

2018

# Motivation, Comprehensibility, and Accentedness in L2 Spanish: Investigating Motivation as a Time-Varying Predictor of Pronunciation Development

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# Motivation, Comprehensibility, and Accentedness in L2 Spanish: Investigating Motivation as a Time-Varying Predictor of Pronunciation Development

## **Abstract**

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## **Keywords**

pronunciation, comprehensibility, accentedness, Spanish; motivation, longitudinal research

## **Disciplines**

Bilingual, Multilingual, and Multicultural Education | Language and Literacy Education | Spanish Linguistics

## **Comments**

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Motivation, Comprehensibility, and Accentedness in L2 Spanish: Investigating Motivation as a  
Time-Varying Predictor of Pronunciation Development

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\*This article has been accepted for publication in *Modern Language Journal*

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## ABSTRACT

This study examined relationships between language learning motivation and the longitudinal development of second language (L2) pronunciation. Twenty-six English-speaking learners of Spanish recorded a simplified picture description task five times over a yearlong period spanning their second, third, and fourth semesters of Spanish language instruction. Learners also completed a quantitative motivation survey based on the L2 Motivational Self System and an open-ended questionnaire on their language learning beliefs once per semester, yielding three measurements. Eighteen native Spanish listeners rated learners' clips for comprehensibility and accentedness. Although mixed modeling of the motivation data revealed a slightly negative trajectory for motivational subcomponents, qualitative analyses of individual patterns indicate that learners were beginning to formulate and evaluate language learning goals that were set into a larger framework of personal and professional objectives. Mixed effects models of the pronunciation data demonstrate that both comprehensibility and accentedness improved over time. When the quantitative motivation measures were integrated into the modeling process as time-varying fixed effects, effort was significantly related to accentedness, which suggests that effort may have played an increasingly important role in shaping learners' pronunciation over time.

*Keywords:* pronunciation; comprehensibility; accentedness; Spanish; motivation; longitudinal research

## INTRODUCTION

Over the past two decades, pronunciation research has increasingly scrutinized listeners' perceptions of second language (L2) speech, focusing on fluency, comprehensibility, and accentedness (Derwing & Munro, 2013; Trofimovich & Isaacs, 2012). Fluency is defined in reference to pause structure, the frequency of pauses or hesitations and where they occur in the speech stream. Comprehensibility refers to processing difficulty or how easy or difficult the speech is to understand. Finally, accentedness is operationalized at a more granular phonetic level as deviation from native speech.

Research has demonstrated that these constructs only partially overlap since heavily accented speech may nevertheless be highly intelligible (Munro & Derwing, 1995). More recently, studies have endeavored to understand how linguistic features, including phonetic and phonological variables, map onto L2 speech ratings (O'Brien, 2014; Saito, Webb, Trofimovich, & Isaacs, 2015, 2017). Likewise, a growing body of longitudinal scholarship has illuminated how L2 learners' pronunciation develops over time (Derwing & Munro, 2013; Munro & Derwing, 2008; Munro, Derwing, & Thomson, 2015). However, most studies have examined L2 English speakers, focusing on learners in naturalistic contexts. Within such an environment, studies have shown that learners' pronunciation tends to improve rapidly over the first few months of more intensive L2 exposure, and distinct developmental trajectories have been observed for fluency and comprehensibility on the one hand and accentedness on the other (Derwing & Munro, 2013). In contrast, few studies have been conducted on pronunciation development in the instructed context, which is problematic since classroom language learning reflects the experiences of many adult language learners, some of whom may ultimately spend more time interacting with one another than with native speakers (O'Brien, 2014). Given that

there are over 1.5 million language students in the US alone (MLA, 2015), it is important that we gain a better understanding of how classroom learners' comprehensibility and accentedness change over time.

The goals of the current study were therefore twofold: (a) to track L2 Spanish learners' comprehensibility and accentedness over a yearlong period spanning their second, third, and fourth semesters of college-level language instruction and (b) to investigate whether individual differences in language learning motivation, operationalized as both a between- and within-subjects predictor, were related to learners' pronunciation.

## BACKGROUND

### *Comprehensibility and Accentedness of L2 Speech*

Research on the linguistic predictors of L2 comprehensibility and accentedness has demonstrated that morphological, lexical, and fluency factors tend to undergird the former, whereas phonetic and phonological variables predominantly map to the latter (Akiyama & Saito, 2017; O'Brien, 2014; Trofimovich & Isaacs, 2012). In one of the few studies involving a target language other than L2 English, O'Brien (2014) investigated advanced L2 German learners' perception of native (L1) and L2 German speech. Speech samples were analyzed for 12 linguistic variables such as segmental, syntactic, and lexical errors. For L2 speech, five factors were derived, and results indicated that listeners relied on distinct speech stream characteristics when rating the fluency, comprehensibility, and accentedness of clips produced by other L2 learners. For example, the articulation rate and morphology factor was a significant predictor of comprehensibility but not accentedness, and, on the other hand, the combined phonology, syntax, and pauses factor predicted accentedness but not comprehensibility.

In addition to understanding how linguistic variables map onto L2 speech ratings, longitudinal research on L2 pronunciation development has grown to include studies investigating global characteristics of L2 speech such as comprehensibility and accentedness (Derwing & Munro, 2013; Derwing, Munro, & Thomson, 2008; Saito, 2015) as well as a range of segmental and phonetic features (Casillas, 2016; Munro & Derwing, 2008; Munro et al., 2015; Nagle, 2017a, 2017b). Concentrating on the former, accumulated findings indicate that most pronunciation development occurs within a window of maximal opportunity (Derwing & Munro, 2015) corresponding to the first few months of intensive L2 contact. Learner variables, such as individual differences in willingness to communicate, also appear to play a determinative role, giving rise to divergent individual developmental trajectories. For example, Derwing and Munro (2013) tracked L1 Slavic language speakers and L1 Mandarin speakers over a 7-year period, during which both groups were living in Canada. For the Slavic speakers, fluency and comprehensibility improved over the duration of the study, but accentedness improved only over the first two years with no gains observed from year 2 to 7. Conversely, the L1 Mandarin speakers did not improve at all, which may have been related to the fact that they maintained greater ties to the L1 community. However, the two Mandarin speakers rated as the most comprehensible at the end of the study reported interacting in English more frequently than their peers, which underscores the interplay between internal learner factors and external resources, such as opportunities for L2 use. In Kennedy, Foote, and Dos Santos Buss (2015), seven L2 English speakers took part in a mock job interview during their first and third years at a university where English was the language of instruction. Fluency, comprehensibility, and accentedness ratings revealed that learners' speech improved significantly along all three dimensions.

Despite increased interest in L2 pronunciation development and the affordances of more advanced statistical techniques such as growth curve modeling, longitudinal studies remain rare, and to date, most research has prioritized L2 English, investigating speakers living in an L2 environment. Yet, many individuals begin their language learning careers in the classroom, enrolling in language programs designed to produce communicatively competence (i.e., highly comprehensible) L2 speakers. Though in immersion contexts learners' pronunciation appears to improve automatically to a certain extent coinciding with the onset of massive L2 exposure, the same may not hold true of instructed language learning since opportunities for sustained L2 use are limited. Thus, more research on the interplay between individual differences and classroom learners' pronunciation development is warranted.

#### *Concern for Pronunciation as a Specific Facet of Motivation*

Research has shown that learners' concern for their pronunciation may be related to their L2 pronunciation accuracy. Examining complex relationships among individual differences in aptitude, motivation, and pronunciation strategy use and L2 oral skills, Baker Smemoe and Haslam (2013) found that motivation was related to fluency and comprehensibility but not accentedness, which was associated with auditory aptitude. Elliot (1995) likewise found that concern for pronunciation, as assessed via the Pronunciation Attitude Inventory, predicted L2 Spanish learners' pronunciation accuracy, accounting for 14% of the variance in a regression analysis. Although Purcell and Suter (1980) obtained a similar finding—concern for pronunciation emerged as a significant predictor of L2 English pronunciation—the authors argued that its contribution was “negligible” relative to other factors, such as L1 background. Despite their negative appraisal of the role motivation plays in pronunciation learning, significant scholarship on exceptional L2 learners, individuals who appear to possess a nativelike

accent despite having learned the L2 later in life, suggests that a high level of motivation may be critical to achieving near-native L2 proficiency, including nativelike pronunciation (Moyer, 1999, 2013, 2014a, 2014b). However, although studies have demonstrated important links between concern for pronunciation and L2 pronunciation accuracy, research has yet to provide evidence of a relationship between pronunciation accuracy and more general motivation to learn a language, which may become more closely connected to pronunciation at more advanced levels of proficiency. Moreover, it is important to bear in mind that motivation is a complex, dynamic construct that interacts with other socio-affective factors such as learner autonomy and identity, which can in turn have a nondeterministic, variable impact on the concern for sounding accurate that different learners experience at different times in their careers as language users (Marx, 2002; Müller, 2013). Therefore, any relationship between motivation and pronunciation accuracy is likely to be complex.

#### *Language Learning Motivation: The L2 Motivational Self System*

Borne out of large-scale research on secondary school foreign language learners in Hungary (Csizér & Dörnyei, 2005a, 2005b; Dörnyei & Csizér, 2002), the L2 Motivational Self System (Dörnyei, 2009) is a prominent model of language learning motivation composed of three subcomponents: the ideal L2 self, ought-to L2 self, and the language learning experience. The ideal and ought-to L2 selves are conceptualized in terms of promotion and avoidance orientations insofar as the former represents learners' hopes and aspirations for language learning and the latter perceived responsibilities and obligations. Consequently, the selves can be conceptualized along a continuum of goal internalization with the ideal L2 self encoding internalized goals and the ought-to L2 self external forces and pressures. In both cases, links to possible selves and self-discrepancy theory are clear: learners imagine future contexts of L2 use

and take steps to realize that future self-guide, that is, to reduce the discrepancy between their current language profile and their desired one. Accumulated research on the model has demonstrated strong links between the ideal L2 self and outcome measures such as course grade (Dörnyei & Chan, 2013), and L2 knowledge (Lamb, 2012). On the other hand, research on the ought-to L2 self has yielded weaker results, casting doubt upon its motivational potential (e.g., Dörnyei & Chan, 2013).

In addition to detailed analyses of the structure of language learning motivation, research has begun to concentrate on its dynamic properties. For example, Waninge, Dörnyei, and de Bot (2014) examined the motivational trajectories of four high school students who were learning Spanish and German. Adopting a dynamic systems approach, the authors tracked learners' motivation over a fifty-minute lesson on three occasions for each L2, and the students completed a Likert-style questionnaire designed to assess their general attitudes toward the language courses. Results demonstrated that learners' overall motivational profile (i.e., their disposition toward the two L2s) and the instructional context acted as attractor states, such that certain contextual developments (e.g., acting out a scene in front of a group) produced idiosyncratic shifts in learners' motivational states, whereas others produced temporary convergences between learners' disparate trajectories. Overall, the findings of the study point to the existence of an array of individual and contextual factors that act in concert, shaping learners' motivation at both macro and micro levels. Motivational shifts may be convergent in the presence of a powerful contextual attractor, such as a particularly engaging activity, or divergent if one learner is asked to perform an anxiety-inducing individual task. In another longitudinal study, Busse and Walter (2013) investigated first-year university students' motivation to learn L2 German over a yearlong period. Despite learners' strong desire to achieve proficiency in German, their motivation

decreased over time, which appeared to be rooted in a mismatch between learners' goals and instructional practices. Coursework included literature instruction in English and the explicit presentation of challenging grammar points, which conflicted with students' interest in continuing to develop their communicative language skills. Taken together, these studies highlight interactions between contextual events and students' personal interests and objectives as related to language learning.

To summarize, research has demonstrated the motivational potential and preeminence of the ideal L2 self, which has been linked to a range of outcome variables, and recent scholarship has focused on the dynamic characteristics of language learning motivation. However, most research has focused on English as a global language, though scholars have begun to focus on the motivational dynamics of learners of other languages (Ushioda & Dörnyei, in press). For L1 English speakers, while proficiency in another language is oftentimes perceived of as advantageous in a professional setting, it does not typically serve as a gatekeeper. Consequently, English-speaking learners of other L2s like Spanish may display unique motivational characteristics.

### *The Current Study*

Despite an increase in the number of longitudinal studies addressing pronunciation, important gaps remain. The body of work examining L2 pronunciation development has concentrated on L2 English speakers, predominantly examining naturalistic learners, whose experiences are quantitatively and qualitatively different from instructed students. With respect to individual differences in pronunciation learning, few studies have investigated pronunciation and motivation in tandem, and the ones that have done so have typically defined motivation as a static factor, regressing it onto accentedness scores without taking speakers' comprehensibility

into consideration. Recent motivation scholarship has provided the conceptual framework for adopting a more dynamic approach in which motivational shifts are linked to contextual factors.

Bridging these perspectives, the present study addressed the following research questions:

1. How does learners' motivation change over two semesters of basic Spanish language instruction?
2. How do learners' comprehensibility and accentedness develop over the same period and do those characteristics exhibit similar or divergent intercepts and trajectories?
3. Is motivation related to the development of more accurate and comprehensible L2 speech?
4. What are students' goals and beliefs as related to language learning generally and pronunciation in particular?

To examine pronunciation development, 26 L1 English speakers were recorded completing a picture description task five times over a yearlong period. Eighteen native Spanish listeners rated the L2 speech samples for comprehensibility and accentedness, and mixed effects models were fit to the data. To address motivation, learners completed a quantitative selves survey based on the L2 Motivational Self System and an open-ended questionnaire once per semester or three times. Mixed effects models were fit to the motivation and pronunciation data to detect group-level trends. Complementary qualitative analyses of learners' responses on the open-ended questionnaire were undertaken to explore students' language learning attitudes and beliefs.

## METHOD

### *Speakers*

Twenty-six English-speaking learners of Spanish were recruited from two sections of a second-semester college-level Spanish course. They had a mean age of onset of 14.38 years ( $SD = 4.11$ ) and reported 3.35 ( $SD = 3.17$ ) years of previous Spanish instruction. Consequently, although participants were enrolled in the same basic language course at the time of recruitment, most had taken a few Spanish courses in high school. Learners participated in five sessions over a yearlong period spanning their second, third, and fourth semesters of language coursework. Data was collected shortly after participants had begun their second semester and approximately every half semester thereafter: at the end of their second semester, at the midterm and at the end of their third, and near the midterm of their fourth. During this period, learners received instruction from both native and near-native Spanish speakers who were working as graduate teaching assistants in a coordinated Spanish language program that followed a communicative approach to language teaching. When surveyed as to their teaching practices, all but one instructor indicated that they did not explicitly address pronunciation. The one individual who responded affirmatively reported that she spoke with her students about the Spanish tap and trill and diphthongs on one occasion. Thus, pronunciation was not a substantive part of teachers' daily practice nor was it a targeted aspect of the language curriculum. Learners likewise reported that they had not received any targeted pronunciation training either prior to the study or while it was ongoing. Five learners decided to discontinue their study of Spanish after the first semester (i.e., after the first two sessions), three learners reported experience with another language and were therefore excluded from analysis, and data from the first session was unavailable for four participants. After taking into account these sources of attrition, data for at least 19 of the 26 learners was available at each of the five sessions<sup>1</sup>.

### *Listeners*

Listeners were 18 native speakers (11 females) representing nine varieties of Spanish (Colombia,  $n = 5$ ; Ecuador,  $n = 3$ ; Mexico, Panama, and Puerto Rico,  $n = 2$  each; Costa Rica, Peru, Uruguay, and Chile,  $n = 1$  each) who were pursuing an advanced degree at a US university. On average, they reported comparable proficiency in both languages on a nine-point scale ranging from *very poor* to *extremely proficient* (for Spanish,  $M = 8.76$  and, for English,  $M = 7.93$ ) and indicated using Spanish and English on a daily basis at rates of approximately 40% and 60%. When asked to estimate how familiar they were with L2 Spanish speech on a nine-point scale (0 = *not at all familiar*; 9 = *extremely familiar*) and to report how often they interacted with non-native Spanish speakers in Spanish on a four-point scale (0 = *never*; 3 = *more than once a day*), listeners reported moderate familiarity with L2 speech ( $M = 5.63$ ) and infrequent interactions with L2 speakers. Half of the listeners reported some linguistic training and/or teaching experience, and those categories were crossed half of the time; of the ten listeners with teaching experience, five had linguistic training. Listener characteristics are summarized in Table 1.

<INSERT TABLE 1 ABOUT HERE>

TABLE 1

Summary of Listener Characteristics

	<i>M</i>	Range
Age	28.32 (5.69)	18–44
Spanish proficiency	8.76 (0.78)	7–9
Percent daily Spanish use	42.89 (25.36)	10–90
Age of onset: English	10.37 (6.64)	3–30
English proficiency	7.93 (0.95)	6.75–9

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Familiarity with L2 Spanish speech	5.63 (2.99)	1–9
Interactions with L2 Spanish speakers	~monthly	Never: 6 raters Monthly: 7 raters Daily: 2 raters Daily Plus: 3 raters
Linguistic training	8 raters	
Language teaching experience	9 raters	

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### *Speaking Task*

The L2 learners completed a picture description task five times over the course of this yearlong study. They received 20 sets of images, combining the images in each set to form a simple sentence in Spanish (e.g., *Mario limpia la cocina*, ‘Mario is cleaning the kitchen’). Before recording the speaking task, they participated in a training phase designed to familiarize them with the vocabulary required for the experiment and to acquaint them with the particular image associated with each term. The training was computerized such that the participant saw an image with the word printed beneath and heard the word pronounced by a native Spanish speaker. Level-appropriate terms were selected from the learners’ textbook to maximize the likelihood that they knew the words. After the program cycled through the 25 terms included in the study and corresponding images, learners took a quiz on which they had to match vocabulary with images. Once they achieved a perfect score on the quiz, they advanced to the recordings. Otherwise, they repeated the training module. Recordings were carried out in a quiet room using a head-mounted microphone. On each trial, learners saw a PowerPoint slide with three images, one each for the subject, verb, and either the location or the direct object, and had as much time

as needed to form and record the sentence before moving to the next trial. Whereas a narrative task has been employed with intermediate to advanced L2 speakers (e.g., Derwing & Munro, 2013; O'Brien, 2014), pilot testing indicated that the sentence elicitation task employed in the present study was more feasible for novice language learners.

### *Motivation Surveys*

A quantitative L2 selves survey addressing the ideal L2 self, ought-to L2 self, and learners' intended effort was adapted from Dörnyei (2009). Learners rated agreement to ten items per construct on a six-point Likert scale ranging from *strongly disagree* to *strongly agree* (Appendix A). In addition to the quantitative selves survey, learners completed an open-ended questionnaire answering six questions tapping into their goals and beliefs related to language learning and the actions they took both inside and outside of the classroom to become more communicatively competent Spanish speakers (Appendix B). Learners completed both instruments on three occasions, once near the midterm of each semester, to capture shifts in their motivational profiles over time. Although it would have been possible to sample motivation at each session, three measurements were deemed appropriate since the goal was to document larger-scale shifts in motivation, which are arguably more likely to occur from one semester to the next. That is, given that variables such as course level, classroom dynamics, and instructor style are in flux between, but not typically within, semesters, sampling motivation once per semester was regarded as providing sufficient resolution for the purpose of this study.

### *Language Background Questionnaire*

To provide data on learners' previous language experiences and patterns of language use, participants completed an adapted version of the Language Contact Profile (Freed, Dewey, Segalowitz, & Halter, 2004). They reported biographical and previous language experience data

once, at the first session. Once per semester, at the third and fifth sessions, they completed an abbreviated version dealing exclusively with language use, reporting on any extracurricular activities related to Spanish.

### *L2 Speech Ratings*

To prepare files for rating, individual sentences were labeled, extracted, and normalized for peak intensity using Praat acoustic analysis software (Boersma & Weenik, 2015). Of the 20 sentences each learner recorded at each session, five sentences per learner per session were randomly sampled for presentation to raters and compiled using SuperLab software. Three blocks were created with breaks in between to prevent listener fatigue. On each trial, listeners heard a tone, a brief pause, and the sentence to be rated, which they evaluated using nine-point scales (e.g., for comprehensibility, 1 = *very easy to understand* and 9 = *very difficult to understand*). Ratings were carried out sequentially, and the order of ratings was counterbalanced to avoid sequencing effects (i.e., half of the listeners rated comprehensibility before accentedness and the other half accentedness before comprehensibility). Thus, each rater heard each sentence twice, once for the accentedness ratings and once for the comprehensibility ratings. Files within each block were randomized before presentation, such that each listener rated sentences in a unique order. All blocks contained files from all speakers, including the native speaker control items described below. Listeners received instructions on how to interpret the scales and descriptors and completed four practice trials before the experimental portion of the rating task. For comprehensibility, listeners were instructed to focus on how easy or difficult the speech was to understand. For accentedness, listeners were instructed to evaluate the extent to which the speech deviated from a native variety of Spanish.

Accentedness is oftentimes couched in terms of a local variety of the target language, which is appropriate for L2 studies dealing with speakers who have relocated to a single geographic area and whose input is consequently relatively constant. In contrast, in a foreign language context, classroom learners are oftentimes exposed to multiple dialects through their instructors and their study abroad experiences, in which case it is not immediately clear what dialect or local variety would be the most valid reference criterion. Moreover, because classroom learners, including those in this study, report a variety of reasons for language study, such as traveling or living abroad or using the L2 in their careers, contexts of L2 use and the reference norms associated with them will vary considerably. For these reasons, accentedness was operationalized more generally as characteristics deviating from any native variety.

Thirty-five audio files spoken by seven native speakers of Spanish were included with the L2 learner audios to examine whether listeners reliably detected the native speakers. One listener was excluded from analysis because she assigned multiple native speaker clips ratings of nine, which suggests that she had reversed or misinterpreted the scale. Inter-rater reliability was evaluated for the remaining 17 listeners using separate two-way, consistency, average-measure intra-class correlation coefficients (ICC). Inter-rater reliability was excellent for both comprehensibility,  $ICC = .93$ , and accentedness,  $ICC = .94$ .

## RESULTS

Mixed effects modeling is a statistical analysis integrating fixed and random effects. Fixed effects are observed variables that are regressed onto the outcome measure, and random effects account for unobserved variables, modeling random variance around the population-level estimate. Multiple sets of random effects may be posited to account for the hierarchical structure of data and potential crossing between levels, such as random effects by subjects and raters.

Fixed effects may be time-invariant, if a single score is associated with each participant, or time-varying, if the predictor changes over time, making mixed models an ideal analytical tool for longitudinal data sets dealing with dynamic (i.e., time-varying) traits, such as motivation in the present study.

The present study adopted an exploratory approach to model building according to which simpler models were first fit and expanded as warranted. Model comparisons were computed by performing a Chi-square test on the deviance statistics of nested models. If a more complex model improved fit, then the additional parameters it included were taken to be statistically significant. Scholars have also interpreted absolute  $t$  values of 2 or greater as statistically significant following the large-sample normal approximation (Cunnings & Finlayson, 2015; Linck & Cunnings, 2015). All models were fit using the lme4 package (Bates, Maechler, Bolker, & Walker, 2014) of R (R Core Team, 2016).

### *Motivation Over Time*

Learners' scores on the ten individual items representing each subcomponent of the L2 Motivational Self System were averaged to prepare the data for modeling. Thus, scores ranged from a minimum of 1, representing very little effort or motivation on the relevant scale, to 6, representing significant effort and motivation. Mixed effects models were fit to examine whether learners' motivation changed over time in each area. The analysis included fixed effects for session (i.e., the effect of time) and motivation type (three levels: effort, ideal L2 self, and ought-to L2 self), and effort was set as the baseline value against which the ideal L2 and ought-to L2 selves were compared. By-subject random intercepts were included, and by-subject random slopes for motivation type and session. Integrating a session by motivation type interaction term did not significantly improve fit ( $\chi^2(13) = 19.45, p = .11$ ), which indicates that learners'

motivation in each area changed at approximately the same rate over the course of the study. Table 2 summarizes the final model. Results indicate that there was a significant difference between learners' self-reported effort and the ought-to L2 self (estimate =  $-1.50$ ,  $SE = .13$ ,  $t = -11.85$ ). However, there was no difference between effort and the ideal L2 self (estimate =  $-.19$ ,  $SD = .14$ ,  $t = -1.36$ ), which suggests that learners' effort was more closely aligned with the ideal L2 self, that is, with their goals and aspirations. The negative coefficient for the session term (estimate =  $-.07$ ,  $SE = .03$ ,  $t = -1.92$ ), which just missed significance, demonstrates that motivation tended to decrease slightly over time at the group level. Figure 1 plots model-estimated group trajectories for each subcomponent (thick black lines) against individual data (thin grey lines). As is evident, for many individuals, motivation increased over time or exhibited a more complex pattern of increase-decrease-increase or decrease-increase-decrease, which underscores the importance of examining motivation as a time-varying trait situated within the individual.

<INSERT TABLE 2 ABOUT HERE>

TABLE 2

Summary of Mixed Model fit to Motivation Data

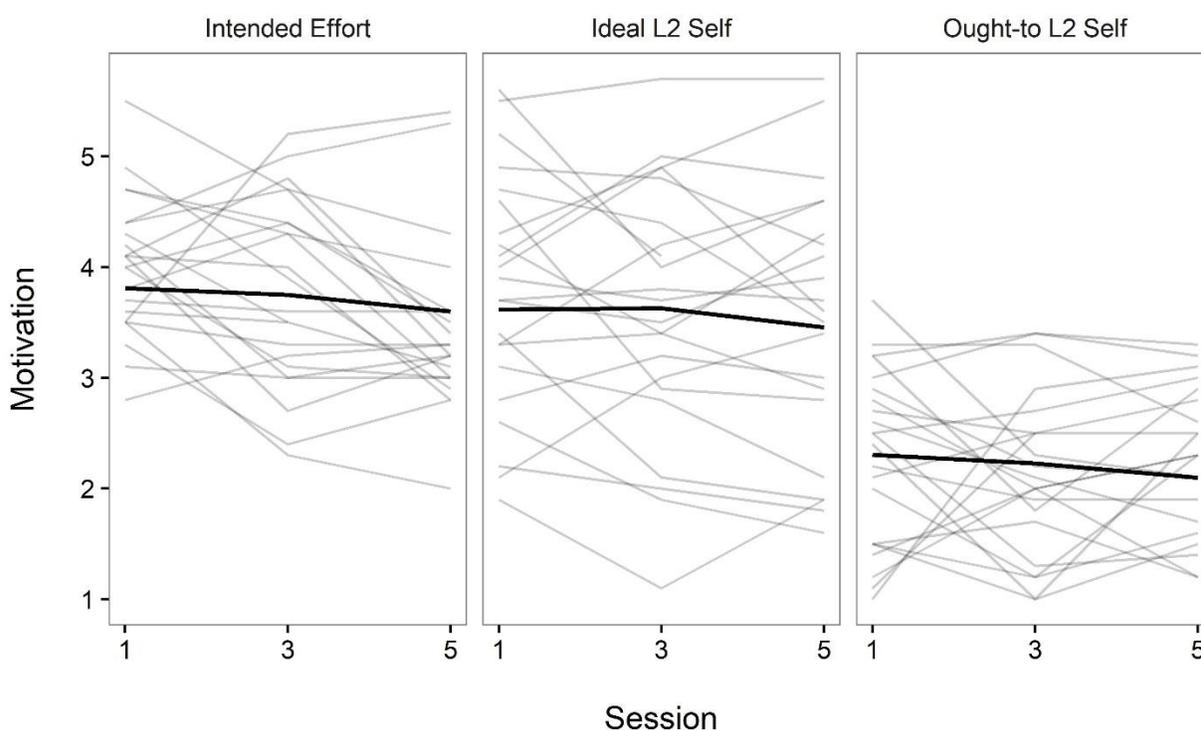
<i>Parameters</i>	<i>Fixed effects</i>			<i>Random effects</i>
	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>By Subject</i>
				<i>SD</i>
Intercept	3.88	.14	24.43	.55
Session	-.07	.03	-1.92	.13

Ideal L2 Self	-.19	.14	-1.36	.57
Ought-to L2 Self	-1.50	.13	-11.85	.47

<INSERT FIGURE 1 ABOUT HERE>

FIGURE 1

Changes in Motivation Over Time



### *Listener Characteristics*

Because previous research on listener characteristics has shown, for example, that experts (e.g., teachers) and naïve raters often rate speech samples quite differently (Trofimovich & Isaacs, 2012), mixed effects models were fit to the data as a preliminary step to determine whether any listener factors were associated with their ratings. None of the factors summarized in Table 1 emerged as a statistically significant predictor of the comprehensibility and

accentedness data, which suggests that all of the raters, irrespective of their background and training, evaluated learners' L2 speech similarly.

### *Comprehensibility and Accentedness Over Time*

Scores on the five sentences that were sampled and rated were aggregated by construct for participants at each session to create two continuous outcome measures for comprehensibility and accentedness. Session was also grand-mean centered to facilitate model interpretation and to reduce spurious correlations between random slopes and intercepts (Baayen, 2008). Fixed effects for these models included the centered session predictor, which quantified the effect of time on the outcome measure, and a grand-mean centered previous instruction covariate to control for the fact that participants varied with respect to the number of Spanish courses they had taken in elementary or high school. Random intercepts were included for subjects and raters, and a by-subject random slope for session was also estimated, which can be conceptualized as adjusting the rate of change for each individual learner in the data set. The correlation parameter between random slopes and intercepts was suppressed because it did not improve fit: for comprehensibility model comparisons (i.e., comparing models with and without the slope-intercept correlation),  $\chi^2(1) = .19, p = .66$  and for accentedness comparisons,  $\chi^2(1) = .01, p = .93$ . Model coefficients are reported in Table 3. At the outset of the study, the average learner was very comprehensible (estimate = 2.98,  $SE = .34, t = 8.86$ ) despite a moderate foreign accent (estimate = 5.87,  $SE = .36, t = 16.23$ ). Both comprehensibility and accentedness improved significantly over the study, as demonstrated by the negative coefficients for the centered session terms (for comprehensibility, estimate =  $-.26, SE = .06, t = -4.61$ ; for accentedness, estimate =  $-.20, SE = .04, t = -4.38$ ). Figures 2 and 3 display the group trajectories as thick black lines and predicted individual trajectories as thin grey lines.

<INSERT TABLE 3 ABOUT HERE>

TABLE 3

Summary of Mixed Effects Models for L2 Comprehensibility and Accentedness

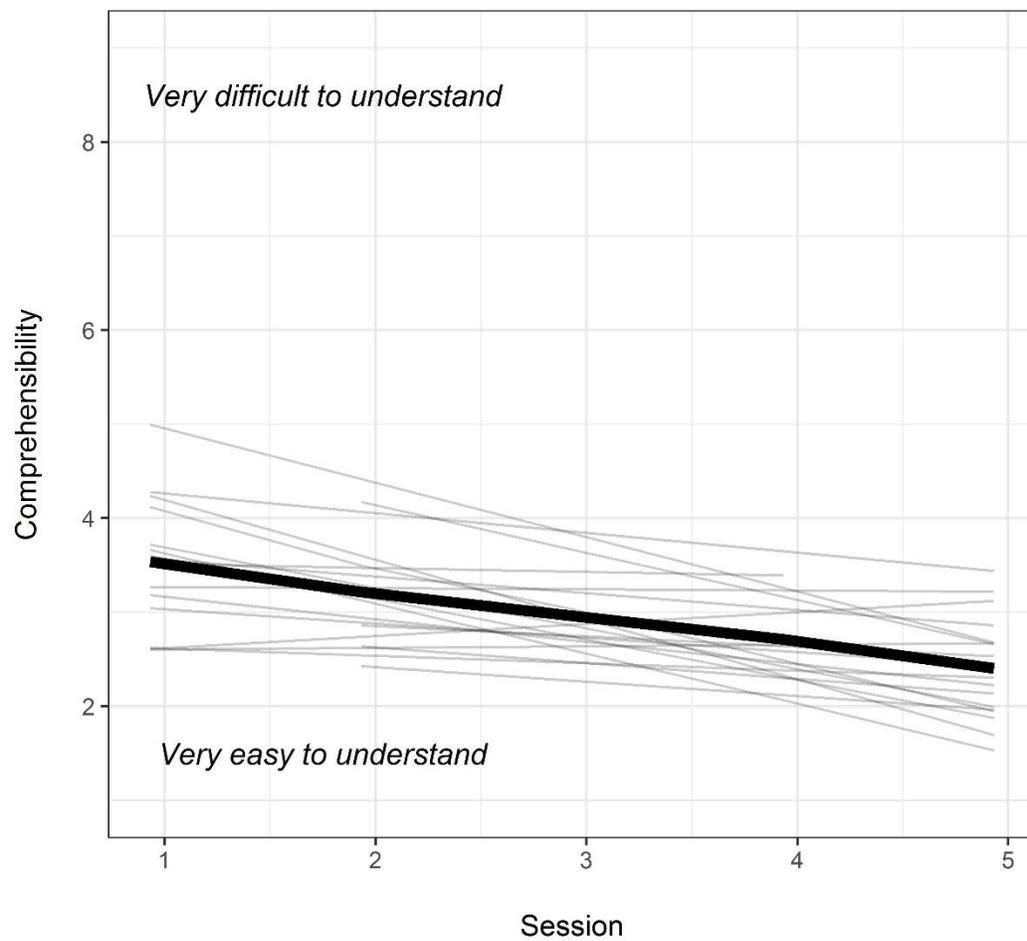
<i>Parameters</i>	<i>Random effects</i>				
	<i>Fixed effects</i>			<i>By Subject</i>	<i>By Rater</i>
	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>SD</i>	<i>SD</i>
<i>Comprehensibility</i>					
Intercept	2.98	.34	8.86	.47	1.30
Session	-.26	.06	-4.61	.23	
Pre. Instruction	.003	.03	.10		
<i>Accentedness</i>					
Intercept	5.87	.36	16.23	.70	1.32
Session	-.20	.04	-4.38	.18	
Pre. Instruction	.01	.05	.22		

*Notes:* Pre. Instruction is a grand-mean centered covariate that refers to previous Spanish courses taken in elementary, middle, and high school.

<INSERT FIGURE 2 ABOUT HERE>

FIGURE 2

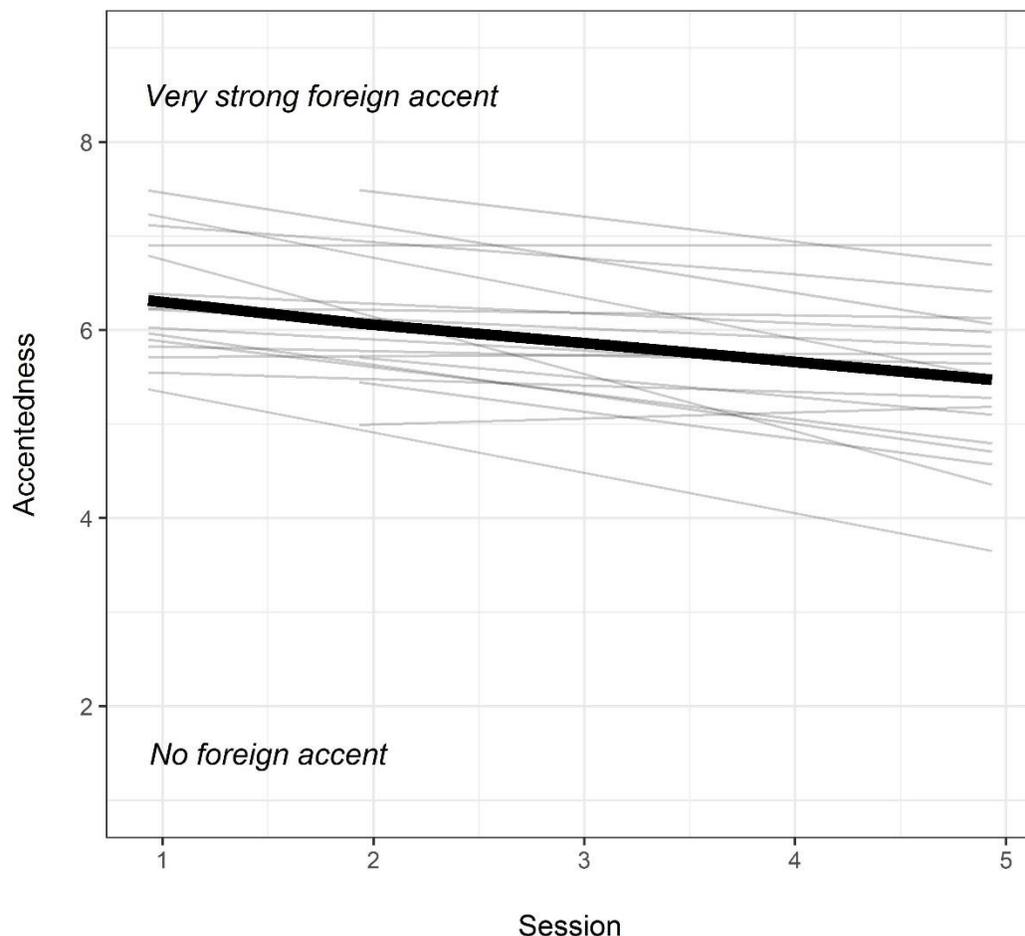
Improvements in Comprehensibility Over Two Semesters of Spanish Instruction



<INSERT FIGURE 3 ABOUT HERE>

FIGURE 3

Improvements in Accentedness Over Two Semesters of Spanish Instruction



### *Motivation, Comprehensibility, and Accentedness*

Motivation was operationalized as a time-varying within-subjects predictor to examine its relationship to the development of more comprehensible and less accented L2 speech. For each subcomponent of the L2 Motivational Self System, the centered predictor was created by subtracting participants' scores on each measure at session 1 from their scores at sessions 3 and 5. Consequently, positive scores indicates an increase in motivation relative to an individual's session 1 motivational baseline and a negative score a decrease relative to their baseline. Model-building extended the developmental models described in Table 3. The centered effort, ideal L2 self, and ought-to L2 self variables were progressively integrated into separate models as follows: (a) a model containing the predictor as a fixed effect, (b) a subsequent model including

by-subject random slopes for the motivation predictor, and then models including (c) the motivation by session interaction term as a fixed effect and (d) as a by-subject random effect. Following recommendations laid out in Barr, Levy, Scheepers, and Tily (2013), correlations between random slopes and intercepts were eliminated to facilitate model convergence while maintaining a maximal random effects structure. A general taxonomy of models fit is presented in Appendix C.

Although including a fixed effect and by-subject random slopes for effort significantly improved model fit for the comprehensibility data, as reported in Table 4, the predictor missed significance (estimate =  $-.34$ ,  $SE = .19$ ,  $t = -1.82$ ). Models integrating the time-varying ideal L2 self and ought-to L2 self predictors did not significantly improve fit, which suggests that neither was related to learners' comprehensibility over time. For accentedness, including effort and session  $\times$  effort as fixed effects significantly improved models, but including the corresponding random effects did not. Consequently, the final model for accentedness included fixed effects for effort and session  $\times$  effort, and by-subject random slopes for effort; random slopes for the interaction were not included. The main effect for effort missed significance (estimate =  $-.10$ ,  $SE = .10$ ,  $t = -1.05$ ), but the statistically significant negative coefficient for the interaction term (estimate =  $-0.10$ ,  $SE = .04$ ,  $t = -2.26$ ) indicates that as effort increased relative to the session 1 baseline, participants produced less accented speech. The time-varying specification of the predictor furthermore suggests that effort became more important over time, such that increasing effort promoted sustained development with respect to accentedness. Like the comprehensibility models, integrating the ideal and ought-to L2 selves into the models did not significantly improve model fit. Consequently, despite significant variance within-subjects with respect to all three motivational dimensions (cf. Figure 1), only changes in learners' self-reported effort were

related to comprehensibility and accentedness. Increasing effort was associated with decreasing accentedness, as evidenced by the statistically significant session  $\times$  effort interaction term. Figure 4 plots the effect of effort over time for a learner whose effort displayed an average amount of change over time (for session 3 – session 1,  $M = -.20$ ,  $SD = .78$ ; for session 5 – session 3,  $M = -.57$ ,  $SD = .99$ ) and for learners whose effort increased ( $M + 1 SD$ ) and decreased ( $M - 1 SD$ ) over time relative to the first session. The y-axis has been adjusted for this plot relative to the other plots for the sake of display.

<INSERT TABLE 4 ABOUT HERE>

TABLE 4

Summary of Mixed effects models Integrating Effort as Time-Varying Predictors of Comprehensibility and Accentedness.

<i>Parameters</i>	<i>Random effects</i>				
	<i>Fixed effects</i>			<i>By Subject</i>	<i>By Rater</i>
	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>SD</i>	<i>SD</i>
<i>Comprehensibility</i>					
Intercept	3.03	.36	8.36	.65	1.34
Session	-.25	.07	-3.59	.29	
Effort	-.34	.19	-1.82	.70	
Pre. Instruction	-.004	.05	-.09		
<i>Accentedness</i>					

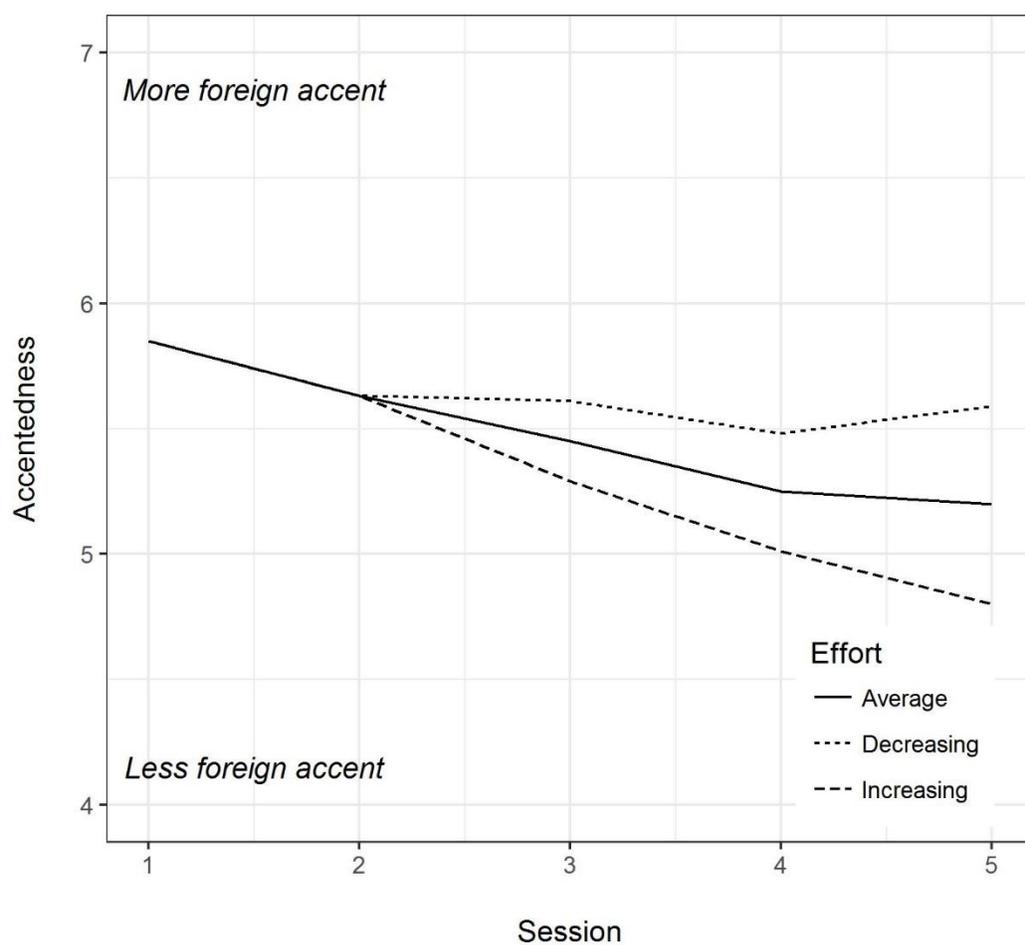
Intercept	5.85	.38	15.50	.77	1.35
Session	-.22	.05	-4.69	.18	
Effort	-.10	.10	-1.05	.21	
Session × Effort	-.10	.04	-2.26		
Pre. Instruction	.01	.06	.15		

*Note.* Models including the ideal and ought-to L2 selves are not reported because no significant relationships emerged between those variables and learners' pronunciation.

<INSERT FIGURE 4 ABOUT HERE>

FIGURE 4

The Relationship Between Changing Levels of Effort and Accentedness Over Time



*Language Learning Goals, Attitudes, and Effort*

To complement the quantitative modeling, the three administrations of the open-ended questionnaire were analyzed for persistent themes to examine students' language learning goals and attitudes and their relationship to their effort, including their beliefs on pronunciation. Six major categories emerged: (1) travel and study abroad, (2) career, (3) general education (i.e., being a well rounded student and a global citizen), (4) enjoyment, (5) language requirement, and (6) grades. It is important to note that these orientations were not mutually exclusive; rather, most learners mentioned at least two of these themes, alongside more granular linguistic goals, such as the desire to become more proficient or to master the present tense. Moreover, though some learners consistently referenced the same theme, it was more common for learners to shift foci over the course of the study. For example, one learner remarked at the first session that he predominantly focused on his speaking skills. In contrast, on his second questionnaire, he concentrated on the utility of Spanish to his work, stating that his main goal in learning Spanish was "to one day be able to incorporate it into [his] workplace." By the end of the study, he no longer referenced his career, but instead focused on study abroad: "I care most about speaking and how I sound because I want to be able to communicate effectively if I ever study [or] travel abroad." Other learners referenced more immediate, externally-sourced goals, such as completing a language requirement, while recognizing future possibilities. For example, one learner rejected the idea of using Spanish his career but highlighted the potential utility of Spanish for travel abroad or in domestic interactions, "I do not envision myself using Spanish in my profession but do believe that the ability to communicate comprehensively abroad or with American Spanish speakers could be important." As these examples indicate, learners tended to

evaluate their language learning goals along multiple dimensions, contrasting personal interests with requirements and immediate concerns with longer-term objectives.

In terms of pronunciation, when learners were asked to report on what aspects of language learning they cared most about, nine of the 26 (35%) mentioned pronunciation, and those references ranged from intelligibility concerns, “I care about the pronunciation of my words...I care about being clear and the speed at which I am talking,” to fear of negative appraisal due to pronunciation mistakes, “I care a lot about how I sound and my accent mainly because I don’t want to sound like a complete idiot.” Nearly all learners indicated that they paid attention to their peers’ and teachers’ pronunciation in class, but apparently for the sake of vocabulary uptake insofar as they believed encoding the general phonological form of the word would facilitate its future retrieval and use. Even though learners did not seem to concentrate on phonetic accuracy when discussing their own learning objectives, they reported admiring peers with a more targetlike accent or who used features pertaining to a particular variety of Spanish, which suggests that they were attuned to accentedness issues. For example, when asked to comment on peers with strong Spanish skills, one student remarked on the fact that more accurate pronunciation may mask other linguistic problem areas, “Their accent is spot on. They sound fluent even though they aren’t.” However, despite the fact that most learners noticed and evaluated one another’s pronunciation, they appeared to view it at a distance, as a property of more advanced speakers who had studied abroad or who had a special talent for language learning (e.g., “I believe that some people are able to pick up languages really well and adjust their voice and pronunciation to adapt to the accent. While some of my friends and peers have this ability, others do not”).

To summarize results, quantitative modeling of learners' motivation revealed that the ought-to L2 self was much weaker on average than the ideal L2 self, which tended to coincide with learners' self-reported effort. Nevertheless, all aspects of motivation declined slightly over time. Participants were consistently rated as comprehensible despite a moderate foreign accent, and both comprehensibility and accentedness improved over time. Motivation was defined as a within-subjects predictor and centered on individuals' initial score for each measure. When these variables were integrated into the comprehensibility and accentedness models, the session  $\times$  effort interaction was a significant predictor of accentedness. A qualitative exploration of learners' beliefs revealed that many individuals were engaged in a complex process of self-reflection and goal appraisal, though travel and career orientations were common among learners. Although most participants referenced pronunciation as integral to good or strong Spanish, for these novice to intermediate learners, approximating the general pronunciation of a word was evidently a means of vocabulary building. In contrast, a more targetlike accent was something to be acquired at a later stage.

## DISCUSSION

This study examined learners' comprehensibility and accentedness in L2 Spanish over a yearlong period, encompassing students' second and third semesters of communicative language instruction with a final data point in the fourth. Motivation data was collected on three occasions, once per semester, using a quantitative selves survey, which elicited information on learners' ideal and ought-to L2 selves and their effort, and an open-ended questionnaire, which was designed to tap into students' attitudes and beliefs on language learning.

### *Motivation*

In the present study, motivation decreased slightly over the first few semesters of university language instruction, which seemed to be reflective of a larger process of goal setting within which learners sought to harmonize linguistic objectives with personal and professional ones. Two learners, pseudonyms Sonya and Henry, serve as illustrative examples. Over the course of the study, Sonya exhibited a positive trajectory for both the ideal L2 self and her self-reported effort, which can be explained in terms of her emerging professional goals and their relationship to language learning. In particular, Sonya expressed a desire to improve her Spanish since she planned to work as a medical professional and anticipated interacting with Spanish-speaking patients. If the specificity of learner reports can be interpreted as indices of motivational clarity of purpose (Ushioda, 2001), then Sonya's increasing motivation and effort, as quantified via the selves survey, could be attributed to her increasing ability to envision her career path and the role of Spanish within it. For example, at the outset of the study, she stated that she "want[ed] to communicate with others in Spanish" and characterized speaking and listening as her "biggest weaknesses." In contrast, on subsequent questionnaires, she explained in detail the importance of Spanish to her career aspirations, "I want to be a physician, and I think communication with patients is of the utmost importance. If I practice in Texas or in many other places in the US, I'll need Spanish to communicate effectively with some patients," and reported that she planned to take a course in medical Spanish, which suggests that she had begun to formulate a detailed strategy that would enable her to achieve her goals.

In contrast to Sonya, Henry's motivation decreased substantially. On the basis of this quantitative information alone it would be easy to characterize him as less motivated than Sonya, but doing so would overlook the fact that Henry in fact reported an equally concrete, albeit more personally-oriented, goal: to function as a traveler in Spanish-speaking countries. However,

whereas Sonya seemed to regard developing her speaking skills as central to her professional objectives and therefore presumably increased her effort to see those objectives realized, Henry channeled his energy into what he perceived as a more achievable outcome: processing basic information in Spanish. On the second questionnaire, he summarized his goal as follows: “I’d like to become most proficient at reading. I love traveling, and I know I’ll end up in Spanish-speaking countries; knowing how to read signs and basic information therefore is an accomplishable goal.” If motivational dynamics are understood as a process within which individuals seek to align their goals and actions, then in Henry’s case, effort did not decrease due to an absolute decrement in motivational intensity, but rather to a level appropriate for his particular language learning goal. Thus, trajectories for Sonya and Henry, while seemingly disparate, seem to reflect the same underlying optimization process in that both learners sought to allocate motivational resources as efficiently as possible within the context of their specific objectives for language study.

Overall, these findings suggest that changing levels of motivation can only be interpreted in reference to individual learner profiles, which supports a situated view of motivation as a multidimensional construct (Ushioda, 2011). Consequently, whereas previous reports have shown that motivation may decrease when instructional practices do not align with students’ personal goals and interests (Busse & Walter, 2013), rather than focus on contextual variables related to the learning environment, learners in the present study seemed to reference more often the internal dynamics of their own motivational systems.

#### *Beliefs on Pronunciation*

Most students did not seem to conceptualize pronunciation in terms of the intelligibility or accuracy of their speech, but rather as a vocabulary development mechanism: to recall a

particular word in Spanish, learners felt that they needed to remember its pronunciation, that is, to encode a general phonological template. However, many learners did regard correct or proper pronunciation, or the use of a regional accent, as a property of good or strong Spanish. While these two viewpoints seem to conflict with one another, they are compatible within a longitudinal framework since learners seemed to distinguish between their immediate language learning needs such as vocabulary building and future possibilities such as developing a more targetlike accent. It is important to bear in mind that students were enrolled in basic Spanish language classes in which they predominantly interacted with one another on highly predictable topics. In this context, it is unlikely that learners would face significant communicative pressure to make their pronunciation more intelligible to their L2 interlocutors. Furthermore, altering one's pronunciation could be perceived of as interrupting the social dynamics of the language classroom. While using certain regional features or attempting to mask an American accent in the L2 may be seen as a means of asserting one's linguistic and cultural capital while abroad (Marx, 2002; Müller, 2013), the opposite may be true in the foreign language context. Lefkowitz and Hedgcock (2002) observed that although novice and intermediate learners of L2 Spanish and French generally ascribed higher social status and positive characteristics to students who spoke with a more nativelike accent, many learners continued to use nontargetlike features in their own speech, either as a means of subverting traditional power dynamics associated with a prestige or normative variety or due to an apparent disconnect between their perceived self-competence and their actual language output. Some of these same themes emerged in the present study. For example, learners admired peers who had "great" pronunciation or "strong" accents, though they did not seem to have a clear sense of what those descriptors entailed and oftentimes conflated fluency, grammatical complexity, and pronunciation.

### *Comprehensibility and Accentedness*

Learners were consistently evaluated as very comprehensible despite the presence of a moderate foreign accent, which aligns with previous research underscoring the independence of these dimensions of L2 speech (Munro & Derwing, 1995; Trofimovich & Isaacs, 2012). Nevertheless, both constructs improved significantly over the study and at approximately the same rate, such that over the yearlong period, learners' achieved on average a gain of one unit on each 9-point scale. In this study, learners were enrolled in a language program whose instructional approach was based on the principles of communicative language teaching and did not involve a programmatic focus on pronunciation. Moreover, teachers indicated that they did not actively target pronunciation as part of their daily lesson planning. Consequently, while one might expect that learners' comprehensibility would improve in this context, particularly since a broader range of predictors are implicated in comprehensibility judgments (O'Brien, 2014; Trofimovich & Isaacs, 2012), the fact that accentedness also improved suggests that general communicative language training may promote increased pronunciation accuracy. Findings therefore complement research on learners in naturalistic contexts demonstrating significant development of L2 oral skills over the first year, which has been attributed to an initial window of maximal opportunity (Derwing & Munro, 2015) during which increased L2 exposure seems to facilitate phonetic learning in the absence of targeted training (Derwing & Munro, 2013; Derwing et al., 2008).

### *Motivation and Pronunciation Development*

When motivational variables, drawn from the framework of the L2 Motivational Self System, were integrated into the models as time-varying predictors of comprehensibility and accentedness, a significant relationship emerged between accentedness ratings and self-reported

effort over time. According to model estimates, accentedness continued to improve for individuals whose effort increased relative to their session 1 baseline, whereas for individuals whose effort remained constant or diminished over time, accentedness began to stabilize, acquiring a flatter trajectory. Effort therefore became more important to sustain continued growth in this area, a finding which aligns with previous research documenting positive associations between motivation and L2 pronunciation accuracy (Baker Smemoe & Haslam, 2013; Elliott, 1995; Purcell & Suter, 1980).

In contrast, neither the ideal L2 self nor the ought-to L2 self were related to accentedness. Regarding the latter, it stands to reason that the ought-to L2 self might become important in environments in which pronunciation serves as both identity marker and status symbol, such as when studying and living abroad. Whereas in an immersion context learners may strive to pass as native speakers, thereby avoiding possible negative appraisals associated with nonnative speech characteristics, it is unlikely that they would feel compelled to do so in the classroom, where it could be advantageous to maintain and deploy nontargetlike features (Lefkowitz & Hedgcock, 2002). This could explain why the ought-to L2 self was not significantly related to accentedness.

In terms of the ideal L2 self, for most of the novice learners in this study pronunciation was not, or at least had not yet become, an important aspect of their goal architecture. Although nearly all learners reported noticing their peers' pronunciation and admiring those who had acquired a more targetlike accent, only one individual expressed an interest in improving her pronunciation above and beyond what would be required for communicative purposes. Interestingly, this learner, pseudonym Katie, was rated as the most comprehensible ( $M = 1.83$ ,  $SD = 1.26$ ) and least accented ( $M = 3.70$ ,  $SD = 2.22$ ) at the end of the study, which tentatively supports the view that a particular affinity for pronunciation facilitates the acquisition of more

nativelike L2 speech. In fact, Katie possessed many of the characteristics thought to be critical for exceptional pronunciation attainment (Moyer, 2014a): She considered pronunciation be one of the most intriguing aspects of the Spanish language and although she reported noticing and evaluating her peers' pronunciation, she did not attempt to imitate them, but rather looked to her instructor for a pronunciation model. She also described herself as possessing an aptitude for imitating accents. Katie therefore shared a similar profile to Moyer's (1999) exceptional L2 German speaker, who received an average accentedness rating that fell within the native range despite the fact that he had taken fewer German courses and had spent less time abroad than his peers.

The fact that no significant relationships emerged between the motivation variables and comprehensibility seems to indicate that the communicative language training learners received may have nullified any advantages conferred by a stronger motivational profile. In other words, the common communicative curriculum, which emphasized comprehensible output through task-based activities, may have leveled the playing field, reducing the effect of individual differences in motivational variables. However, these results should be interpreted with caution until more research on the relationship between L2 speaking skills and motivation has been conducted.

#### LIMITATIONS AND FUTURE RESEARCH

In the present study, listeners rated the comprehensibility and accentedness of short, simple sentences provided by novice to intermediate L2 Spanish speakers. Because previous work has shown that speech ratings depend on the task used to elicit the samples (Crowther, Trofimovich, Isaacs, & Saito, 2015), future work should include tasks that result in longer stretches of more complex speech. In this study, motivation was operationalized as a time-varying predictor and sampled on three occasions, once per semester over three semesters of

basic communicative language instruction. However, motivation varies on multiple time scales and along multiple dimensions; participants' motivation may increase or decrease in response to a particular class, as a result of programmatic decisions, or due to their own shifting educational and personal interests. Thus, care should be taken to establish for each study the most appropriate motivational axis and timeline. To that point, sampling motivation at each of the five sessions in the present study would have provided finer-grained insights into the extent to which motivation varies within and across semesters. Along those same lines, it would be informative to capture motivational trajectories over a longer period encompassing watershed moments such as study abroad or an internship experience in the L2. It is at these times that learners' motivation and abilities are likely to develop in tandem, becoming increasingly aligned as language use sustains personal and professional motivation and motivation reinforces patterns of language use. Lastly, although this study focused on motivation, other potentially important variables, such as language learning aptitude or language use, should not be neglected. A comprehensive account of individual differences in (phonological) SLA will ultimately rest upon the inclusion and intensive evaluation of a range of socioaffective, cognitive, and experiential factors.

## CONCLUSION

This study tracked developments in L2 Spanish learners' motivation and pronunciation over two full semesters of novice and intermediate communicative language instruction. Although motivation decreased over time, individual patterns suggest that learners were aligning their effort with their emerging linguistic, personal, and professional goals. Even though learners were rated as fairly comprehensible at the outset of the study, their comprehensibility and accentedness improved significantly over the yearlong period. A significant interaction between session and effort suggested that accentedness would only continue to improve through sustained

effort. This finding highlights the importance of adopting a more dynamic definition of individual differences by situating them within the individual learner, which not only intersects with alternative approaches to SLA such as dynamic systems theory but is now more possible than ever given the availability of more advanced statistical procedures such as mixed modeling. Consequently, this study is a first step toward a more complex and ecologically valid treatment of variable predictors.

#### NOTES

1. Mixed effects models are robust in the case of missing data since models are built on available data points.
2. Centering facilitates the interpretation of model parameters by situating them relative to a theoretically and empirically meaningful value. For example, uncentered previous instruction indexes an individual with no previous coursework in Spanish. Given that most individuals had taken Spanish in secondary school, basing model parameters on zero previous instruction does not respect the characteristics of the sample. Centering previous instruction on the sample mean yields a more meaningful and interpretable model without altering model form; though the coefficients change, significance values do not. Similarly, motivation was centered on learners' time 1 score to examine the effects of motivation on development. Computing a prototypical trajectory for an individual with zero motivation makes little theoretical sense and was impossible given the operationalization of motivation in the present study according to which the minimum score on each subcomponent was one.

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## APPENDIX A. Selves Survey adapted from Dörnyei (2009).

In this survey, I would like you to tell me how much you agree or disagree with the following statements by simply circling a number from 1 to 6. Please do not leave out any items.

Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

<b>1.</b>	I would like to take more Spanish courses at my university in the future.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>2.</b>	I would like to spend lots of time studying Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>3.</b>	If my teacher were to give the class an optional assignment, I would certainly volunteer to do it.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>4.</b>	I am prepared to expend a lot of effort learning Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>5.</b>	I would like to study Spanish even if I were not required to do so.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>6.</b>	I would like to concentrate on studying Spanish more than any other topic.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>7.</b>	If a Spanish course were offered somewhere else in the future, I would like to take it.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>8.</b>	I think that I am doing my best to learn Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>9.</b>	Compared to my classmates, I think I study Spanish relatively hard.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>10.</b>	I am working hard at learning Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>11.</b>	I can imagine myself writing Spanish e-mails/letters fluently.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>12.</b>	The things I want to do in the future require me to use Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>13.</b>	I can imagine myself living abroad and using Spanish effectively for communicating with the locals.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>14.</b>	I can imagine myself as someone who is able to speak Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>15.</b>	I can imagine myself living abroad and having a discussion in Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>16.</b>	I can imagine myself speaking Spanish with international friends or colleagues.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

<b>17.</b>	Whenever I think of my future career, I imagine myself using Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>18.</b>	I can imagine a situation where I am speaking Spanish with foreigners.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>19.</b>	I can imagine myself studying in a university where all my courses are taught in Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>20.</b>	I can imagine myself speaking Spanish as if I were a native speaker of Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>21.</b>	I have to study Spanish, because, if I do not, I think my parents will be disappointed with me.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>22.</b>	Studying Spanish is important to me in order to gain the approval of my peers/teachers/family/boss.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>23.</b>	Studying Spanish is important to me because other people will respect me more if I have a knowledge of it.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>24.</b>	I study Spanish because close friends of mine think it is important.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>25.</b>	It will have a negative impact on my life if I don't learn Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>26.</b>	If I fail to learn Spanish I'll be letting other people down.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>27.</b>	Learning Spanish is necessary because people surrounding me expect me to do so.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>28.</b>	My parents believe that I must study Spanish to be an educated person.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>29.</b>	Studying Spanish is important to me because an educated person is supposed to be able to speak Spanish.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>30.</b>	I consider learning Spanish important because the people I respect think that I should do it.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

## APPENDIX B. Open-Ended Questionnaire Items.

Please answer the following questions in as much detail as possible. Your responses will provide insight into students' beliefs concerning language learning.

1. Please comment on what aspects of Spanish you care most about? For example, speaking, writing, being intelligible, how you sound, knowing many words, etc. Why do you care about them?
2. When you listen to your teacher and your peers, what aspects of their Spanish do you pay attention to? What catches your attention often, if anything? For example, pronunciation, cultural information, vocabulary, grammar structures, etc.
3. Have you ever thought that a peer had very strong Spanish? If so, please explain why.
4. What do you try to imitate or learn from your peers' Spanish? From your teachers'?
5. What is "good" Spanish to you? What do you think is important to be a "good" Spanish learner/speaker?
6. What is your main goal in learning Spanish? How do you accomplish that goal? Please discuss what you do to achieve the goal both inside and outside of class, if applicable.

## APPENDIX C. Taxonomy of Mixed Effects Models Fit to L2 Accentedness Data.

Model	Model description			Test against prior model			
	Fixed effects	Random by subject	Random by rater	AIC	$\Delta$ AIC	Statistic	$p$
1	intercept, session	intercept, session	intercept	4105			
2	effort			4097	-8	$\chi^2(1) = 10.03$	.002
3	effort	effort		4098	1	$\chi^2(1) = .95$	.33
4	effort, session $\times$ effort	effort		4095	-3	$\chi^2(1) = 5.06$	.02
5	effort, session $\times$ effort	effort, session $\times$ effort		4097	2	$\chi^2(1) = 0$	1.00

*Notes.* Each model subsumes the previous so the table should be read cumulatively. The *session* parameter, which was grand-mean centered for analyses, refers to the effect of time on learners' accentedness. When treated as a fixed effect, *session* examined group-level development over time to estimate a population-level parameter. The random effects represent a slight adjustment to growth rate for each individual learner in the sample. Effort was defined as a time-varying predictor of accentedness by subtracting scores at the first session from scores at subsequent sessions. The centered predictor represents increasing or decreasing effort relative to the session 1 baseline. A similar set of models was fit for each motivation variable to the accentedness and comprehensibility ratings.