a") are also better preserved in cases of Broca's aphasia associated with agrammatism.

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