INVESTIGATING PREDICTORS OF FOREIGN ACCENTEDNESS IN L3 ACQUISITION

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ABSTRACT

Research into predictors of foreign accentedness investigated from the perspective of third language acquisition (TLA) has been rather scarce to date. The study aims to explore to what extent a holistic assessment of global accent in the third language is correlated with the learners' general proficiency level, oral fluency, fine-grained phonetic performance and the frequency of L3 use. Accentedness and comprehensibility ratings were performed on samples of L3 read speech. The results demonstrated that the two rating parameters are significantly correlated, yet the impact of particular variables varied, with the rater's nativeness status being the most important predictor.

Keywords: foreign accentedness, comprehensibility, predictors, raters, L3 acquisition.

1. INTRODUCTION

Ratings of perceived global foreign accent have been widely applied in second language acquisition (SLA) research [1, 2, 3]; however, this phenomenon has been less frequently explored from the multilingual acquisition perspective [4, 5]. Further, the most recent L3 studies focus mostly on heritage speakers [6, 7]. Previous research on factors contributing to a perception of accentedness has identified the amount of L1/L2 use, the age of onset or age of arrival in an L2-speaking country and the presence of non-native segmental features in rated samples as the most significant predictors (see [8] for a detailed overview).

The present study forms one part of a large project investigating L3 development longitudinally. It aimed to explore to what extent a holistic assessment of global accent in the third language is correlated with the learners' general proficiency level, oral fluency and fine-grained phonetic performance. The theoretical framework embraced in this paper is the Natural Growth Theory of Acquisition (NGTA) [9]. NGTA's main assumptions include a gradual dynamic emergence of foreign language phonology, shaped by the input from L1 and other L2/L3/Ln, influenced by typology, universal preferability generalizations and context of use. NGTA relies on principled explanations as well as inductive, data-driven accounts and proposes a hierarchy of linguistic and extralinguistic factors to account for the process of multilingual acquisition of speech in a given acquisition situation (see [6] for a detailed discussion). The results of the current study are used to further inform the hierarchy of variables as stemming from the NGTA framework.

2. STUDY DESIGN

The participants were 24 speakers of L1 Polish–L2 English–L3 Norwegian, aged 21, after 8 weeks of intense initial exposure to the L3 in a formal academic setting. They performed a Norwegian placement test as a measure of proficiency and completed the Language History Questionnaire LHQ [10]. The language material used in the rating study involved text reading of a Norwegian version of *The North Wind and the Sun*. Oral reading fluency was expressed as the number of words per minute (wpm). Fine-grained phonetic performance was assessed based on the reading of a word list in L3 including /p, t, k/ stop tokens in stressed onset positions (controlled for vocalic context), where Norwegian, unlike Polish, displays long-lag VOT durations [11, 12, 13]. We also calculated the amount of L3 use based on the self-declared detailed responses to the LHQ.

In the rating study, approximately 20-second-long samples were extracted from the recordings of the read text and normalised for loudness. Twenty-three raters, half of whom were Norwegian native speakers and the remaining half were non-native speakers highly proficient in Norwegian, rated the samples for the degree of foreign accentedness and comprehensibility on a 9-point scale, using a Qualtrics online survey. The raters had moderate to considerable amount of previous experience with foreign accented speech in Norwegian. The survey included 30 randomised samples, featuring the 24 L3 learners and 6 Norwegian controls.

2.1. Measures

- L3 Proficiency – Norwegian placement test
- Amount/frequency of L3 use – a composite score based on self-declared answers in LHQ

- Oral reading fluency: number of words per minute (wpm)
- Fine-grained phonetic performance: VOT durations in /p, t, k/ in word list reading in L3
- Rating parameters: degree of foreign accentedness and comprehensibility on a 9-point scale

2.2 Research questions

RQ1: Do the rating parameters (i.e., accentedness and comprehensibility) correlate?
RQ2: Does perceived global accent correlate with the learners' proficiency level, their oral fluency and fine-grained phonetic performance in L3 Norwegian?
RQ3: Does perceived comprehensibility correlate with the learners' proficiency level, their oral fluency and fine-grained phonetic performance in L3 Norwegian?
RQ4: Do rater-related variables influence the ratings?

3. RESULTS

Statistical analysis was run in R [14]. For significance testing, mixed-effects ordinal regression modeling was performed using the 'clmm' function from the *ordinal* R package [15]. All models included by-speaker and by-rater random intercepts.

Descriptive statistics including mean values and SD for Accentedness and Comprehensibility ratings, fine-grained phonetic performance (i.e. VOT durations for /p, t, k/ in L3 Norwegian, oral reading fluency (words per minute) and L3-frequency of use is presented in Table 1.

Parameters	Experimental group *M (SD)*	Control group *M (SD)*
Accentedness (1–9)	6.72 (1.8)	1.5 (1.5)
Comprehensibility (1–9)	6.03 (2.3)	7.8 (2.7)
Oral fluency (wpm)	0.05 (0.01)	–
VOT /p/ (ms)	44 (14)	–
VOT /t/ (ms)	62 (15)	–
VOT /k/ (ms)	74 (18)	–
Norwegian use (hrs/week)	4.2 (4.6)	–

Table 1. Descriptive statistics.

The control samples received lower accentedness ratings both from Norwegian native ($b = -14.24$) and non-native ($b = -6.47$) raters. The control samples also received higher comprehensibility ratings from both Norwegian ($b = 8.06$) and non-native ($b = 0.9$) raters. All four effects were statistically significant, with effect sizes smaller for non-native raters than for Norwegian native raters in both cases.

In turn, the test samples of L3 Norwegian speakers were judged as more accented by non-native raters than by Norwegian native raters (see Fig. 1). Similarly, the L3 Norwegian speakers were rated as fairly comprehensible; a little less comprehensible to native Norwegian raters than to non-native raters (Fig. 2).

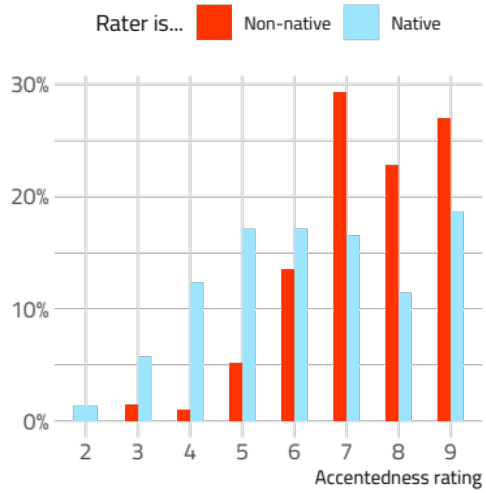

Figure 1: Effects of rater status for Accentedness (1 – no foreign accent, 9 – strongly accented).

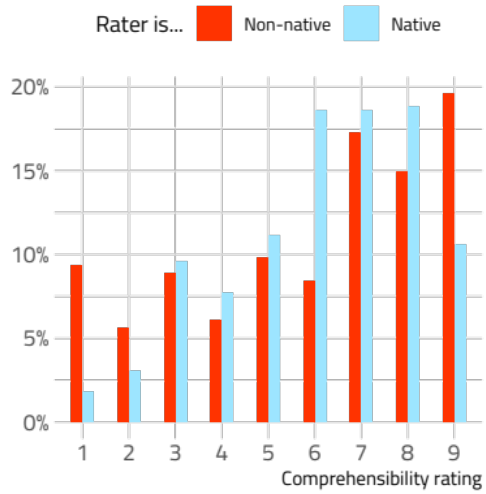

Figure 2: Effects of rater status for Comprehensibility (1 – not comprehensible, 9 – fully comprehensible).

For the first rating parameter, the Pearson's correlation between Accentedness and Comprehensibility ($r = -0.77$) was found to be strong and significant demonstrating that the stronger the accent, the lower the comprehensibility of the speech sample (see Fig. 3).

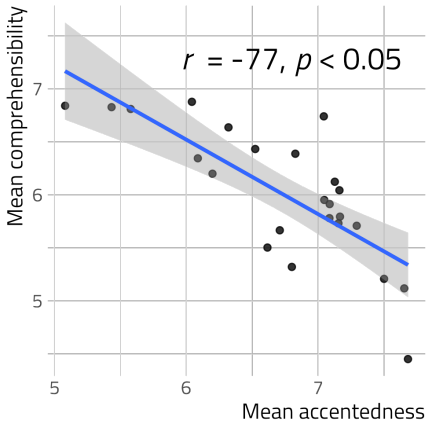

Figure 3: Correlation between Accentedness and Comprehensibility.

The Pearson's correlation between Accentedness and L3 Norwegian Proficiency was significant and moderate in strength (r = −0.59); similarly to that between Accentedness and oral fluency (r = −0.59), thus showing that the higher the speech rate, the less accented it is perceived to be. No correlations were found between perceived foreign accent and VOT measures.

For the second rating parameter, the Pearson's correlation between Comprehensibility and L3 Norwegian Proficiency was found to be significant and moderate (r = 0.41), demonstrating that more proficient learners were perceived as more comprehensible by the raters. As far as Comprehensibility and oral fluency is concerned, the correlation between these two measures proved to be significant and moderate (r = 0.51), showing that the higher the speech rate, the higher the comprehensibility rating. No correlations were found between Comprehensibility and VOT measures.

The analysis of rater variables pointed to statistically significant differences between native vs. non-native raters for Accentedness but not Comprehensibility. A mixed-effects ordinal logistic regression model was fitted with Accentedness as a function of nativeness of rater, with Norwegian proficiency as control, and by-speaker and by-rater random intercepts. The results showed a statistically significant effect of the rater's nativeness status as well as Norwegian proficiency of the speakers for the performed ratings of Accentedness. It was found that non-native raters proficient in Norwegian tended to give higher (i.e., harsher) accentedness ratings than native Norwegian raters who tended to be more lenient (b = −1.8, p = 0.03). Higher L3 Norwegian proficiency of the speakers was also linked to lower accentedness ratings (b = −0.14, p < 0.001). However, no statistically significant effect of rater nativeness was found in the case of the second parameter, i.e., Comprehensibility.

The Interrater reliability was calculated using Cronbach's alpha; for Accentedness, α = 0.89; and for Comprehensibility, α = 0.87.

The relative importance of predictors was compared by means of random forests: the forests were fitted and variable importance was calculated with the *party* R package [16]. For both Accentedness and Comprehensibility, the influence of nativeness status of the rater (variable importance: 0.026 for Accentedness and 0.003 for Comprehensibility) by far outweighs the influence of all other predictors, i.e. L3 Norwegian proficiency (0 and 0), overall oral fluency (0 and 0), amount of Norwegian use (−0.002 and −0.001), and VOT values of /p (0 and 0), t (0 and 0), k (0 and 0)/. Figures 4 and 5 show representative Conditional Inference Trees.

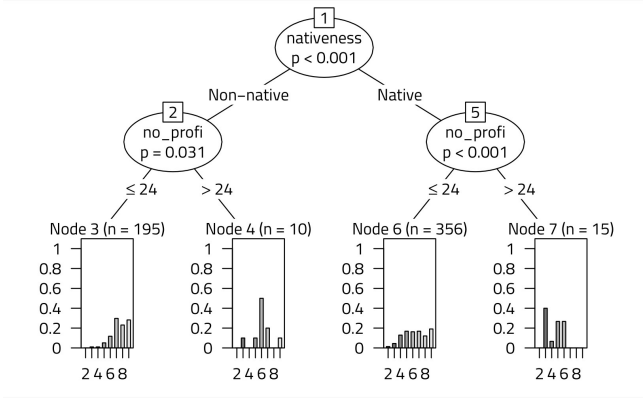

Figure 4: Conditional importance of predictors for Accentedness.

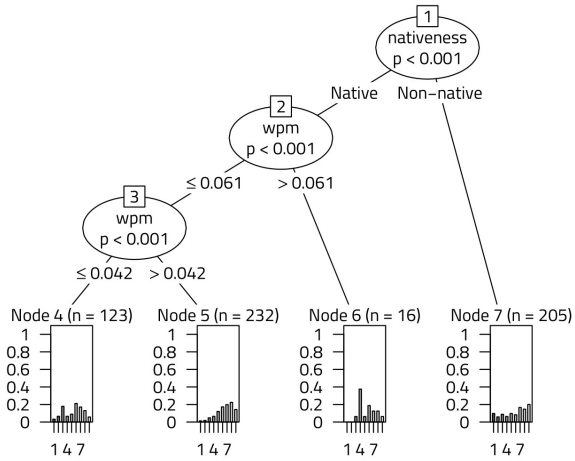

Figure 5: Conditional importance of predictors for Comprehensibility.

4. DISCUSSION

RQ1 asked whether rating parameters (i.e., accentedness and comprehensibility) correlate, and this was corroborated by our results. As predicted, a heavier accent was perceived to be less comprehensible. Moderate correlation patterns were observed for both parameters, unlike in some of previous L2 rating studies where even more accented samples were perceived as still comprehensible [1, 2]. RQ2 explored the relationship between perceived global accent and the learners' proficiency level, their oral fluency as well as their fine-grained phonetic performance in L3 Norwegian. Our predictions were partially confirmed as the holistic perceptual assessment correlated with how proficient the participants were in their L3 and with how fluent their reading production was. However, we did not find any correlations for the VOT durations even though it could have been expected that these fine-grained measures of phonetic performance should be an important predictor of global perceived foreign accentedness [5].

In turn, RQ3 enquired if perceived comprehensibility correlated with the variables under investigation. Similar patterns emerged as in RQ2 since comprehensibility ratings tended to correlate with the level of L3 proficiency as well as oral fluency measures, which was not the case for VOT performance of L3 speakers. Consequently, our predictions that all the investigated performance measures should align with the global perception of comprehensibility were partially confirmed.

Finally, RQ4 asked if rater variables influenced the ratings of L3 speech. The results indicate that rater nativeness status (native vs. non-native) proved to be the most significant predictor, as pointed out by the random forest analysis. Interestingly, the non-native raters proficient in Norwegian appear harsher in their ratings of both the degree of foreign accentedness as well as comprehensibility, which corroborates also some previous research both from L2 and L3 accent rating studies, e.g. [5, 8], and L2 accent attitude studies, e.g. [17]. These systematic differences in rating patterns resulting in the more lenient performance of the Norwegian native raters could be partially ascribed to the predicted higher degree of familiarity with accented speech as well as a higher predicted level of metalinguistic awareness on the part of non-native raters.

The study findings can also be used to further elaborate the hierarchy of variables as proposed by the NGTA framework [9]. As far as the linguistic factors are concerned, the raters' status (native vs. non-native) was the most significant predictor of L3 speech ratings pointing to the influence of language-specific systems; whereas fine-grained phonetic performance (i.e., VOT durations) was not. The raters' status also implied the potential significance of extralinguistic factors mentioned above, i.e., familiarity with accented speech and metalinguistic awareness, both expected to be greater in non-native speakers, but not measured explicitly in this study. As to further extralinguistic factors, reading fluency and L3 proficiency predicted accentedness and comprehensibility, but the amount and frequency of L3 use, and speaker individual differences were found to be of lesser importance. Recapitulating, based on the performed analysis of L3 speech ratings, the NGTA hierarchy of factors in the acquisition situation under investigation here is depicted in Figure 6. The most important factor – the influence of the raters' language-specific systems – was linguistic, but two extralinguistic factors were also implicated, i.e. metalinguistic awareness and familiarity with foreign accent. Oral fluency and proficiency turned out to be the most important measured extralinguistic factors, which were classified as such as they both are consequence of language use by speakers as a result of their linguistic competence. Variables of lesser importance included the frequency of input and use, and individual factors (see Fig. 6).

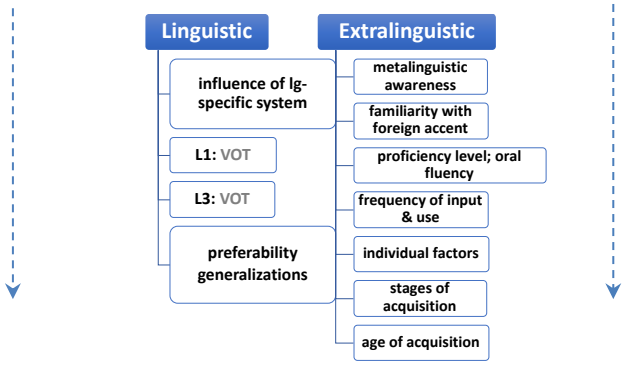

Fig. 6: Hierarchy of linguistic and extralinguistic variables in NGTA.

5. CONCLUSION

This study aimed to contribute to a growing body of research on the acquisition of L3 phonetics and phonology [18]. In particular, we investigated predictors of foreign accentedness from a lesser studied perspective of third language acquisition (TLA). Moreover, we attempted to further verify the hierarchy of variables as proposed by NGTA [9].

In future studies, we intend to explore how foreign accentedness and comprehensibility ratings are correlated between the same speakers' samples in their first and second foreign languages (i.e., L2 and L3) to tap into more intricate interactions between all the languages in multilingual learners' repertoires.

6. ACKNOWLEDGEMENT

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