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DIALECTAL VARIATION IN SPANISH AND ITS ROLE IN U.S. HEALTHCARE

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ABSTRACT

Spanish is the number one language spoken in the U.S. aside from English, especially among immigrants. This thesis aims to address and advocate for issues related to the intersection of linguistics and medicine, especially as they pertain to healthcare in the U.S. There are three main goals of this thesis: to establish a basis for expanding medical Spanish programs in the U.S., create a glossary of colloquial medical terminology as a reference for healthcare professionals, and to determine dialectal retention in a Chilean Spanish speaker with aphasia. The last two goals will focus on lexical variation and phonetics, respectively, two linguistic factors that distinguish Spanish dialects from one another. Overall, there are few resources that focus on the potential impacts of dialectal variation in healthcare. My goal with this thesis is to create a practical resource and bring attention to this minimally investigated issue that may impact the quality of care for native Spanish speakers in the U.S.

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Chapter 1

Spanish in U.S. Medicine and Medical Education

There is a growing need for medical Spanish programs for health professionals based on demographic shifts in the U.S. In addition to Spanish being the most widely spoken language in the country after English (Dietrich & Hernandez, 2022), the U.S. Hispanic population is estimated to increase to 111.22 million speakers by 2060 ("Hispanics in the United States - Statistics & Facts", 2023). In contrast, an email survey was sent to 132 U.S. medical schools inquiring about the status of medical Spanish programs, 110 of which responded, finding that only 66% of these schools have existing programs (Morales et al., 2015). Furthermore, a majority of the existing curricula in Spanish are taught by both faculty and students, solely offered as electives, and do not count for course credit (Morales et al., 2015). In the context of healthcare, a lack of language concordance between patients and physicians could increase health disparities for patients whose primary language is not English, which may negatively impact patient health and safety. Although implementing and expanding the resource of qualified medical interpreters in clinical settings is an effective tool to address linguistic barriers, patient-physician language concordance, which is the ability to speak the same language, has been proven even more effective as measured by patient satisfaction and other quality assessments (Ortega et al., 2019).

While U.S. healthcare would benefit from highly-trained physicians with Spanish proficiency, there are several challenges to achieving this goal. One such challenge is the underuse of an accurate assessment of language skills, which can manifest in several ways. For example, false fluency—a phenomenon that leads language learners to overestimate their competency—could pose a risk to patient safety and health outcomes, as it may result in miscommunication and consequent errors. Even heritage speakers, although they are more likely to self-report high Spanish proficiency, may vary widely in their language use and might not be trained in medical Spanish. Despite this, *ad hoc* interpreters, such as

family members, as well as medical students that report some Spanish proficiency, are often called in to interpret for patients (Ortega et al., 2019).

Another challenge that concerns medical school administrators is justifying the implementation of Spanish in a time-limited medical school curriculum. Ortega et al. (2019) suggests that advocates place language barriers in a national health disparities context in order to gain institutional support. Studies have shown that language discordance is associated with decreased access to preventative health services, longer hospital stays, decreased patient satisfaction, and other negative effects. In order to address health disparities exacerbated by language discordance, it is imperative that medical schools implement or expand upon existing medical Spanish programs. Another way to prepare future healthcare professionals for working with primarily Spanish-speaking patients is to encourage premedical students to pursue a language major/minor or expose themselves to conversational Spanish (Ortega et al., 2019).

Working in the healthcare field and interacting with Spanish-speaking patients requires knowledge beyond basic medical Spanish. For instance, basic medical Spanish courses may teach commonly used medical terminology; however, caring for Limited English Proficiency (LEP) patients requires the ability to navigate difficult conversations, such as those related to end-of-life care. One significant challenge that medical schools face in this regard has to do with the varying levels of language proficiency among students and establishing courses that take this into account. Therefore, healthcare disparities should ideally be addressed at the level of medical school education by offering medical Spanish courses of varying skill levels. In order to maximize efficacy, it would be beneficial to give students pre-curricular assessments for placement in the most fitting course, as well as post-curriculum assessments to assess competency goals (Ortega et al., 2019).

In response to the demographic shifts over the last few decades, there has been an increase in the number of medical Spanish courses offered in undergraduate and post-graduate institutions. While this serves as a starting point to address language-based health disparities in the U.S., these programs could be expanded upon to increase efficacy. Hardin (2015) conducted a literature review of medical Spanish

curricula in the U.S., spanning a 38-year period. In that study, they found that only 35 articles were published during this time, demonstrating that programs are generally underreported and not easily replicable. Furthermore, most articles examined in the literature review lacked further data after the pilot phase of the medical Spanish program (Hardin 2015).

Hardin (2015) suggests that administrators of these programs consider several factors when implementing or expanding upon existing medical Spanish curricula. Two important factors that are mentioned are context and continuity. It was suggested that learners are taught the context of Spanish-speaking patients particular needs, including specialized oral communication and cultural considerations. This could be achieved best by immersive and interactive learning programs placed in relevant healthcare contexts, ensuring that medical Spanish curricula are informed by the needs of Spanish-speaking communities in the U.S. In terms of continuity, Hardin asserts that examinations would be valuable in reporting on language proficiency and learning progress; however, even "formal language assessments cannot guarantee proficiency for all situations" (Regenstein et al., 2013; pp.145-146). Therefore, the target for learning medical Spanish should include advanced proficiency, rather than basic medical Spanish, especially regarding speaking and listening skills (Hardin 2015).

In order to expand existing language resources, medical education should be adapted to equip students with the language skills needed to care for an increasingly linguistically diverse population. Many medical schools have responded to this need, as per the aforementioned research and given that the majority of LEP patients in the U.S. are native Spanish speakers, but this solution comes with unique challenges (Vela et al., 2016). About 70% of medical schools report facing significant obstacles when implementing and delivering a medical Spanish curriculum. These include costs, a lack of time in a full curriculum, insufficient faculty support, continued student interest, and the wide variety of skill levels among students. Vela et al. (2016) emphasizes that it is imperative for medical school to take steps to overcome these challenges. These include the fact that most physicians work with or have worked with

LEP patients, bilingual students oftentimes serve as existing interpreters despite potential skill limitations, and providers with language skills may overestimate their proficiency (Vela et al., 2016).

Several key recommendations for medical Spanish curricula are described in Vela et al. (2016). The introductory focus should be how language barriers lead to healthcare disparities and the importance of prioritizing the health and safety of LEP patients. Other important topics to integrate into curricula include the following: screening patients for LEP, legal considerations of language access, advocacy for expanding language resources in clinical settings, avoiding ad hoc interpreters, and immersive experiences to cultivate language and cultural skills. To overcome the common obstacles listed above, students and faculty advocates should take the following steps: employ surveys and the Liaison Committee for Medical Education (LCME) standards that support training on health disparities to motivate medical school leadership to establish or expand a medical Spanish curriculum, integrate the curriculum into established coursework, and choose an appropriate faculty director to run the course (Vela et al. 2016).

An important consideration is the nature of patient-doctor interactions when implementing or expanding upon a medical Spanish curriculum. Patients and doctors mainly exchange information via conversation, which is essential to ensure an accurate diagnosis and effective treatment plan. For L1 Spanish-speaking patients and L2 Spanish-speaking physicians, conversations can be challenging due to language barriers and differences in cultural knowledge, potentially leading to miscommunication. One factor is the dialectal variants of common medical terms used by Spanish-speaking patients, which are absent in many existing medical Spanish curricula. Few studies exist that analyze lexical differences of L1 Spanish-speaking patients and L2 physicians and how these differences impact communication. A preliminary study done by Bennink demonstrated that lexicon varies greatly among Latino patients in the United States. Many of these variants were not included in the textbooks analyzed in the study, which calls to attention an issue of "ideal" vs. "real" language used in healthcare settings (Bennink et al., 2015).

There exists a plethora of factors that may affect language use, which is central to patient-physician interaction and effective communication. One factor is the influence of mental framework or scripts—the expectations of an individual that affect their use of language given situational context and their role in the situation. For instance, language leveling and accommodation can occur on the level of the patient to match the physician, which is further influenced by social distance, formality, the need for comprehension, and cultural considerations (Bennink et al., 2015). These expectations are built on the basic tenets of communication accommodation theory, which posits that interlocutors will adjust their use of language to achieve a specific purpose, reducing linguistic variation (Giles, 2016).

Despite the expectation that patients will accommodate their speech based on the context of a medical interview and the need to be understood, there are additional factors to consider in terms of why this might not occur in reality: SES, education level, gender, group identification, and urban vs. rural environments. For instance, individuals that attain higher levels of education tend to use more standardized language. In terms of gender, men tend to use more nonstandardized forms than women (Bennink et al., 2015). In terms of environment, individuals who come from rural areas may use more lexical variation characteristic of specific rural dialects. These factors may provide an explanation for the variation in language use found in the preliminary study done by Bennink. The term "lexical" refers to "words or the vocabulary of a language as distinguished from its grammar and construction" (Merriam-Webster, n.d.). Therefore, lexical variation refers to differences in the vocabulary used to describe a particular meaning.

To date, there are few resources that document the influence of dialect on medical vocabulary used by Spanish-speaking patients in the U.S. As such, basic medical Spanish courses in undergraduate and post-graduate institutions tend to rely on standardized language and focus less on dialectal variation. This thesis is an exploratory study that aims to examine the dialectal variation of Spanish vocabulary used in the medical field with the goal of providing information that can be incorporated into basic medical Spanish curricula, and to better equip future medical professionals with the tools they need to

communicate with Spanish-speaking patients. Additionally, it includes a case study on dialect retention in a Chilean Spanish speaker with Broca's aphasia, mainly focusing on the speaker's retention of syllable final /s/ lenition. The following survey will aim to determine the influence of factors relating to dialect on lexical variation in everyday medical vocabulary.

Chapter 2

Lexical Variation in Spanish Medical Terms

Chapter 2 of this thesis reports the findings from a survey that aimed to explore the medical terms used by speakers of different dialects of Spanish. The primary goal of this survey was to collect data on lexical variation within the Spanish language as it relates to medicine and occurs among native Spanish speakers in the U.S. With this survey, I hope to create a glossary of terms and answer two key research questions: (i) Is the medical vocabulary used across regional dialects of Spanish different? (ii) If so, how does it vary?

Methods

The survey was created using Google Forms for simplicity of format and data collection. Before writing the survey, I decided on three main sections: an introduction to discuss the purpose of the survey, demographic and language proficiency questions, and the main questions on medical vocabulary. The last section focuses on common conditions, such as the flu, terms that are commonly used among Spanish-speakers but are not easily translated into English (e.g., *ataque de nervios*), and vocabulary related to mental health and speech pathology. Several measures were implemented to protect personal identity and sensitive information, including a statement about voluntary participation in the introduction, asking participants not to list their name or any other identifying information, and a question on consent. Responses were kept anonymous to protect participant privacy. The introduction and survey questions were written in both English and Spanish, and each question required a response before the form could be submitted.

Once I completed the initial draft of the survey, the accuracy of Spanish was checked and improvements were suggested by two consultants: my advisor, a bilingual English-Spanish speaker, and a native Spanish-speaker from Ecuador. The necessary changes were made to ensure clarity of information.

Once adjustments were made, I sent the survey to my contacts via email, who are listed in the acknowledgements, to be distributed and shared among native Spanish speakers. These included classmates, student leaders on campus, and professors in the Department of Spanish, Italian, and Portuguese at Penn State. Data collection was approved by the Institutional Review Board (IRB) at Penn State University.

Participants

A total of 71 participants completed the survey. Participants represented a wide variety of careers, including those in finance, education, medicine, linguistics, business, engineering, agriculture, culinary arts, homemaking, and more. Education levels ranged from high school to graduate degrees. There were 10 Spanish-speaking countries represented in the survey responses. These included Chile, Columbia, Ecuador, Honduras, Mexico, Spain, Puerto Rico, Argentina, Costa Rica, and Peru. Table 1 provides a breakdown of the Medical Vocabulary Survey.

Table 1. Medical Spanish Survey Questions

#	Category	Question in English	*Pregunta en español*
1	consent to research	I consent to having my responses to these questions recorded and used for research purposes (your identity will remain anonymous).	*Autorizo el uso de mis respuestas con fines investigativos (su identidad permanecerá anónima).*
2	language proficiency	Are you a native speaker of Spanish?	*¿Es Ud. un hablante nativo de español?*
3	demographic	What is your profession? If you are a student, please specify your field of study.	*¿Cuál es su profesión? Si Ud. es estudiante, por favor indique su área de especialidad.*
4	demographic	Please select the highest education	*Por favor, escoja el nivel más alto de educación que ha completado.*

		level you have completed.	
5	demographic	In which country did you reside for most of your childhood (ages 0-12)?	*¿En cuál país vivió Ud. por la mayoría de su niñez (edad 0-12)?*
6	demographic	In which country did you reside for the majority of the last 10 years?	*¿En cuál país vivió Ud. por la mayoría de los últimos diez años?*
7	language proficiency	What other languages do you speak? What is your proficiency in each language (beginner, intermediate, advanced, native/fluent)?	*¿Qué idiomas habla? ¿Cuál es su destreza en cada idioma (nivel principiante, nivel intermedio, nivel avanzado, hablante nativo/habla con fluidez)?*
8	lexical (illness/condition)	How would you say "I have a fever" in Spanish to a family member?	*¿Cómo diría que tiene una temperatura alta en español a un miembro de su familia?*
9	lexical (mental health)	What does "ataque de nervios" mean to you? (1-2 sentences)	*¿Qué significa la frase ¨ataque de nervios¨ para Ud.?*
10	lexical (illness/condition)	How would you tell someone in your family that you have a cold?	*¿Cómo diría a un miembro de la familia que Ud. tiene un resfriado/resfrío/catarro/etc.?*
11	lexical (illness/condition)	How would you tell someone in your family that you have the flu?	*¿Cómo diría a un miembro de la familia que tiene gripe/la gripa/etc.?*
12	lexical (illness/condition)	What does the word "achaques" mean to you? In what context would you use this word?	*¿Qué significa la palabra "achaques" para Ud. y en qué contexto lo usaría?*
13	lexical (illness/condition)	What does the word "desmayo" mean to you?	*¿Qué significa la palabra ¨desmayo¨ para Ud.?*
14	lexical (mental health)	How would you explain that someone (a friend or family	*¿Cómo explicaría Ud. que alguien (un amigo o su familia) tiene la depresión?*

		member) has depression?	
15	lexical (mental health)	What does "brote psicótico" mean to you? In what context have you heard this phrase being used?	*¿Qué significa la frase ¨brote psicótico¨ para Ud.? ¿En cuáles contextos ha escuchado esta frase?*
16	lexical (mental health)	In relation to health, what does "desequilibrio" mean to you? How would you use this word?	*¿En el contexto de salud, que significa ¨desequilibrio¨ para Ud.?*
17	lexical (mental health)	How would you say that someone is in a "good mood" or "bad mood" in Spanish (to a friend or family member)?	*¿Cómo explicaría a un miembro de la familia o un amigo que una persona tiene un buen/mal humor en español?*
18	lexical (speech pathology/stroke)	How would you say that someone has difficulty with their speech (i.e. a speech disorder) in Spanish?	*¿Cómo diría que alguién tiene ¨trastorno de habla¨ en español?*
19	lexical (speech pathology/stroke)	How would you say (to a friend or family member) that someone has had a stroke in Spanish?	*¿Cómo diría (a un miembro de la familia o un amigo) que alguién ha sufrido de un derrame cerebral/apoplejía/etc. en español?*
20	lexical (speech pathology/stroke)	How would you say that someone is experiencing sudden mental confusion in Spanish?	*¿Cómo diría que alguien está sufriendo de confusión mental repentina en español?*
21	lexical (speech pathology/stroke)	How would you say that someone is experiencing numbness or paralysis in one or more parts of the body, like the face, arms, or legs (in Spanish)?	*¿Cómo diría que alguien no puede sentir o mover una parte de su cuerpo, como la cara, los brazos, o las piernas en español?*

Analysis

Organizing qualitative data in a way that is clear and concise can be challenging, as responses were diverse and varied. In an effort to clean up the data and make it more comprehensible, the original survey response data was refined, and certain responses were excluded. These included responses that were unrelated to the question, responses where the participant expressed uncertainty, responses that were unable to be deciphered, or in the case of asking for the word or phrase to name a condition, the participant described symptoms instead. For example, for the question #18 (speech disorder question), one of the responses was *derrame* (stroke), which was related more to question 19 rather than the former question. Because it is assumed that this response was mistakenly included in the question about speech disorders, instead of the question about strokes, it was excluded. As another example, for the last question in the survey regarding the sensation of numbness or temporary loss of mobility in a limb, responses were excluded that interpreted the paralysis to be a more permanent condition—for example, *hemiplejia* (hemiplegia) and *paraplejia* (paraplegia). Only responses in Spanish were included in the glossary, whereas any responses in English were excluded.

To ensure that participants were native speakers of Spanish, the following question was added after 53 responses were collected:

Are you a native speaker of Spanish?

¿Es Ud. un hablante nativo de español?

Responses of participants who expressed not being native Spanish speakers were also excluded. Spanish-English bilingual speakers who stated that they had lived in the U.S. for a majority of their lives were excluded, as well as participants for whom it was unclear whether they were native speakers of Spanish. On the other hand, participants who have lived in a Spanish speaking country for most of their childhood, even if they lived in a non-Spanish speaking country, like the U.S., for a majority of the last ten years, were considered to be native speakers and their responses were included their responses in the analysis.

After exclusions were made, the remaining data was compiled into a "Medical Language Glossary", which can be found in Table 2. The first column in Table 2 lists key words related to the survey question, accompanied by the responses in Spanish in the middle column, and the English translation on the third column. Questions that resulted in responses with defined vocabulary terms, as well as questions that elicited a mix of explanations and terms for the responses, were included in the glossary. Questions that were excluded from the glossary included those that elicited longer explanations, which are discussed at the end of this chapter. In the Spanish column, responses were grouped together that shared the same root. For example, *tener fiebre* (to have a fever) and *estar afiebrado* (to be feverish) constituted one response group. Some participants gave more than one response, and each response (rather than each participant) was counted in the parentheses following the lexical items. In order to obtain the English translations for the Spanish lexical items that I could not find in an online dictionary, I consulted two native Spanish speakers (one from Puerto Rico and the other from Ecuador) and recorded their responses in the English translation section of the glossary below.

Table 2. Medical Language Glossary

English and survey question #	Spanish Lexical Items	English translation
fever #8	***estar/tener fiebre, afiebrado(a) (53)***	to have a fever, to be feverish
	tener/estar/sentirse con temperatura (alta) (6)	to have/to be with/to feel high temperature
	tener calentura (1)	to have a fever
cold (illness) #10	***estar/tener resfriado/a/resfrío, me resfrié (37)***	to have a cold, I caught a cold
	tener/estar con catarro, acatarrado(a) (3)	to have a cold

	tengo gripe/gripa, síndrome gripal, estar agripado(a) (17)	to have the flu* *sometimes used to describe cold as well
	estar enfermo/a (1)	to be sick (general)
	estar constipado/a (2)	to have a cold* **constiparse*=to get nasal congestion
	Me he enfriado (1)	I have (gotten) sick
flu #11	***tener/estar/andar con gripe/gripa/agripado/gripiento, síndrome gripal (53)***	to have/to be with/to walk with the flu/influenza
	tener un trancazo feo (1)	to have an ugly cold or flu
	tener catarro (2) *tengo resfriado (1)*	to have a cold* *cold and flu terms seem to be used interchangeably, according to responses
	tener la monga (1)	to have a severe cold or the flu* *Puerto Rican colloquialism. The word *monga* refers to a lack of structural stability, which in this case, refers to the body. Note provided by a native Puerto Rican Spanish speaker.
	tengo (el) flu (3)	I have the flu.
	tengo (la) influenza (1)	I have the flu.
	apestado(a) (1)	plague-ridden
	tener un resfriado (1)	to have a cold
good/bad mood #17	*estar de/en/con buen/mal humor, malhumorado (28)*	to be of/in/with a good/bad mood, of a bad mood
	estar de buenas/malas (7)	to be of good/bad (plural)
	estar en la suya (1)	to be doing your own thing (good mood)*

		*Note provided by a native Spanish speaker from Puerto Rico.
	estar chillin' (1)	to be "chilling" (good mood)
	no soportar/aguantar a nadie (1)	to not put up with anyone (bad mood)
	no le bebe el caldo a nadie (1)	he/she does not drink the broth to anyone (bad mood)* *Used to mean that the individual does not put up with anyone/anything bothersome. Note provided by a native Puerto Rican Spanish speaker.
	tener/estar de buen/mal genio, es malgenio/malgeniado (16)	to have/to be of good/bad temperament, to be ill-tempered
	tener buen/mal carácter (3)	to have good/bad character
	Estar de buenas/de malas pulgas (1)	to be of good/bad fleas (to be of good or bad temper)
	Está animado(a) (1)	to be cheerful, in good spirits
	levantarse con el pie izquierdo (2)	To get up with the left foot* *English equivalent is to "get up on the wrong side of the bed," indicates bad mood. Note provided by a native Spanish speaker from Ecuador.
	levantarse con el pie derecho (1)	To get up with the right foot (good mood)* *Note on meaning provided by a native Spanish speaker from Ecuador.
	se comió un payaso (1)	she/he/they (singular) swallowed a clown (good mood)* *Note provided by a native Spanish speaker from Ecuador.
	es (una persona) alegre (1)	to be a happy person
	estar alegre (3)	to be happy (good mood)

	sentirse/estar feliz, estar contento (9)	to feel/to be happy (good mood)
	estar positivo (2)	to be happy (good mood)
	estar bravo (3)	to be bad-tempered (bad mood)
	no estar de/tener ganas, sin ganas, perder las ganas (4)	to not be of desire* *to not want to do anything, indicates a bad mood
	colaborar de ánimo (1)	to collaborate with mood* *Used mostly in a positive sense to indicate good mood. Note provided by a native Spanish speaker from Puerto Rico.
	ser temperamental (1)	to be temperamental
	estar intensa (1)	to be intense (emotionally)* * Used to indicate negative disposition. Note provided by a native Spanish speaker from Puerto Rico.
	ser agradable (2)	to be agreeable, nice, pleasant
	irritarse/enojarse con facilidad (1)	to become irritated/angry easily (bad mood)
	ser liviano(a) (1)	to be easy going
	divertido (1)	fun
	histeria (1)	hysteria
	estar cascarrabias (1)	to be grouchy (bad mood)
	estar irritado/enfadado, irritarse (4)	to be irritated or angry, to get irritated (bad mood)
	estar con buen ánimo (1)	to be of good spirits (good mood)
	estar de mal talante (1)	to be of a bad mood/humor (bad mood)
	estar de mal temple (1)	to be of a bad temper (bad mood)

speech disorder/difficulty with speech #18	***dificultades/problemas para/de hablar (27)***	difficulties/problems with speaking
	tartoso(a) (2)	adjective that refers to someone with a difficulty articulating or pronouncing words
	tener problemas de lenguaje (1)	to have problems with language
	tener problemas al/dificultades para expresarse (3)	to have problems/difficulties expressing oneself
	tartamudo(a), tartamudez (9)	stuttering, stutter
	trastorno de lenguaje/de habla (6)	language/speech disorder
	tener afección del lenguaje (1)	to have a language condition/illness
	no modula (1)	he/she/they do not modulate/regulate (their speech)
	dificultades de lenguaje (1)	difficulties with language
	se le traban las palabras (1)	words get tangled-up* *means that a person is tongue-tied
	no poder hablar bien/habla mal (4)	cannot speak/speaks poorly
	defecto de hablar (1)	speaking defect
	le cuesta hablar (bien) (1)	it costs him/her/them to speak* *means that it is difficult to speak
	tatareto (1)	stuttering (similar to *tartamudo*)
	impedimento en el hablar (1)	speech impediment
	deficiencia de habla (1)	speech deficiency
	padecer problemas de dicción (1)	to suffer from diction problems
stroke #19	***tener/sufrir derrame, le dio un derrame (cerebral) (44)***	to have a stroke

	tener infarto (cerebral) (3)	to have a brain infarction/stroke* *note that *infarto* can also mean "heart attack"
	tener un ataque cerebral (3)	to have a stroke
	accidente cerebrovascular (ACV) (7)	to have a stroke, brain injury, or brain damage
	le dio/le pegó un ictus (2)	he/she/they were given/were struck with a stroke
	trombosis cerebral (1)	cerebral thrombosis
	evento cerebrovascular (1)	cerebrovascular event, stroke
sudden mental confusión #20	***confusión mental de la nada/repentina, estar confundido(a) de pronto, confundirse, tener estado confusional (12)***	sudden mental confusion, to be confused suddenly, to have a confused state (of being)
	problemas mentales (1)	mental problems
	no pensar claramente (1)	to not think clearly
	(estar) volver loco, estar loco, locura (5)	to become crazy, to be crazy, craziness
	se le fue la guagua (1)	the bus left him/her/them* *In Puerto Rico, *guagua* means "bus."
	estar olvidadizo(a) (1)	to be forgetful
	encontrarse difuso(a) (1)	to find oneself vague* *to be confused
	tener un lapsus (mental) (4)	to have a (mental) lapse
	ataque de demencia (1)	dementia attack
	perdida temporal de conocimiento (1)	temporary loss of understanding or consciousness

	se le soltó un tornillo (1)	a screw became loose
	no estar en sus cabales (1)	to not be in your right mind
	alteración de la conciencia/estado mental (3)	change of awareness or mental state
	(sufrir de) delirios, estar delirando(a) (3)	to suffer delusions, to be delusional
	se le voló la teja (1)	the brick/tile was blown away
	se le borró el cassete (1)	the cassette was broken
	quedarse momentáneamente con alguna laguna (1)	to find oneself in a momentary lapse
	desorientarse, estar desorientado(a) (2)	to disorient oneself, to be disoriented
	estar desvariando (1)	to be delirious
	se le cruzaron los cables (1)	the cables have been crossed
	estar fatal de la mente (1)	to be fatal of the mind* *Here, fatal refers to something horrible, rather than referring to death, as confirmed by a native Puerto Rican Spanish speaker.
	hablar raro (1)	to speak strangely
	perder el sentido (1)	to lose one´s senses
	estar conmocionado(a) (1)	to be shocked or shaken up
	hablar incongruencias (1)	to speak inconsistencies/contradictions
	estar perdido(a) (3)	to be lost
	estar deschavetado(a) (1)	to be crazy, mad
	desconexión mental (1)	mental disconnection
	tener un chucaque (1)	to have a headache*

		*The word *chucaque* (used in the highlands of Peru) is a cultural syndrome that refers to a specific type of headache associated with having experienced a traumatic event (Brooks, 2014).
	estar/andar despistado (1)	to be distracted, absent-minded* *colloquialism from Spain based on self-reported data
	estar/andar espeso/denso (1)	to be thick or dense* *colloquialism from Spain based on self-reported data
numbness/paralysis #21	***tiene/le dio/le pegó parálisis, estar paralizado, le paralizó (37)***	to have/receive/be hit with paralysis, to be paralyzed, was paralyzed
	perder/no tener la sensación (3)	to lose/to not have feeling
	no sentir (2)	to not feel
	se le dormió/durmieron (parte o partes de cuerpo), estar dormido, sentir dormida (8)	fell asleep, to be sleeping, to feel asleep* *all terms/phrases here refer to parts of the body
	está entumecido(a) (1)	to be numb
	estar con problemas de movilidad (1)	to experience mobility problems
	tener/estar amortiguado (1)	to be dampened
	parestesia (1)	pins and needles, a prickling sensation
	anestesia (1)	anesthesia* *Numbness. Also used in the past participle form, *anestesiado*, as confirmed by a native Spanish speaker from Puerto Rico.

In addition to compiling responses and explanations of terms to create a glossary in Table 2, I compared the instances of lexical items for the following questions. When asked how to say “I have a

fever" in Spanish (question #8), most responses used the terms *fiebre* or *afiebrado.* Other less common responses included *temperatura (alta)* or *calentura.*, as illustrated in Figure 1.

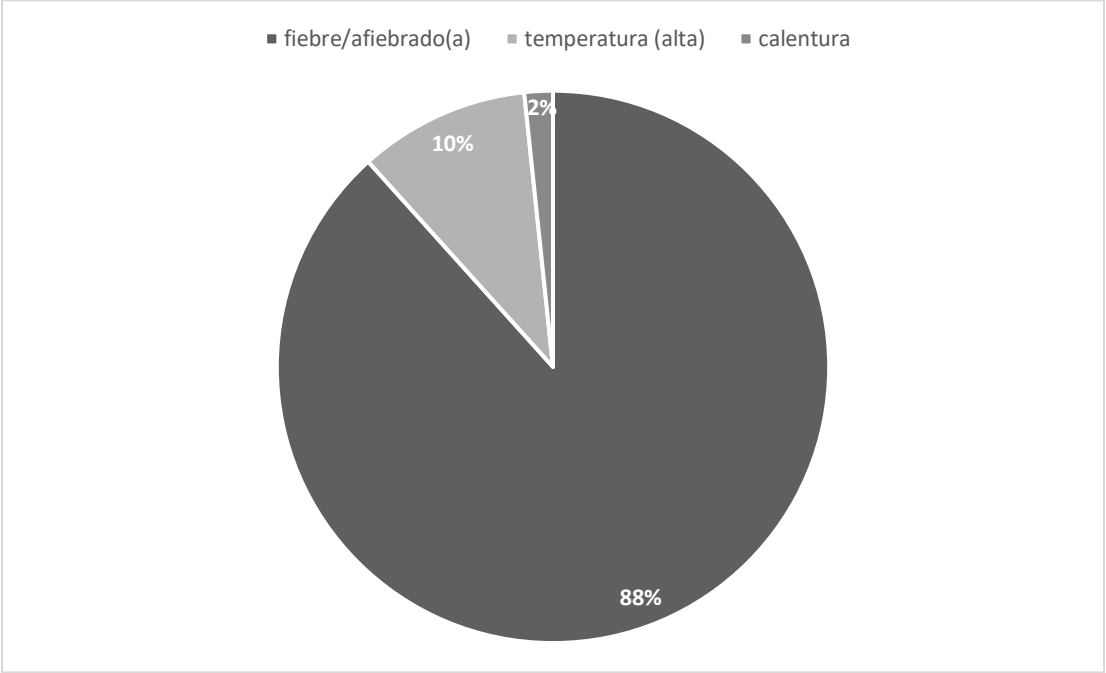

Figure 1. Reponses to fever question

For questions #10 and #11 regarding the common cold and flu, there were certain terms used interchangeably for each condition. Terms related to *gripe(a)*, including *síndrome gripal* and *estar agripado(a)*, were used to name both the cold and flu, although the term was much more commonly associated with the flu. For example, as shown in Figure 3, 85% of the responses consisted of *gripe(a)* and related terms for the question about the flu; however, 28% of responses used these terms to name the common cold, as noted in Figure 2. The most frequent answer (61% of responses) to the common cold question was *resfriado*, including *resfrío* and *resfriar* (see Figure 2). Less than 1% of responses to flu question included terms more commonly associated with the cold, like *catarro* and *resfriado*. In summary, the responses showed that the terms related to *gripe(a)* were used to describe both the flu and the common cold, although there was a stronger association between the terms related to *gripe(a)* and the

flu. It is important to be aware of this occurrence as a health professional, as it may be a source of confusion and misunderstanding when communicating with a Spanish-speaking patient.

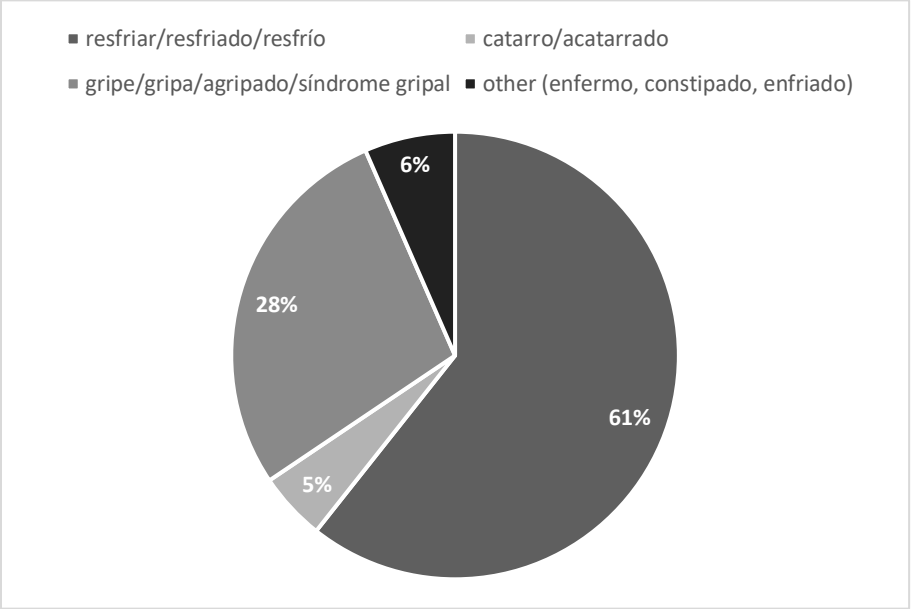

Figure 2. Responses to cold question

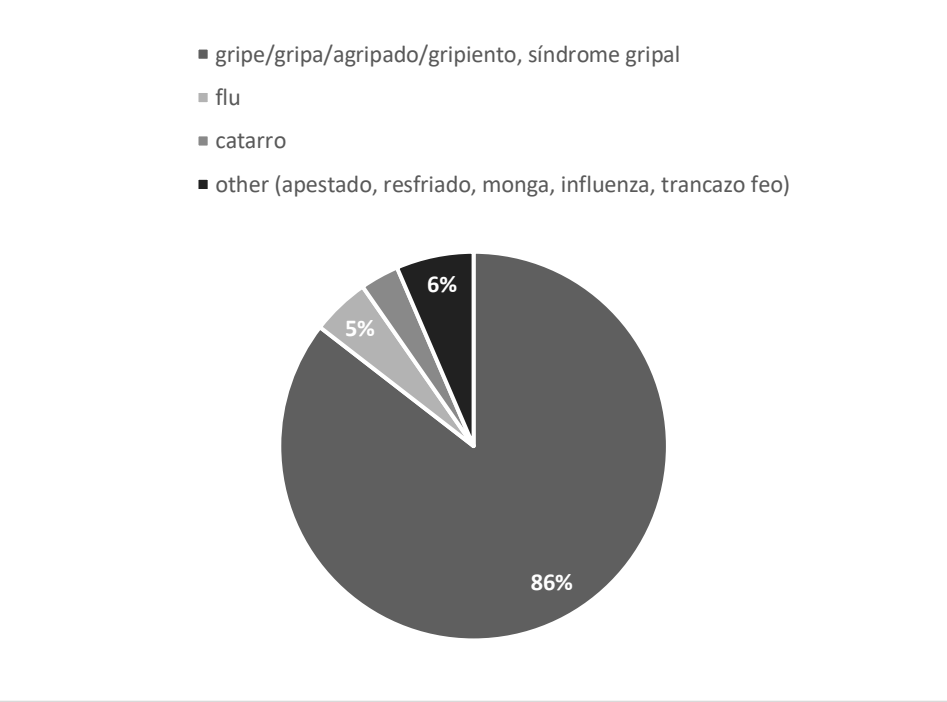

Figure 3. Responses to flu question

In addition to calculating percentages, I compared the lexical items from questions #10 and #11 to the country that the participant resided in for most of their childhood (question #5). Participants who listed two different Spanish-speaking countries for questions 5 and 6 were excluded, since either country may influence the participant's lexicon in Spanish and result in a potential confound. However, participants who listed the U.S. as their response to question #6 were included, since it is assumed that their Spanish lexicon is influenced and retained based on the country provided in question #5. In terms of the representation of each country after irrelevant data was filtered out, most participants were from Ecuador. Two to five participants each, depending on individual answers that were irrelevant and excluded, were from Puerto Rico, Spain, Colombia, Mexico, and Honduras, and one participant each from Costa Rica and Peru. For question #10 regarding the common cold, various forms of *resfriado* (e.g. *resfriada, me resfrié, resfrío*) were found among most countries represented in the survey, including Puerto Rico, Spain, Ecuador, Colombia, Chile, Honduras, and Costa Rica. All five participants from Chile answered with a form of *resfriado*. As previously mentioned, terms like *resfrío* and *gripe* seem to be used interchangeably to describe the cold and flu. This partially coincides with an introductory medical Spanish textbook that mentions *gripe* as being used to describe both the common cold and flu. In this same textbook, however, *resfrío* and *resfriado* are labeled as terms only describing the common cold (Chase & Medina de Chase, 2019). Countries that were associated with the use of various forms of *gripe* (e.g. *gripa, agripado, sindrome gripal*) to describe the cold included Ecuador, Colombia, Mexico, Honduras, and Peru. One interesting finding was that all instances of *gripa* in the survey responses, rather than *gripe*, were associated with Colombia. This coincides with the entry for *gripe* in the *Diccionario panhispánico de dudas* from the Royal Spanish Academy, that refers to the use of *gripa* in Colombia and Mexico (Real Academia Española, n.d.), as well as an introductory medical Spanish textbook that cites the use of *gripa* to describe the common cold in Colombia (Chase & Medina de Chase, 2019). Other terms for the common cold included *catarro* and *acatarrado*, which were noted by participants from Puerto Rico, Ecuador, and Spain. One participant from Ecuador included the phrase *estoy constipado,*

which is a false cognate referring to the common cold, rather than what it may sound like to an English speaker—constipation.

For question #11 regarding the flu, most participants across different Spanish-speaking countries used a form of *gripe*, although there were some exceptions—specifically for Puerto Rico and Honduras. For example, one of the participants from Puerto Rico responded with *tengo la monga,* a known Puerto Rican colloquialism with African origins (Academia Puertorriqueña de la Lengua Española, n.d.). Another notable lexical item was the term *tengo (el) flu,* a cognate of the English term "flu." This term was mentioned by the other Puerto Rican participant and all three of the Honduran participants. One participant from Ecuador used the term, *trancazo feo,* and one participant from Colombia used the term *apestada*. Based on the survey data, there do not seem to be any other notable relationships between lexical items and regions for question #11.

Most responses to question 12, "What does the word *'achaques'* mean to you? In what context would you use this word?" were about body pains, illnesses, or general health issues, many of the responses associating the word with old age. However, some of the responses indicated that the participants were unfamiliar with the word, which begs the question of whether this can be explained by regional variation, age, or other sociolinguistic factors.

In contrast to these first few questions referring to physical health, most of the survey questions were successful in eliciting a wide variety of responses, although there was more consensus among the responses for some questions than others. The responses to some of the mental health questions also seemed to range in severity based on individual interpretation. One example of this phenomenon could be observed in question 14: "How would you explain that someone (a friend or family member) has depression?" On the less severe end of the spectrum, participants used words and phrases like *tristeza* (sadness), *perder las ganas de* (to lose the desire to), *no tener ganas de* (to not have the desire to), *cansada* (tired), y *sensible* (sensitive). On the other end of the spectrum, words like *decaído* (depressed), *deprimido* (depressed), and *depresión* (depression) were used. Some of these responses referred to the

person with this condition needing professional help. Some responses referred to a change in ¨*ánimo,*¨ or mood. This variation suggests that the word *depresión* among native Spanish speakers can either be considered as a mood or temporary state of feeling, or on the other hand, a more permanent clinical condition.

Similar to question 12 regarding *achaques*, many respondents (26%) were unfamiliar with the phrase *brote psycótico* in question 15. Most of the remaining responses described this as the person *ha perdido la cabeza* (has lost their head), which according to the Cambridge dictionary means to get "angry or excited, or to act foolishly in a crisis." Some responses used the word *loco(a)* or "crazy," and others mentioned that the episode was accompanied by a dangerous or violent act. Another interesting finding is that some respondents mentioned that they normally hear this phrase, or would expect to hear it, in media (the movies, television, the news). For the question regarding the word *desequilibrio,* most responses referred to an abnormal mental or physical state.

Based on the responses to question #17, referring to good or bad mood, the question was interpreted in two ways: one regarding a temporary mood, and the other referring to a character trait or more permanent state of being. One way that this was reflected was in the use of *ser* or the more permanent verb for "to be," and *estar*, or the more temporary verb for "to be" with words like *alegre* or *feliz*, both of which mean "happy." Some responses used adjectives with the word *cáracter*, which describes an individual's personality, while others used words like *ánimo,* which describes a temporary state of being, or mood. It is possible that the wording of the question was ambiguous in this regard, as the verb *tener*, or "to have" in *tiene un buen/mal humor* may be interpreted as having in one's possession permanently, as part of one's character, rather than experiencing a temporary emotion or mood, like the question was intended to ask.

The most common answer across the countries represented for question #17 was *buen/mal humor,* although this question elicited a variety of responses, many of which seemed to be based on regional colloquialisms. In an effort to focus only on relevant data to determine the relationship between region

and lexical items in question #17, responses that were in English or explained what *buen/mal humor* meant, rather than giving terms to refer to a good or bad mood in conversation, were eliminated. *Está en la suya* and *está chillin'* were both Puerto Rican colloquialisms used to refer to a good mood, as noted by a native Spanish speaker from Puerto Rico (Table 2). To describe bad mood, colloquialisms such as *soporta/aguanta a nadie* and *no le bebe el caldo a nadie* were included in responses, and similar to the Puerto Rican colloquialisms for good mood, no other participants from any other region used these same lexical items in their answer, which further points to their unique association with Puerto Rican Spanish. Seven participants from Ecuador and one participant from Chile used the term *malgenio* or *mal genio*, to describe bad mood, which suggests that this term may be more typically used in South America. Some notable colloquialisms listed by participants from Spain were *cascarrabias*, *estar de mal talante* and *estar de mal temple* (Table 2). Two more notable colloquialisms were *levantarse con el pie derecho/izquierdo* and *estar de buenas/malas pulgas*. The first term was used by participants from Ecuador and Colombia, while the second term was used by a participant from Colombia. *Levantarse con el pie derecho* is the English equivalent of "get up on the right side of the bed," while *levantarse con el pie izquierdo* is the equivalent of "get up on the wrong side of the bed." It is interesting to note that the right foot is associated with a good mood, while the left foot is associated with a bad mood. I consulted with a Spanish speaker from Ecuador on the meaning of this colloquialism, who suggested that the association may have religious origins. This explanation is plausible, given the association of the left hand with the devil in the Catholic Church (Crabtree, 2002) and given that both Ecuador and Colombia are predominantly Catholic countries (Central Intelligence Agency, n.d.)

The question regarding speech disorder surprisingly elicited a wide range of responses, from more general terms to specific symptoms or conditions of speech. Some responses consisted of phrases like *dificultades de hablar* or *trastorno de habla*, which respectively mean "difficulty speaking" and "speech disorder," the latter being the more formal medical term for the condition. Other responses consisted of words like *tartamudo*, which specifically refers to having a stutter. This may be due to the

exposure someone has had in their personal lives to individuals with speech impediments, if they knew someone whose speech was characterized by a stutter. One response was *se le traban las palabras*, which refers to getting "tongue-tied" in the English equivalent of the expression. The variety of these responses suggest that conditions such as speech disorders and difficulties with speech are based on individual experience, and are not clearly defined in informal, everyday interactions. Similar to previous questions, the question about "sudden mental confusion" resulted in a wide variety of responses heavily characterized by colloquialisms (Table 2). These included terms such as *se le fue la guagua,* a Puerto Rican colloquialism that is literally translated to "the bus has left him/her/them." Another notable colloquialism from Peru is *tener un chucaque,* which refers to a specific type of headache associated with having experienced a traumatic event (Brooks, 2014).

There were some limitations encountered during the data collection and analysis of the survey. For example, the representation of the respondents was narrow. Since the survey was distributed primarily at Penn State University, many of the respondents are students or faculty, which comprise a demographic group characterized by higher levels of education. Furthermore, many of the respondents have lived in the U.S. for the majority of the last ten years, despite having spent most of their childhood in a Spanish speaking country. On the other hand, from the perspective of linguistic ecology, this may provide a more accurate representation for U.S. medical professionals of Spanish that has been influenced by English variants in the U.S. Respondents that were clearly not native Spanish speakers, or for ones whom it was uncertain whether they were native speakers or not, were excluded. Finally, the survey questions that asked for specific terms primed participants to give one response, rather than listing all familiar terminology associated with the condition. Therefore, participants may be familiar with a broader range of terms and expressions than this survey elicits, which would affect the quantitative results above.

The next section explores the influence of sociolinguistics factors on speech, in this case, dialect, in the context of a specific medical condition—aphasia. Aphasia diagnostic tools are generally based on standardized language, and it has been suggested that there is a need to consider dialect in patients with

speech disorders, such as those caused by aphasia, which will be described in further detail in the next chapter. In addition to lexical variation, another notable feature that distinguishes dialects of Spanish from one another is phonetics. While phonetic differences are less likely to contribute to miscommunication between a patient and doctor in a medical interview, it is an important factor to consider in the treatment of patients with speech disorders, to effectively distinguish between dialect and disorder, and to adapt speech therapy to the needs of the individual patient. According to the American Speech-Language-Hearing Association (ASHA), "an essential step toward making accurate assessments of communication disorders is to distinguish between those aspects of linguistic variation that represent regular patterns in the speaker's dialect and those that represent true disorders in speech and language" (*American English dialects,* 2003). Furthermore, investigating the relationship between sociolinguistic variables and speech pathology may contribute to our understanding of how humans process and encode language. The following case study explores this relationship by analyzing the speech of a Chilean speaker with Broca's aphasia for dialect feature retention.

Chapter 3

Case Study on Dialect Feature Retention in Chilean Speaker with Aphasia

There is a great deal of dialectal variation that exists between Chilean Spanish and other Spanish dialects; however, this case study will focus on the phonological process of syllable final /s/ lenition. In Spanish, /s/ lenition can manifest as an aspiration or omission of a syllable-final /s/. The phenomenon of /s/ lenition in Chile occurs at the ends of syllables, but not at the beginnings of syllables. For example, /s/ lenition may occur in words like *mismo, gatos,* and *lápiz*, but not in words like *sapo* and *demasiado* that contain /s/ at the beginning of a syllable. As a result, they may be pronounced with aspiration, such as [mih.mo], [ga.toh], and [la.pih], or omission, such as [miØ.mo], [ga.toØ], and [la.piØ].

Both linguistic and sociolinguistic factors can constrain how often a speaker lenites syllable final /s/. Linguistic factors include the grammatical category of the word and the phonological context of the /s/ form. For example, the /s/ is more commonly omitted when it is a plural marker on a noun, as in *gatos*, rather than when it is non-morphological, for example, like the /s/ in *lápiz.* An /s/ that comes at the end of a word, as in *lápiz* or *gatos,* is omitted more frequently than an /s/ that appears word-medially, as in *mismo*. Sociolinguistic factors that constrain how often /s/ is lenited include social class, gender, and register. In Chile, middle class speakers will often exhibit /s/ aspiration, while working class speech more commonly features /s/ omission. According to a study done on Chilean Spanish speakers, omissions were disfavored in the word-medial position, but favored in the word-final position, along with /s/ retention (Miller, 2013). Omission is more common in male speakers as opposed to female speakers, and in informal social contexts, rather than formal social contexts. /S/ lenition is common in the Spanish dialects spoken in Latin America (except for the Mexican highlands and the Andean regions), southern Spain, and the Canary Islands (Miller, 2014).

Although variations in the phoneme /s/ tend to be classified as retention, aspiration, and omission, these categories may not explain the true nature of the sounds involved, but rather the listener's

perception of them. Instead, the sound is perceived as aspiration may be characteristic of the transition between a vowel and the following /s/, due to the partially open glottis in this position. According to this argument, aspiration is always present during /s/ retention, but only becomes perceptible once /s/ lenition occurs (Widdison, 1995; Miller, 2013); however, for the purposes of this case study, /s/ retention, aspiration, and omission will be classified separately, following the listener's perspective.

Chile is often classified as a separate dialect zone in the Spanish-speaking world (Lipski, 1994). There is little linguistic variation within the country itself in terms of speech used in professional settings. On the contrary, there tends to be more linguistic variation in informal speech. Based on informal speech, Chile can be separated into 4 dialect zones: North, Central, South, and Chiloé, as illustrated in Figure 4.

Figure 4. Dialect zones of Chile. From north to south, the zones are as follows: North, Central, Chiloé, and South.

The various dialect features of Chilean Spanish and can be summarized in the table below, adapted from Lipski (1994).

Table 3. Phonological Characteristics of Chilean Spanish

Reduction of syllable- and word-final /s/ to aspiration [h] or to an omission ex. *gato*[s]→ *gato*[h] or *gato*[ø]
Neutralization of /ʎ/→ palatal fricative [y] ex. *yema* and *calle* are pronounced as [ɟema] and [kaɟe]
Neutralizing syllable-final liquids (central Chile, younger generations and lower social classes) ex. *cantar* [kantaɾ]→[kantal]
Dropping of word-final /r/ in urban working-class speech ex. *acaba*[r]→*acaba*[ø]
/č/ can have a fricative articulation (working-class speech, more common in males) ex. *chica* [tʃika]→[ʃika]
Unstressed vowels at the ends of words are either subtle or not voiced at all ex. *casa* [kasa]→[kasḁ]

Reduction of the syllable- and word-final /s/ to aspiration [h] is the phenomenon referred to as "/s/ lenition" (Table 3). Omission, rather than aspiration, is also common in less formal speech in Chilean Spanish (Miller, 2013). This feature is most relevant to the following case study, but other notable characteristics of the Chilean Spanish dialect are included for reference (Table 3).

There exist several different second-person pronouns in Spanish, in other words, pronouns that are used in a conversation where the speaker is addressing a person or group of people directly. The use of the particular form varies based on dialect, and there are different forms for second person singular and

plural pronouns. For example, *tú, vos,* and *Ud.* are the second person singular pronouns. The second person plural pronouns are *Uds.* and *vosotros* (Pharies, 2015, pp. 167–197). Both *tú* and *vos* are used in Chile as second person singular pronouns, although *voseo* is more commonly used to convey solidarity with familiar individuals. *Ustedes* is the predominant second person plural pronoun, compared to *vosotros*, the latter of which is used only in Spain. *Tuteo* is used in the imperative form. (Lipski, 1994).

Aphasia, Diagnostic Tools, and Dialectal Considerations in Speech Pathology

Aphasia is an acquired language disorder that may affect speech, listening comprehension, reading, and writing. The disorder is generally caused by neurological damage resulting from a stroke, head trauma, neurodegenerative disease, or infections. Strokes are the most common cause of aphasia, which itself can be categorized into two main types: fluent and non-fluent. The non-fluent classification of aphasia is characterized by labored speech, changes in morphosyntax, and in the most severe cases, complete loss of speech (Gonzáles Victoriano & Hornauer-Hughes, 2014).

Broca's aphasia falls into the category of non-fluent aphasias, named for brain lesions found in Broca's area of the brain or in the ventral anterior nucleus of the thalamus. In addition to the characteristics of non-fluent aphasia, patients with Broca's aphasia produce less than 50 words per minute, with difficulty articulating words. Agrammatism and difficulty recalling verbs are two other common symptoms that affect the speech of Broca's patients. In general, patients tend to struggle more with using verbs grammatically than with nouns (Gonzáles Victoriano, & Hornauer-Hughes, 2014). In terms of other speech characteristics, patients may repeat isolated words or fragment their sentences. Below are two examples of speech characterized by agrammatic aphasia from a spoken narrative retelling of the Little Red Riding Hood (Håkansson & Ballard, 2022):

1. *One day uh j uh ridinghood uh sca uh cape and uh cookie/s.*
2. *Mother go home and oh go home and tell the dad your mother's home.*

Reading comprehension remains fairly intact, although patients tend to have difficulty understanding longer, more grammatically complex sentences. When writing, Broca's aphasia patients write in short sentences, omitting words and presenting difficulty with functional words, like verbs. Related disorders include hemiplegia, or paralysis on one side of the body, apraxia of speech, or dysarthria (Gonzáles Victoriano, & Hornauer-Hughes, 2014).

Peña-Casanova et al. (2019) sought to review and compile online resources regarding neurological diagnostic tools and discuss their compatibility with various dialects of Spanish. The authors discuss the following motivations for creating dialect-sensitive aphasia diagnostic assessments. While there exist standardized aphasia diagnostic tests, such as the Boston Diagnostic Aphasia Evaluation or the Boston Naming Test, they include culturally normative vocabulary. For example, the Boston Naming Test presents lexical items such as *iglú* (igloo) and *pretzel*, concepts that are tied to specific cultures and may not be recognized by others. Another issue is that neuropathologies that affect speech have been historically diagnosed using "standardized language," whereas dialectal considerations within a language have been neglected, which, at least in part, leads to testing of the patient's knowledge of the standardized language, rather than focusing entirely on how the pathology affects language use. Note that the term "standardized language" is used in this study. It is important to remember even that which is "standardized language" is actually a standardized dialect, and "to speak a language is to speak some dialect of that language" (Wolfram, 1991). Given these motivations, the overarching goal of this study was to provide resources and suggestions necessary to develop dialectally-sensitive assessments to evaluate speech pathology, focusing on "real" language rather than a standardized form. There are six dialectal regions listed in this study: Mexican, Caribbean, Central American, Andean, Rioplatense (River Plate), and Chilean. Table 2 lists examples of lexical variation between the languages in the phrase for "to hitchhike". For instance, in Mexico, you might hear *pedir aventón* or *pedir ton,* whereas in Chile, Paraguay, or Argentina, you would most likely hear *hacer dedo*. In addition to these examples, the study

also provides a list of online resources for the Spanish and Catalan languages, as a reference for the development of dialect-sensitive diagnostic tools.

Some suggestions made by Peña-Casanova et al. (2019) are to analyze existing diagnostic tools for their cultural content, create a pilot assessment for dialect or "standardized variant," collaborate with others to review the pilot assessment for clarity and content, and adapt the assessment based on psycholinguistic considerations. Distinguishing between linguistic variation belonging to dialect as opposed to disorder is a crucial component of accurately diagnosing and effectively treating a language disorder. For this reason, speech pathologists must be equipped with certain skills and knowledge—namely, recognition and understanding of dialects of their patients' language, as well as implementing nondiscriminatory testing procedures (*American English dialects*, 2003). Overall, it is imperative to improve diagnostic tools regarding speech pathology to include these dialectal considerations.

Spanish is becoming increasingly more common in the U.S., especially in cities in New York, Miami, and Los Angeles. The complexity of the language is reflected in its many dialects, which vary based on elements such as lexicon and phonology. Like Peña-Casanova et al. (2019), Kong (2020) argues that dialects influence speech, and when diagnosing a speech pathology, it is necessary to take these variations into account to discern the effects of aphasia from normal discourse. By making this distinction, speech pathologists can prevent the correction of natural and normal features of the dialect. Therefore, Kong (2020) also carried out a study that focused on dialect and speech language disorders. The goal of this study was to create a dialectally-sensitive Spanish version of an aphasia diagnostic tool known as "Main Concept Analysis" (MCA). Participants were selected from four different dialectal regions: Central American Caribbean, Andean-Pacific, Mexican, and Central Southern Peninsular. Based on the data, four sets of dialect-specific versions were established of the MCA to improve the accuracy of diagnoses and treatment plans established by speech pathologists and physicians. Another goal of this study was to determine if age and education level can affect speech. The data on age as a factor was inconclusive, but education level was found to affect word choice. This demonstrates a need to continue

expanding upon the MCA in future studies in order to be culturally- and dialectally-sensitive towards all Spanish-speaking aphasia patients (Kong, 2020).

Lázaro García et al. (2010) discusses the importance of considering quantitative and qualitative analyses when diagnosing patients with aphasia and interpreting test errors, as well as improving the applicability of standard aphasia diagnostic tools to Spanish, taking into account the linguistic diversity within the language. According to Lázaro García et al. (2010), qualitative analyses should consider neuropsychological factors, including motor sequential organization, kinesthetic integration, phonematic integration, and audio-verbal retention. Other quantitative factors, like language, can also affect the accuracy of an aphasia test. Standard aphasia diagnostic tests were first developed in other languages and later translated to the Spanish language. Without careful refinement, this results in a lack of adaptation to the Spanish language and consideration for dialectal differences (Lázaro García et al., 2010).

In an effort to incorporate these factors into an aphasia diagnostic test, Lázaro García et al. (2010) tested the efficacy of the Neuropsychological Clinical Assessment of Aphasia Puebla-Sevilla. This tool not only allows for the accurate characterization of aphasia but serves as an effective way to diagnose Spanish-speaking patients, as the test is adapted to the features of Castilian. The Pueblo-Sevilla diagnostic also employs a systematic way of selecting words and pictures for the test, including similarities between the point of articulation, mode of articulation, phonetics, and semantics. Ten patients were selected for the study, who were native Spanish speakers and who suffered from some form of brain injury that resulted in language disturbances. Each patient was tested using the Neuropsychological Clinical Assessment of Aphasia Puebla-Sevilla diagnostic tool. While the authors found the test to be an effective tool when combining both quantitative and qualitative analyses, they emphasize the need for further development of aphasia diagnostic tools adapted to the Spanish language, especially for clinical use in Latin America (Lázaro García et al., 2010).

The following case study will focus on a Chilean speaker with aphasia, analyzing his speech for dialect retention. The focus of the dialect analysis will be primarily centered on the first characteristic of

Chilean Spanish- reduction of syllable- and word-final /s/ to aspiration [h], as well as /s/ omission. The primary objective is to determine if Spanish speakers with aphasia retain the sociolinguistic aspect of their language use.

Case Study on LTL: A Chilean Spanish Speaker with Aphasia

For this case study I reanalyzed data that was published in Miller (2001) on an agrammatic patient who suffered from Broca's aphasia. The speaker, who is referred to as LTL, is a 57-year-old Spanish-speaking male from Chile. At the time, he had 18 years of formal education and worked as a dentist before suffering from an ischemic CVA, or stroke, fourteen months before the interview was conducted. LTL was clinically diagnosed with agrammatism, but did not suffer from comprehensive, hearing, or vision disabilities with no history of substance abuse. According to medical records, LTL suffered from unilateral, left-sided lesions to the middle cerebral artery, including Broca's Area, and the enlargement of the left lateral ventricle (Miller, 2001). The recordings of LTL were characterized by slow, halting speech. The following is an example of LTL's speech from conversational data (Miller, 2001, p. 99):

Cinco día(s) pero después(s) eh…yo eh…una…do-do(s) semana(s) después(s) ya eh tuve eh ¿cómo se llama esto?…esto ehm…/si/-/si/-silla rueda(s) . vení eh viene para acá...así sin (ha)cer terapia. Después eh . la Paula . fonoaudiólogo . la terapeuta. Así que . ahí eh tuve uno do(s) tre(s) mese(s)…sin andar.

To examine the extent to which LTL retained dialect features of Chilean Spanish in his speech, I examined the transcriptions and audio recordings from Miller (2001). These audio recordings, which were obtained from interview data, included a reading passage, picture descriptions, and conversational data. Because the most notable characteristic of LTL's speech was his frequent use of syllable final /s/ lenition, I coded each syllable final /s/ as being pronounced as either a /s/, /h/, or omission. To do this, I first

examined the transcript and highlighted all of the words that had an /s/ in syllable final position. I then listened to each recorded word as part of audio recordings in the form of wav. files on OneDrive. I coded all the tokens by ear, perceptually, with JLab Go Air True Wireless Bluetooth Earbuds, determining whether they were pronounced as [s], [h], or omission. For tokens which it was clear, I coded them according to the category of [s], [h], or omission. When there was confusion, I replayed the token up to 10 times and then made a decision once certain about the category. In total, there were 70 tokens extracted from the audio recordings of LTL's speech to carry out this exploratory study.

Figure 5 shows the total number of /s/ produced as an alveolar fricative [s], an aspiration [h], or as an omission '0' produced by LTL. Throughout the analysis, I will compare LTL's /s/ lenition to that of a control group of Chilean Spanish speakers taken from Miller (2013) (Figure 5). Throughout the case study, all the reading and conversational data will be kept separate because of observed differences in /s/ retention.

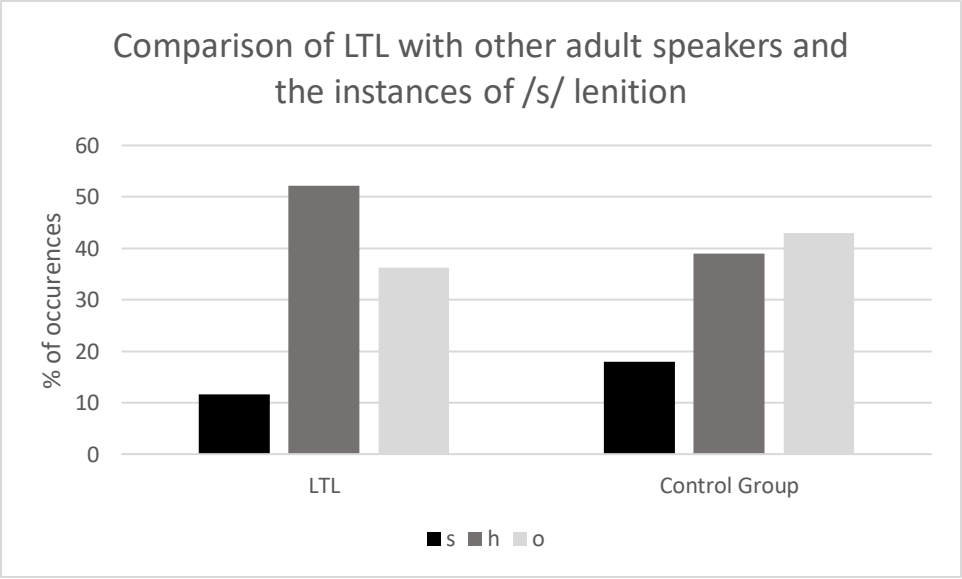

Figure 5. Comparison of /s/ lenition between LTL, the patient of this case study, and the control group. Control group data taken from Figure 2 of Miller (2013). In the figure, s=retention, h=aspiration, and o=omission of /s/.

According to the figure, both LTL and the control group demonstrated more /s/ lenition than retention in their speech. One notable difference between the two groups is that LTL more frequently

aspirates /s/ than he omits it, and the control group omits in more instances than they aspirate the /s/. This may be explained by the difference in education levels, as aspiration is associated with higher SES speech, while omission is associated with lower SES speech. A potential confound is the difference in gender, as LTL is a male patient and most speakers in the control group are female; however, according to Miller (2013), this would go against the trend of male speakers tending to omit /s/ more frequently than female speakers. Thus, it is more likely that the difference might be attributed to another factor, such as education, age, or formality of the situation in which the data was gathered. Regardless of this, the more frequent occurrence of /s/ lenition compared to retention in LTL's speech suggests that sociolinguistic characteristics of speech persist, even given a speech disorder, like Broca's aphasia.

I created pivot charts using Microsoft Excel to analyze four independent variables that affect /s/ lenition in audio recordings of speech from LTL: whether or not the word is a plural marker, word-medial vs. word-final /s/, syllable length, and position (if part of a noun phrase).

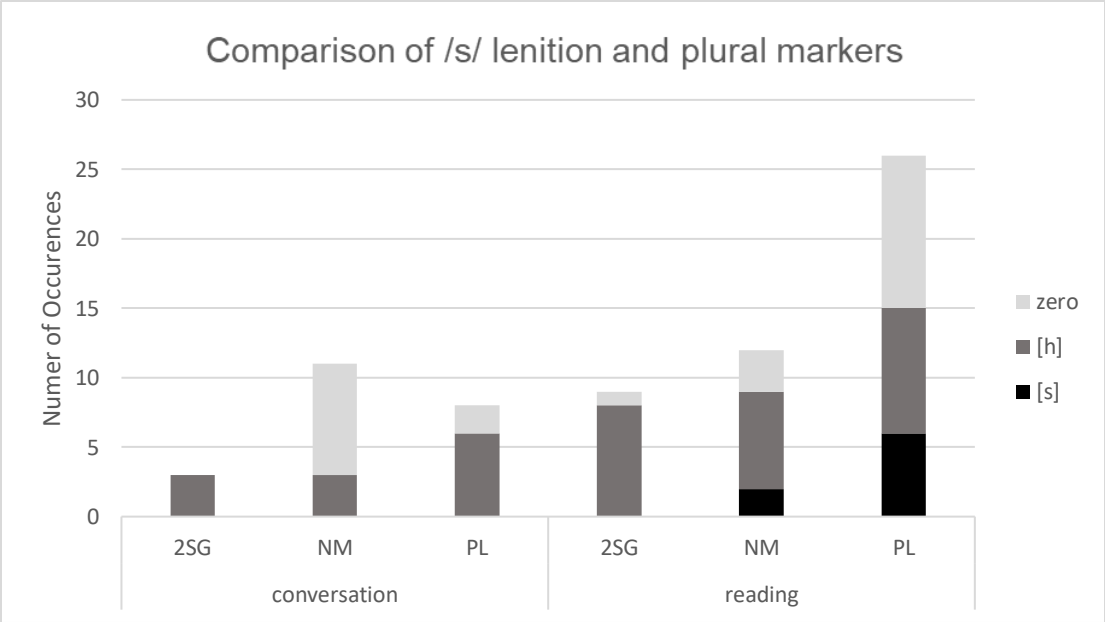

Figure 6. Relationship between /s/ lenition and plural markers in audio recordings of conversational and reading data from LTL. In the figure, 2SG= 2. Sg. verbal inflection (tú), PL=plural marker, and NM=nonmorphological.

As illustrated in Figure 6, the /s/ phoneme was aspirated more frequently than omitted for plural markers based on conversational data, whereas the /s/ in nonmorphological tokens was more often omitted than aspirated. In the reading data, aspiration was favored over omission for nonmorphological tokens, which was not the case for the conversational data, and plural markers were both aspirated and omitted with comparable frequencies. The trends in the conversational data may be explained by the nonmorphological tokens themselves, which include words like *canasta*, *entonces,* and *después,* whose meaning is not changed with the omission of the /s/ phoneme. Overall, the alveolar fricative [s] is retained more in the reading task than in conversational data. This indicates that the speaker's use of /s/ lenition is still constrained by register, or social context, similar to what is found in speakers without a speech language disorder. LTL's preference for aspiration over omission may also be a result of his education level, as the /s/ is aspirated in more formal speech, whereas /s/ omission is associated with informal speech.

When comparing nonmorphological tokens and plural markers in the reading data, omission was favored more in plural markers than nonmorphological tokens. This latter observation coincides with Figure 6 of Miller (2013), which found there was a relatively high omission rate for plural markers. Both the LTL data and adult speaker data from Miller (2013) show that omission is disfavored in the second-person singular verbs (*tú*). It is interesting to note that for conversational data, there were no recorded instances of /s/ retention, whereas for the reading data, retention of the /s/ phoneme occurred in several tokens. This suggests that /s/ lenition, a sociolinguistic factor of speech, changes based on the context of language production.

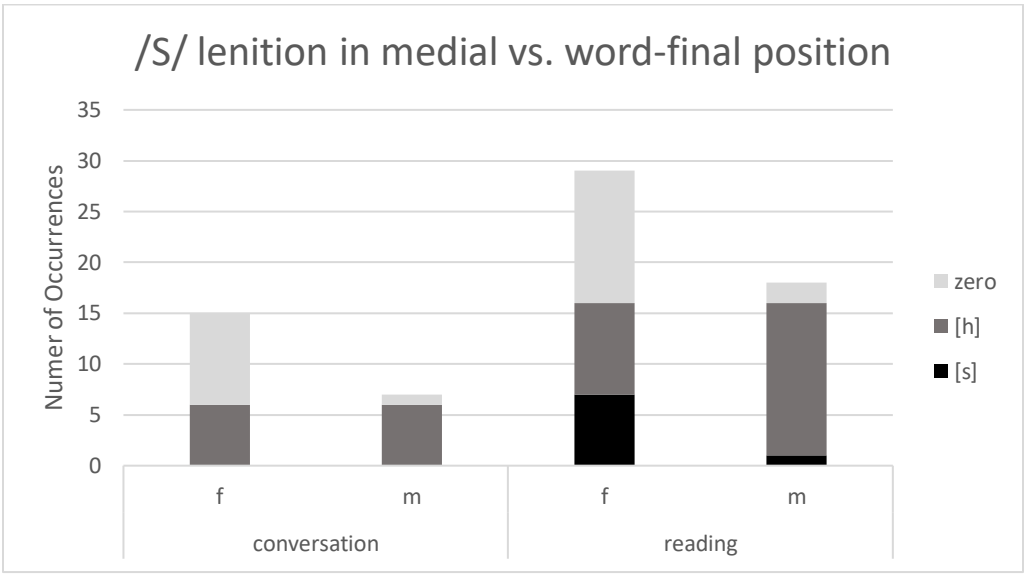

Figure 7. /S/ lenition in medial vs. word-final position. In this figure, m=medial position of /s/ and f=word-final position of /s/.

In the conversational data of Figure 7, word-final /s/ was omitted more frequently than medial /s/. The same is true for the reading data in terms of /s/ omission. It is interesting to note that the medial /s/ was aspirated more often than retained or omitted in both the conversational and reading data. This suggests that in terms of /s/ lenition, LTL prefers aspirating in the word-medial position and omitting the phoneme in the word-final position. The same relationship is demonstrated in Figure 5 of Miller (2013), which shows that the word-medial position disfavors omission, which is not true for the word-final position. This suggests that LTL retained sociolinguistic features that are characteristic of Chilean Spanish, and that his condition does not affect these features of his speech. Like Figure 6, there were no recorded instances of /s/ retention for conversational data, whereas for the reading data, retention of the /s/ phoneme occurred in several tokens (Figure 7). This further strengthens the claim that /s/ lenition, a sociolinguistic factor of speech, changes based on the context of language production—in this case, when speaking in a conversation or reading a text aloud.

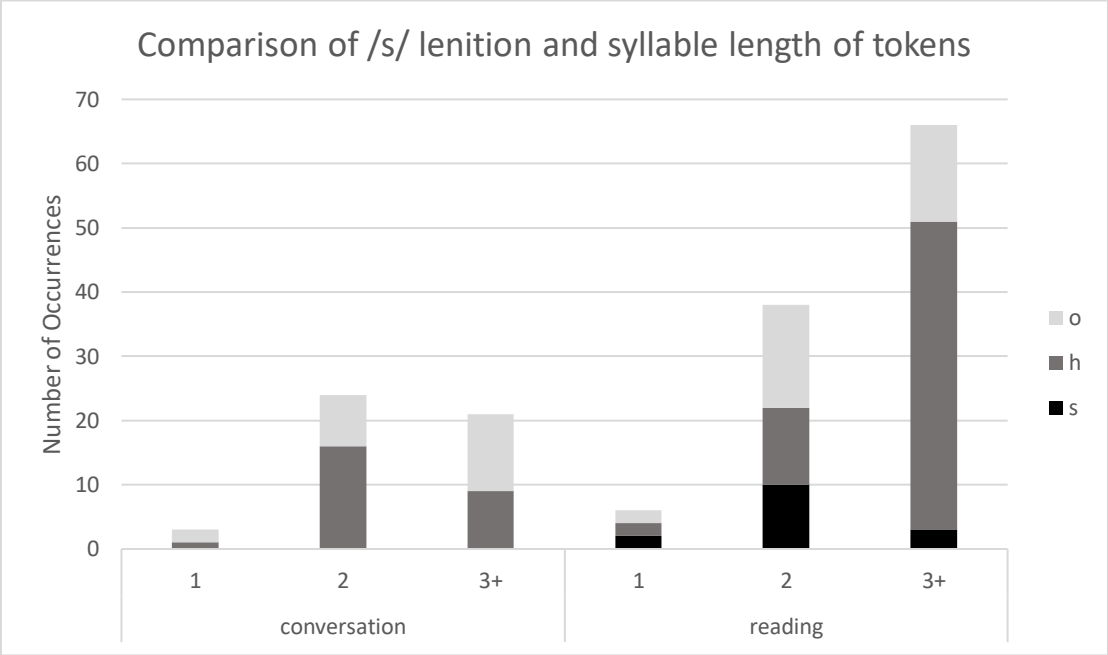

Figure 8. /S/ lenition and syllable length in conversation and reading audio data from LTL. 1, 2, and 3+ on the x-axis indicate syllable length of tokens.

As shown in Figure 8, two-syllable words favor retention compared to three-syllable words in conversation. Omission of /s/ is also higher in three-syllable words compared to two syllable words in the conversational data. Two syllable words also favor retention of /s/ compared to three syllable words in the reading data. These findings coincide with the trend reported by Cepeda (1995), which found that the highest retention of /s/ was found in lexical items that were monosyllabic among Valdivian Chilean Spanish speakers. On the other hand, the highest rate of /s/ deletion occurred among lexical items that were polysyllabic (Cepeda, 1995).

Based on the data in this exploratory study, LTL appears to retain the sociolinguistic influence on his speech as a Chilean Spanish speaker—most notably /s/ lenition—regardless of the effects of Broca's aphasia. Interestingly, speech rate is associated with /s/ lenition vs. /s/ retention based on previous studies. In a study done on Caleño Spanish speakers, it was found that fast speaking rates result in a tendency toward /s/ lenition, whereas slow speaking rates result in a tendency toward /s/ retention (File-Muriel & Brown, 2011). In this exploratory case study, /s/ lenition still permeates in LTL's slow and halting

speech. Further studies need to be carried out to determine the exact relationship of sociolinguistic factors, such as dialect, to language production and the relationship between speech rate and /s/ lenition, given the effects of aphasia on speech.

Chapter 4

Conclusions

The population of Spanish-speakers living in the U.S. has been increasing over the last few decades and is predicted to increase to 111.22 million speakers by 2060 ("Hispanics in the United States - Statistics & Facts", 2023). To better serve the linguistic needs of Hispanic communities, it would be beneficial for medical professionals to develop proficiency in Spanish, as patient-physician language concordance has been shown to increase patient satisfaction and improve the quality of care (Ortega et al., 2019). One way to carry out this goal is to increase the number and scope of medical Spanish courses in tertiary education. However, there are several challenges with implementing or expanding upon existing medical Spanish curricula, including costs, time, and varying levels of language proficiency among students. Furthermore, developing language proficiency for practical use in medicine must be approached carefully, as phenomena such as false fluency may lead to miscommunication and be detrimental to patient care. The literature review conducted in Chapter 1 summarizes several suggestions and factors to consider when implementing or expanding medical Spanish curricula.

One of the important factors related to the use of Spanish in U.S. healthcare is dialect. In Chapter 2, I aimed to answer two research questions: (i) Is the medical vocabulary used across regional dialects of Spanish different? (ii) If so, how does it vary? Based on survey responses, the use of colloquial medical vocabulary does indeed vary among dialects, and the glossary I created from the responses includes a number of regional colloquialisms. The medical language glossary is intended to serve as a resource for medical professionals in the U.S. working with Spanish-speaking patients. Other interesting findings are that words associated with either the cold or flu are used somewhat interchangeably across regions, and there is varying interpretation of terminology related to mental health and speech pathology.

One explanation for the varying interpretations is that topics such as mental health and speech disorders may not be as openly discussed in the regions represented by the participants. The

stigmatization of mental health is a global issue, which, according to one study, contributes to mental health care utilization disparities among Latino faith-based communities. Religious and cultural beliefs have also been found to influence attitudes towards mental health in these communities, such as the perception of mental illness from a spiritual perspective and cultural values such as *familismo* (Caplan, 2019). Overall, the findings in Chapter 2 regarding everyday medical vocabulary would benefit from further research, specifically including a more diverse range of regions, socioeconomic status, education levels, gender, age, and other demographic factors.

Previous research has called for the consideration of sociolinguistic factors, such as culture and dialect, in diagnostic tools and treatment plans employed by speech pathologists (Kong, 2020; Lázaro García et al., 2010; Peña-Casanova et al., 2019). This served as one of the motivations to explore dialect retention in the speech of a Chilean Spanish speaker with aphasia. The case study focused mainly on the manifestation of /s/ lenition, a common phonetic feature of Chilean Spanish, that is affected by many factors, including gender, social class, register, and whether the /s/ occurs in a word-medial or word-final position. The results of the case study in Chapter 3 show that /s/ lenition was exhibited by LTL, a Chilean Spanish speaker with aphasia. This finding suggests that sociolinguistic features of speech, such as dialect, are retained in individuals with aphasia.

Other notable findings regarding /s/ lenition in relation to register, plural markers, word-medial vs. word-final position, and syllable length of words are reported in Chapter 3. One finding that differs from existing research is related to speech rate and /s/ lenition. Previous research has shown that a faster speech rate is associated with /s/ lenition, while a slower speech rate is associated with /s/ retention (File-Muriel & Brown, 2011). This case study, however, demonstrated that /s/ lenition was still present in slow, halting speech that results from the effects of aphasia. Further research must be conducted in order to determine the exact relationship between /s/ lenition and speech rate and if this relationship differs depending on the population (e.g., individuals with aphasia vs. individuals not affected by a speech or language disorder). Overall, dialectal variation in Spanish as it pertains to U.S. healthcare and speech

pathology are important issues that warrant further investigation, to improve the quality of care for Spanish-speaking patients.

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ACADEMIC VITA
Maria Smereka

RESEARCH EXPERIENCE

Independent Research in Spanish linguistics - *Penn State*

MARCH 2022 – PRESENT

- Conducting research on the use of Spanish in medical contexts in the U.S., which will culminate in the completion of my honors thesis.

Undergraduate Research in Chemistry - *Zhang Lab*

SEPTEMBER 2019 - AUGUST 2021

- Conducted research on the use of fluorophores (AggTag method) to detect protein aggregation as it pertains to neurodegenerative disease.

Undergraduate Research in Microbiology and Molecular Genetics – *University of Pittsburgh*

JULY 2020 - AUGUST 2020

- Conducted summer research on the bonding of the TseT-TsiT protein and inhibitor pair of Pseudomonas aeruginosa, a bacterium commonly found in the lungs of patients with Cystic Fibrosis

AWARDS

- **Student Marshal** for Department of Spanish, Italian, & Portuguese in the Penn State College of Liberal Arts
- **Certificate of Excellence in Spanish** for high academic achievement in Spanish
- **Stand Up Award** recipient from the Rock Ethics Institute at Penn State for my ethical leadership in the Ukrainian Society
- **Naydan Award for Excellence in Ukrainian Studies** for my achievements as President of the Ukrainian Society

- **Outstanding Achievement in the Spanish Intermediate Language Program** for skill and scholarship in the Spanish Language studies
- **Erickson Discovery Grant** for my innovative proposal to fund summer research experience in chemistry
- **The President Sparks Award** for outstanding academic achievement as a second-year student (4.0 GPA)
- **The President Freshman Award** for outstanding academic achievement as a first-year student (4.0 GPA)

LEADERSHIP

Ukrainian Society — *President*

AUGUST 2021 - PRESENT

- Re-establishing an active Ukrainian organization at Penn State, promoting education and engagement with Ukrainian culture, language, history, music, and current events, building community among members
- Led and organized several rallies, raised ~$8000 in aid for Ukraine through our fund alone but helped promote more donations to Razom for Ukraine
- Organized dinners to welcome refugees into the community and provide them cultural support.
- Collaborated with Sister's Sister (nonprofit in State College) to help raise funds to repair the boiler system in Nizhyn, Ukraine and provide heat for its citizens during the winter.

Ukrainian Society — *Treasurer*

AUGUST 2020-MAY 2021

- Oversaw the organization's funds remotely
- Completed NSO treasurer training to become familiar with funding opportunities available to the club.

TEACHING EXPERIENCE

Midstate Literacy Council — *ESL Tutor (Volunteer)*

JANUARY 2021 - APRIL 2021, JULY 2022 - AUGUST 2022

- Led a small group of adult learners with varying English proficiencies in a current events class
- Tutored an immigrant from Kazakhstan and personalized lessons to effectively teach them basic, practical English skills.

CHEM 110/111 World Campus, Penn State University — *Teaching Assistant*

AUGUST 2022 - DECEMBER 2022

- Communicated with students in office hours to help them with challenging problems, provided feedback on exams and assignments to enhance learning

CHEM 110, Penn State University — *Teaching Assistant*

JULY 2022 - AUGUST 2022

- Led problem-solving sessions to improve student comprehension and help them master chemistry concepts

CHEM 130, Penn State University — *Teaching Assistant*

JANUARY 2022 - MAY 2022

- Interacted with students to facilitate learning of chemistry concepts (general, organic, and biochemistry), provided feedback on assignments

CHEM 110B, Penn State University — *Teaching Assistant*

AUGUST 2021 - DECEMBER 2021

- Interacted with students to facilitate learning of basic chemistry concepts, graded, held office hours for individualized learning

CHEM 210, Penn State University — *Grader*

JANUARY 2021- MAY 2021

- Graded organic chemistry assignments and exams to ensure accurate understanding of the subject matter and effective learning

Chemistry 210 — *Learning Assistant*

JANUARY 2021- MAY 2021

- Interacted with students to facilitate learning of organic chemistry concepts, provided individualized help and explanations in office hours

Chemistry 110B — *Learning Assistant*

AUGUST 2020 - DECEMBER 2020

- Interacted with students to facilitate learning of basic chemistry concepts, provided individualized help and explanations in office hours

VOLUNTEER EXPERIENCE

Centre Coalition for Ukraine — *Volunteer*

JULY 2022 – PRESENT

- Relocated two refugee families to State College working as a team with other community leaders.
- Secured a total of $25,000 to provide them housing and other resources

CVIM — *Vaccine Clinic Volunteer*

JULY 2021 - NOVEMBER 2021

- Assisted in the operation of vaccine clinics (organization, check-in, greeting, ensuring accuracy of medical information in patient forms)

RAM — *Clinic Volunteer*

SEPTEMBER 2019 - MAY 2020

- Volunteered as a member of Penn State's chapter of Remote Area Medical to provide free, quality healthcare to underserved populations on weekend-long clinics

Honors Orientation Mentor — *Schreyer Honors College*

MAY 2022 - AUGUST 2022

- Led incoming first-year students in their honors orientation, helped them adjust to a major life change by being a mentor and peer educator

LANGUAGES

Fluency in English (bilingual speaker)

Fluency in Ukrainian (bilingual speaker)

Advanced Proficiency in Spanish

TRAININGS/CERTIFICATIONS

NASPA Certified Peer Educator

PA SIIS Training

Completed online training for data entry through the PA Health Department

American College of Surgeons Stop the Bleed Training

Diversity in Healthcare Certificate through the Penn State College of Medicine

SHADOWING EXPERIENCE

Excela Health Westmoreland Hospital — *Premedical Student*

AUGUST 2021

- Shadowing a cardiothoracic surgeon, observing and learning about procedures such as CABG (on-pump and off-pump), aortic root replacement, AVR, TAVR, MVR, and MAZE

UPMC Passavant-Cranberry — *Premedical Student*

JULY 2022

- Shadowed a cardiologist, observed patient interactions and medical history examination, learned relevant medical and anatomical terminology