PHONETICS INSTRUCTION IN L2 FRENCH: CONTRIBUTIONS OF SEGMENTS, PROSODY AND FLUENCY TO SPEECH RATINGS

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ABSTRACT

This study focused on the speech of 30 adult learners of French as a second language (L2) in a 15-week pronunciation course, investigating the relationship between instruction and listener-based ratings of accent, comprehensibility, and fluency before and after instruction in read-aloud and extemporaneous (picture description) speaking tasks. Results showed that the learners improved in all speech ratings, especially in extemporaneous speaking. Results also revealed that accent ratings were linked to prosody (intonation accuracy, pitch range), while fluency and comprehensibility ratings were additionally linked to fluency phenomena (length of fluent run, hesitation rate). We discuss implications of these findings for L2 pronunciation learning and links between instruction, listener-rated dimensions of speech, and performance in different tasks.

Keywords: French, speech rating, prosody, accent, fluency, comprehensibility, pronunciation teaching.

1. INTRODUCTION

Although second language (L2) pronunciation can no longer be described as a neglected aspect of teaching and research, many questions still remain for learners of languages other than English about the links between instruction and development. For example, many textbooks for L2 French cover pro-nunciation (e.g. [1]), yet little is known about the development of French pronunciation in instructed learners. Teachers and learners thus rely on intuition, course materials, and past experience to guide their teaching and learning. This study aimed to fill this gap by investigating pronunciation development of adult L2 French learners over time, with the overall goal of contributing to the knowledge base about how L2 French learners' pronunciation development is linked to pronunciation instruction.

1.1. Pronunciation instruction in L2 French

Prior research on L2 French pronunciation has often used one-time measures of learner speech, targeting learner proficiency [2] or different learning contexts [13]. To date, the few longitudinal studies have been set in university contexts [5, 11]. For example, [8] tracked the use of liaison (as in *mes amis* 'my friends' spoken as [me-za-mi]) over one year in a weekly three-hour French language and literature class at a Korean university. The learners showed a significant increase in production of obligatory and optional liaison in word pairs. Yet tying learning gains to the nature of instruction is problematic in this case because the instruction was not described. To sum up, instructional research on French pronun-ciation presently provides limited evidence of in-struction-pronunciation links, because there are few studies and most provide little methodological detail, precluding a clear interpretation of findings.

1.2. Motivation for the current study

To address these shortcomings, we recently explored the effectiveness of phonetics teaching in a 15-week L2 French course targeting segments, prosody, fluency, and connected speech processes (e.g. enchaînement) [10]. We found improvements in learners' segmental and intonation accuracy, use of enchaînement, pitch range, and number of hesitations. However, it was unclear whether the reported gains in segmental accuracy, prosody, and fluency are linked to L2 speech characteristics which are perceptible to listeners. Therefore, in this study, we revisited the data from our original study to examine the impact of phonetics instruction on listener-based ratings of accent (native-likeness), comprehensibility (ease of understanding), and fluency (smoothness of speech delivery) in L2 French speech by the learners before and after instruction. The research questions were:

1. Do L2 French learners improve in listener-based ratings of accent, comprehensibility, and fluency following phonetics instruction?
2. Which segment, prosody, and fluency aspects of learner speech are associated with these listener-based ratings?

2. METHOD

2.1. Participants

The participants were 30 adult learners of L2 French (23 women) in an intermediate-level listening and speaking course at a French-medium university in Quebec, Canada. The learners, with a mean age of

35.8 years (27-52) and a mean length of residence in Quebec of 3.2 years (0.3-10), came from diverse language backgrounds: Mandarin (11), Russian (7), Farsi (3), Cantonese, Portuguese, Spanish (2 each), Korean, Malay, and Romanian (1 each).

2.2. Instruction

The 15-week listening and speaking course met once per week for three hours, with about one hour devoted to practice in a multimedia lab. The instructor was a native speaker of Quebec French with a graduate degree in applied linguistics and 12 years of teaching experience. The instruction, tar-geting speaking and listening, focused on segmental and suprasegmental aspects of French. The main focus was on connected speech processes, which included enchaînement and liaison (defined below), and on developing fluency and prosody through work on phrasal stress (rhythmic groups) and into-nation. For enchaînement and liaison, the emphasis was on comprehension but learners were encouraged to produce them through practice. For phrasal stress and intonation, the emphasis was on fluid delivery of speech, with practice involving both controlled output recorded in the lab and guided tasks (e.g. practice a scene from a play). In a typical pedagogic sequence, each topic was covered in one class meeting and reviewed during the following class. Each meeting started with a discovery activity, followed by the teacher's explanation of the targeted aspect, then by controlled practice. The learners then practiced the targeted aspect through communicative and fluency tasks (e.g. role plays, shadowing). Lab-based dictation or production tasks involved short sentences illustrating the targeted aspects.

2.3. Tasks and procedure

Learner production was analyzed in two tasks, used at pre-test and post-test. The first task was a read-aloud story (163 words), which involved an ex-change between a woman standing in a ticket line and a man who wanted to cut into the line. The dialogue between the two characters (five turns, nine sentences) was preceded and followed by a three-sentence narrative. The sentences were about 10-15 words long (M = 11 words), and 90% of all vocabu-lary were among the first 1000 most frequent words in French [6]. The second task was an oral picture description based on an eight-panel image sequence. The task, used widely in the elicitation of sponta-neous L2 production [7], featured two people who bumped into each other on a street corner, accident-tally exchanged the identical suitcases, but realized their mistake only later.

The tasks were administered twice, in Week 3 as a pre-test and in Week 15 as a post-test, using the same equipment, instructions, and procedure. The learners recorded their speech in a multimedia lab using interactive software [4]. For the read-aloud task, they received a copy of the text and had a 2 min period to review the text. They had 150 s to re-cord the text. For picture description, the learners received a copy of the picture story entitled *Erreur sur la valise* (Suitcase mixup), to contextualize the story's central element. They then had 2 min to re-view the images and 5 min to record their narrative.

2.4. Speech ratings

Pre- and post-test excerpts (20 s) were rated by 20 native French listeners (28.2 years old; 13 females) for accent (1 = *accent marqué* 'heavy accent', 9 = *pas d'accent* 'not accented'), comprehensibility (1 = *difficile à comprendre* 'hard to understand', 9 = *faci-le à comprendre* 'easy to understand'), and fluency (1 = *pas du tout couramment* 'dysfluent', 9 = *coura-mment* 'fluent'). Listeners (students in linguistics, education, or psychology, with no formal training in L2 phonetics) were first given definitions of each construct, then rated five practice files. They worked at their own pace, playing each consecutive file and recording their ratings in the booklet, with replays permitted. Listeners showed high consistency (Cron-bach's alpha) for accent (a = .89–.93), comprehen-sibility (a = .93–.96), and fluency (a = .94–.97), so mean scores were computed per speaker by avera-ging across listener ratings for each rated construct.

2.5. Speech measures

The audio recordings of both tasks, considered along with the transcripts, were then analyzed for seven measures reflecting the course aims and content:

1. Segmental errors: single segment additions, deletions, or substitutions (e.g. *tu* 'you' spoken as tout 'all'), and spelling-based mis-takes (e.g. *coup* 'hit' spoken as coupe 'cut'). The measure was a ratio of all segment errors over all words produced.
2. Intonation errors: inappropriate pitch moves, with rising or flat contours signalling clo-sure; and falling or flat contours used for an expected signal of continuity (e.g. *Chacun son tour, monsieur!* 'Wait for your turn, sir!' with *tour* spoken with a falling pitch). This measure was a ratio of the total number of inappropriate intonation contours produced over the total number of expected contours.
3. Enchaînement use: a successful consonant-to-vowel or vowel-to-vowel link (e.g. *il a* 'he

has' becomes [i-la] and *tu as* 'you have' becomes [ty~a]). Enchaînement required an expected rise-fall pattern signalling a word boundary (i.e. *il ↑va~a↓ller* 'he will go') and had to involve a continued, unbroken phonation (absence of perceptible pausing). This measure was a ratio of the total number of successfully produced enchaînement over the total number of contexts where such links could potentially occur.

4. Liaison use: obligatory liaison between two words (e.g. between personal pronouns and verbs, determiners and nouns). Liaison had to involve a proper grammatical context (e.g. *nous avons* 'we have' [nu-za-vɔ̃]), accurate phonetic realization of the linked consonant (e.g. [d] produced as [t] as in *grand homme* 'tall man' [gʀɑ̃-tɔm]) and an expected rise-fall pattern signalling a word boundary, with no perceptible pausing between words. This measure was a ratio of the total number of successfully realized obligatory liaison out of the total number of contexts for obligatory liaison in each lear-ner's production.
5. Pitch range: difference between highest and lowest fundamental frequency (F0) values, extracted from a pitch tracker display [4]. This measure was to capture the degree of pitch range for each learner, in absolute terms, on the assumption that narrower pitch ranges characterize flat, monotonous delivery and wider ranges describe lively, animated speech (see [14]).
6. Mean length of run (MLR): mean number of syllables produced between two adjacent filled or unfilled pauses of 400 ms or longer, following [12].
7. Speech hesitations: all dysfluencies such as filled and unfilled pauses (e.g. *ils vont… euh… au travail* 'they are going… hmm… to work', where '…' = unfilled pause), and pauses inside a rhythmic group (e.g. *il y a un… panneau* 'there is a… sign'). This measure was a ratio of the total number of hesitations over all syllables in each sample.

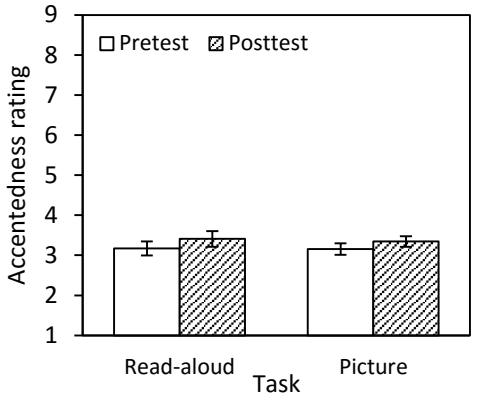
All measures were coded by native-speaking trained coders. Agreement reached 98-100%.

3. RESULTS

3.1. Speech ratings across task and time

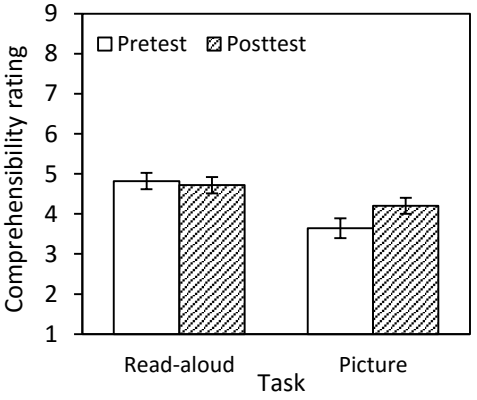
We first compared listener ratings through ANOVAs, with task (read-aloud, picture) and time (pre-test, post-test) as repeated measures. For accent, there was only a significant effect of time [$F(1, 29) = 5.84$, $p = .022$], with learners improving in accent, albeit modestly, in both tasks (Fig. 1).

Figure 1: Accent (error bars = ±1 SE).



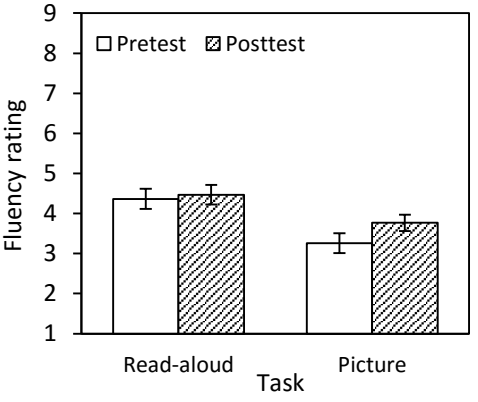
For comprehensibility, there was a significant task × time interaction [$F(1, 29) = 5.33$, $p = .028$], such that the learners improved in comprehensibility only in the picture task (Fig. 2).

Figure 2: Comprehensibility (error bars = ±1 SE).



For fluency, there were significant effects of task [$F(1, 29) = 20.33$, $p < .001$] and time [$F(1, 29) = 5.97$, $p = .021$], with greater fluency in the read-aloud than picture task and an increase in fluency, mostly in the picture task (Fig. 3).

Figure 3: Fluency (error bars = ±1 SE).



3.2. Linguistic contributions to ratings

We then explored contributions of the seven speech measures to listener ratings via partial correlations, carried out between each rating set (accent, fluency, comprehensibility) and each speech measure at post-test, with the relevant pre-test measure partialled out. By controlling initial performance, we examined the extent to which each speech measure was related to listener ratings at the end of the course.

Table 1: Partial correlations between accent ratings and individual speech measures from the post-test, with the relevant speech measure from the pre-test partialled out (*p < .05, **p < .01).

Measure	Read-aloud	Picture
Segmental errors	−.25	−.19
Intonation errors	−.42*	−.43*
Enchaînement	−.06	−.04
Liaison	.13	−.07
Pitch range	.26	−.36*
MLR	.18	.22
Hesitations	−.11	−.14

For accent (Table 1), less accented L2 speech was linked to fewer intonation errors (both tasks) and a narrower pitch range (picture task).

Table 2: Partial correlations between comprehensibility ratings and individual speech measures from the post-test, with the relevant speech mea-sure from the pre-test partialled out (*p < .05, **p < .01).

Measure	Read-aloud	Picture
Segmental errors	−.23	−.03
Intonation errors	−.37*	−.36*
Enchaînement	−.29	−.01
Liaison	.13	.10
Pitch range	.10	−.31*
MLR	.31*	.08
Hesitations	−.04	−.45**

For comprehensibility and fluency (Tables 2, 3), more comprehensible and fluent speech was linked to fewer intonation errors (both tasks), longer fluent speech runs (read-aloud), narrower pitch range and fewer hesitations (picture task).

Table 3: Partial correlations between fluency ratings and individual speech measures from the post-test, with the relevant speech measure from the pre-test partialled out (*p < .05, **p < .01).

Measure	Read-aloud	Picture
Segmental errors	−.14	.05
Intonation errors	−.38*	−.37*
Enchaînement	.02	−.03
Liaison	.03	.21
Pitch range	−.01	−.36*
MLR	.49**	.15
Hesitations	−.24	−.40*

4. DISCUSSION

The current findings showed that the learners' gains in intonation accuracy, pitch range, and hesitation rate reported in our earlier study [10] are also associ-ated with a measurable pre- to post-test improve-ment in ratings of accent, comprehensibility, and fluency. This finding is noteworthy as it implies that focused phonetics instruction has an impact beyond specific aspects of L2 speech, contributing to listener judgments of accent, comprehensibility, and fluency.

Results also showed that listener-based accent, comprehensibility, and fluency ratings after focused phonetics instruction in an L2 speaking and listening course are linked to several aspects of speech tar-geted through instruction. Less accented speech was linked to fewer intonation errors and a narrower pitch range, while more fluent and comprehensible L2 output was additionally related to longer fluent speech runs and fewer hesitations. Contrary to our prediction, a narrower pitch range was associated with higher speech ratings, suggesting that an exaggerated pitch range, although typical of lively, animated speech, might lead listeners to downgrade their evaluations.

These results also contribute to ongoing research efforts to isolate linguistic aspects of L2 speech associated with listener ratings of accent, fluency, and comprehensibility, especially across tasks [e.g. 9, 15]. Our results imply a distinction between ratings of accent and ratings of fluency and compre-hensibility, in that a wider range of speech measures was associated with the latter ratings, especially in spontaneous production. This result is supported by correlations among the three sets of ratings in the picture task, with fluency and comprehensibility sharing 81% of variance (r = .90); in contrast, these two ratings shared only 42% of variance with accent (r = .65 in each case). Our findings are generally en-couraging for both researchers and teachers as they suggest that L2 pronunciation, despite the inherent difficulty it poses for adult learners, is a skill which can be learned in a classroom context.

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