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“Thinking about your pronunciation”: Examining phonological self-awareness with a novel task

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Noticing the gap in one’s pronunciation is notoriously demanding (Piske, 2008), and yet becoming aware of pronunciation challenges is beneficial for overall pronunciation competence (Kivistö de Souza, 2017). Previous studies on phonological self-awareness have employed global tasks such as journaling (e.g., Kennedy & Blanchet, 2014), and have pointed out that more explicit learning conditions lead to more noticing (White & Ranta, 2002). The objective of this paper is to present an instrument that examines second language phonological awareness by bringing the phonetic detail explicitly into the learners’ attention. The participants were 33 L1 Finnish advanced university learners of English attending an undergraduate course on English phonetics and phonology. At the beginning of the semester, the participants provided a speech sample targeting tricky English sounds. At the end of the semester, a “Thinking about your pronunciation” task was administered in which the samples were played back to the participants. They were asked to indicate any pronunciation deviations they could perceive and to elaborate on how they perceived their own intelligibility and their abilities in recognising phonetic and phonological phenomena in their own and others’ speech. Our observations with the task indicate that the instrument can be a helpful and reliable tool in tapping into phonological self-awareness.

Keywords: phonological awareness, phonological self-awareness, pronunciation instruction, noticing, language awareness



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1 Introduction: Research on phonological self-awareness

Language users possess vast amounts of knowledge about the phonological systems of the languages they speak, known as phonological awareness, as evidenced by accurate production and perception of target language sounds, syllables, stress, and intonational patterns. Furthermore, they are able to recognise phonological deviations in the form of a foreign accent, even when the speech sample is extremely short and played backwards (Munro, Derwing & Burgess 2003). Adult language users' phonological awareness thus entails knowledge about the target language phonological system at the subphonemic, segmental, and suprasegmental levels.

Phonological awareness also involves knowledge about one's own phonological competence (Kivistö de Souza, 2015), and includes noticing the gap (Schmidt & Frota, 1986) between one's own production and the target production. Such awareness is also evidenced by language users' ability not only to recognise foreign accented speech but also to provide accuracy judgments on others' speech. Noticing the gap has also been referred to as phonological self-awareness (Kivistö de Souza, 2015) or as phonological self-assessment or self-perception (Isbell & Lee, 2022; O'Brien, 2019). Nevertheless, noticing (i.e., becoming aware of a specific stimulus) does not necessarily entail understanding (i.e., verbalisation of the underlying rules), as these are seen as two distinct levels of language awareness (Schmidt, 1990).

Previous research on phonological self-awareness indicates that speakers' assessment of their pronunciation abilities correlates moderately with the actual performance (e.g., Saito et al., 2020; Trofimovich et al., 2016). However, speakers often tend to either over- or underestimate their pronunciation skills rather than to provide accurate self-assessments. Language learners whose phonological self-awareness is accurate have been shown to have more accurate segmental (e.g., Saito, 2019) and suprasegmental (e.g., O'Brien, 2019) pronunciation. Noticing phonetic detail in regular classroom interactions can be challenging, and research suggests that drawing learners' attention to phonetic detail and explicitly focusing on L2 pronunciation features is beneficial for L2 pronunciation development (Saito, 2021).

Many of the previous studies about L2 phonological awareness have presented the participants with global tasks such as free journaling (Kennedy & Blanchet, 2014; Kennedy & Trofimovich, 2010), stimulated recall (Wrembel, 2011, 2013) or imitating L2 accented speech (Mora, Rochdi & Kivistö-de Souza, 2014). The objective of the present study was to develop an instrument that would bring phonetic detail into the learners' attention in a more focused and controlled manner by prompting learners to engage in in-depth reflection about their pronunciation.

2 Methodology

2.1 Thinking about your pronunciation: Task format

An instrument we called a "Thinking about your pronunciation" task was created to examine the phonological self-awareness of advanced English speakers taking a course in English phonetics and phonology. The objective of this task was to encourage the students to engage in self-reflection in relation to their English pronunciation. The task was carried out towards the end of the semester and thus also served as an opportunity to revisit the course contents. Our previous experience with similar tasks suggested that students would have difficulties in noticing phonological challenges in their own pronunciation (Lintunen, 2013). For this reason, we tried to design a task consisting of four parts (see Appendix) that would be as explicit as possible and would offer ample opportunities for noticing.

In Part 1, the participants listened to a speech sample they had provided at the beginning of the semester and indicated any pronunciation deviations they could notice. The speech sample was a wordlist recording of 12 words containing phonemes and features known to be challenging for L1 Finnish speakers of English (e.g., Lintunen, 2004), namely: aspiration, voiced plosives in word initial and final position as well as reinterpretation of distinctions in vowel contrasts. All the target items were high frequency monosyllabic CVC words. When recording the speech sample, the participants were not aware of the target sounds nor that they would analyse the pronunciation later in the semester. To increase noticing, each word was played three times, and with each time, the participant was asked to focus on one target sound (the initial consonant, the vowel or the final consonant). The participants were asked to mark whether they had pronounced the target sound correctly or not. Optionally, they could also explain why they thought their pronunciation was inaccurate. We chose to use the term ‘correct’ to describe phonologically accurate, non-deviant productions to facilitate the participants’ comprehension. The definition of ‘correct’ was not given in the instructions, but we assumed that the participants’ perceptions of correctness would adhere to a nativeness norm and vary from native production to near-native-like.

Once the participants had focused on each segment in each of the 12 target words separately, they were asked in Part 2 to indicate if they thought that certain words were entirely unintelligible for other English speakers. The objective of Part 2 was to allow the participants to elaborate in more detail on the items they considered especially challenging.

Part 3 consisted of the participants’ self-assessment of their overall English pronunciation. They were asked to indicate on a 7-point Likert scale how comprehensible they thought their speech is for native English speakers. This question aimed to guide the participants’ attention to their pronunciation as a whole, in comparison to focusing on specific pronunciation instances as in the first two sections. Moreover, whereas Part 1 focused on perceptions of accuracy (i.e., how much the pronunciation deviates from the target) and Part 2 on the perception of intelligibility (i.e., how well the productions are understood by other English speakers), Part 3 focused on self-perceived comprehensibility (i.e., how much effort the listener needs to understand the speech) (Munro & Derwing, 1995).

The final section, Part 4, was adapted from Kivistö de Souza (2015), and it focused on the participants’ self-assessment of their phonological abilities. The section consisted of a set of phonological self-awareness questions the participants were asked to provide their opinion on. These questions asked, for instance, how easy it was for them to: notice pronunciation mistakes in other non-native English speakers’ and their own speech, identify English spoken with different accents and explain mistakes of phonological nature. The objective of Part 4 was to explore the participants’ self-reports on the two levels of language awareness, i.e., noticing and understanding (Schmidt, 1990).

2.2 Participants and raters

The participants were 33 L1 Finnish speakers doing an undergraduate degree in English language. Their mean age was 21.2 years, and their English proficiency was estimated to correspond to CEFR level C1, as indicated by their LexTALE scores ($M = 86.70$, $SD = 7.35$) (Lemhöfer & Broersma, 2012, p. 341). Twelve participants were male, 18 female and three did not disclose gender information. At the time of data collection, the participants were enrolled in an obligatory first-year practical course on English phonetics and phonology which aimed at improving students’ pronunciation through practical exercises, as well as description and transcription of English phonemes. The raters were three university professors specialising in English Phonetics and Phonology with extensive experience in rating speech samples. Two raters were L1 Finnish speakers and one rater was an L1 Portuguese speaker.

2.3 Procedures and analyses

The speech samples (word list readings) for the first part of the task were recorded at the beginning of the semester as part of a larger project. First, the recordings' sound quality was improved by removing noise and normalising the speech samples with Audacity© (Audacity Team, 2021). Then, for each of the 33 participants individual recordings were created in Praat (Boersma & Weenik, 2022). The target words were isolated from a larger set of stimuli set and combined into a new sound file together with silent pauses. Each word was copied into the file three times with a one second pause between the words. The final repetition of the word was followed by a three second pause to indicate the change of a set. The recordings were approximately 2.5 minutes long.

The recordings and the instructions were made available through the course's virtual learning platform Moodle, to which the researchers were granted access by the course instructors. Additionally, printed copies of the answer sheets were handed out to the participants in class. Each participant had access to their own recording only. The participants completed the self-paced task at home as an additional non-graded homework assignment. The instructions were given to carry out the task in a calm environment with headphones, if available. Repeated listening of the recordings was allowed. Once the participants had completed the entire task, they submitted the answer sheets through Moodle. Instances of noticing of pronunciation deviations (instances marked as 'inaccurate' in the answer sheet) were computed for each participant and target feature, and then converted into percentages.

To determine whether the participants were noticing actual pronunciation deviations or indicating deviations in accurate productions (i.e., being overly critical), the participants' scores were compared to performance rating scores given by three expert raters. Two raters assessed all samples for accuracy and their overall agreement was 85.7%. When agreement could not be reached, the samples were additionally assessed by a third rater.

3 Results

This section describes our observations on the use of the instrument. (For detailed results see Kivistö de Souza and Lintunen (forthcoming)).

Very few data were missing from Part 1 (11 out of 1188 instances = 0.01%) in which participants listened to their speech samples and assessed their correctness, suggesting that they understood the task and put some effort into completing it, despite not being in the presence of a researcher. Participants differed greatly in their self-assessments and reported noticing on average 9.12% (range: 0–30%) of the pronunciation deviations (i.e., indicated as 'not correct' on the answer sheet). Most of the deviations noticed were in initial consonants ($M = 12.13%$, range: 0–62%), followed by final consonants ($M = 7.81%$, range: 0–34%) and vowels ($M = 7.41%$, range: 0–33%). Among the phonetic phenomena analysed (aspiration, voiced stops, vowel quality), the most frequent problems were in pronouncing initial voiceless plosives (inadequate VOTs; 14.7%, range: 0–100%). Deviations in voiced stops (devoicing) were slightly less frequent ($M = 10.58%$, range: 0–40%).

When the participants' reported noticing is compared with their actual performance, a slightly different image appears. By looking at the raters' assessments of the participants' pronunciation accuracy and comparing them with the participants' reported noticing, the participants' overall pronunciation accuracy was very high ($M = 97.90%$, range: 37.5–100%), and the participants noticed on average 25.9% of the pronunciation deviations present. However, the range of noticing varied from 0 to 100%, indicating a large individual variation in participants' phonological self-awareness.

On very few occasions, the participants (P) chose to elaborate on the deviations they had noticed (93 out of 1188 instances = 0.07%), most likely because this was presented as an optional activity. Short comments were more frequently used, for instance: “not clear enough” (P28), “too Finnish” (P57), “not aspirated” (P73). Longer and more detailed comments were also present in the data though less frequently, for example: “I emphasise the sound too much in order to not make it sound like the consonant "p", which makes it sounds weird” (P80).

Examining the responses to Part 2 where the participants could elaborate on specific items they considered unintelligible, three participants did not answer the question (10%), nine (27%) reported that they did not think any of their productions would be unintelligible, and the remaining 21 (63%) identified at least one word they considered to be unintelligible. The word that was mentioned as unintelligible most frequently ($n = 9$) was *pub*, followed by *buck* ($n = 5$). Both were reported to be easily mistaken for *pup* and *puck*, hence, the participants most likely perceived problems in consonant voicing. One participant commented that it would be difficult to know how other speakers would perceive their pronunciation.

In Part 3 where the participants rated their self-perceived comprehensibility, there was no missing data. The participants favoured the upper range of the scale ($M = 5.6$, range: 4–7), indicating that they did not expect native English speakers to experience problems in understanding them. This self-perception seems accurate as participants had a high English proficiency and were rated as highly accurate by expert raters.

The reliability of the set of phonological self-awareness questions was examined in section four. An earlier version of these questions was found to be an acceptable measure ($n = 71$, $\alpha = .75$) for phonological self-awareness for Brazilian Portuguese learners of English (Kivistö de Souza, 2015). In the version used in the present study, Cronbach’s Alpha of .84 indicated that the items had a relatively high internal consistency and thus could be seen to tap into the same underlying construct (phonological self-awareness). There were three missing data points (out of a total of 396 instances) indicating that even though the participants might have considered some of the questions difficult, they still tried to answer.

Looking at the individual questions that made up the scale, the participants as a group reported the highest ability in recognising Finnish-accented English (quite easy $M = 4.3$) as well as noticing pronunciation mistakes in their own pronunciation (quite easy $M = 4.1$). The lowest ability was reported in explaining why a heard sound combination is possible or impossible in English (very difficult $M = 2.6$) and why the heard intonation and rhythm patterns are correct or incorrect (very difficult $M = 2.7$).

4 Discussion and conclusions

Phonological awareness has been shown to be positively related to pronunciation accuracy (e.g., O’Brien, 2019; Saito, 2019), and consequently, methods and instruments to increase language learners’ phonological awareness are highly relevant for L2 classrooms. In this paper we have described one such instrument that could be useful in drawing learners’ attention to their L2 pronunciation. We tested the instrument with 33 advanced Finnish learners of English who were attending a course in English phonetics and phonology. Our objective was to create an instrument that would reliably tap into phonological self-awareness and encourage students to engage in self-reflection about their L2 pronunciation in a practical manner. Our preliminary observations suggest that the instrument can be useful in examining language learners’ phonological self-awareness. Nevertheless, some issues arose from Part 1 of the instrument which researchers should address if they are interested in employing the tool.

We were aware that noticing the gap might be challenging, even for advanced language learners, which is why we tried to make Part 1 as explicit as possible. The participants received explicit instructions about which aspects to focus on and the task was self-paced, so the sound

files could be played several times. The words were all carefully selected to be monosyllabic and known to the learners, and they were presented in a controlled order in which minimal pair words followed each other (e.g., *pub* was followed by *pup*). This methodology contrasts with think-aloud protocols (Wrembel, 2013, 2015; Zuengler, 1988) and journaling (Kennedy, 2012; Kennedy & Blanchet, 2014; Kennedy & Trofimovich, 2010) which have been used previously to examine phonological awareness, as these methods allow for a wider attentional focus. Despite these efforts, the participants seemed to have a hard time identifying their segmental deviations, as testified by an average of 25.9% of noticed deviations, even though the participants possessed great amounts of metaphonological knowledge due to the course they were attending. Unsurprisingly, the participants found the syllabic and suprasegmental features difficult to explain, as the course they were attending was more focused on segmental phonology and had less emphasis on developing metalinguistic knowledge about English suprasegmentals.

Another possible reason for the low degree of noticing could be the participants' advanced proficiency level: when the production is accurate, there are fewer deviations to notice. However, phonological awareness is positively related to language proficiency (Kivistö de Souza, 2015), so the issue might not be as straightforward. It would be interesting to test participants with intermediate proficiency levels to determine how much noticing takes place.

Another possible reason for the participants' lack of noticing might be the task structure: as the task was carried out at home without researcher's supervision, the participants might have gotten distracted and might not have paid as much attention to the speech samples as they could have. However, as each participant received a different speech sample, working in a language lab was not a possibility for us.

A serious concern for researchers working with phonological self-awareness in this manner is the time required to create and administer the task. First, the researchers have to record the participants, create individualised sound files for each and finally individually send them through a cloud service or learning platform, for example. Second, when learners are asked to notice deviations in their own speech, the researchers have to make sure that those deviations are actually present in the speech samples. This requires either acoustic analysis or perceptual assessment. In the present study, we opted for the perceptual assessment of three teachers, but we are aware that ideally the speech samples should be presented to a larger number of raters.

A point should also be made about what is being noticed. Although we treat segments separately, speech is continuous and segments are affected by their surrounding context and speech rate, among others. When analysing the accuracy of the participants' productions, we had the specific difficulty of deciding, for instance, whether final inaccurate devoicing should be understood as a problem in the preceding vowel (that was too short) or in the lack of voicing of the consonant. These are issues that the researchers have to discuss in advance and while coding the data, in order to maintain consistency.

Finally, we would like to make a recommendation about combined measures of phonological self-awareness. Verbalising language awareness is difficult and verbalising phonological awareness appears to be even more so (Kivistö de Souza, 2015, p. 105; Schmidt, 1990, p. 132). It might be a good idea to complement tasks tapping into explicit phonological awareness, like the present one, with tasks that tap into non-verbalisable phonological self-awareness (e.g., perception, imitation, non-word recognition) for a comprehensive picture of the learners' phonological self-awareness (see Kivistö de Souza & Lintunen, forthcoming).

To conclude, despite the limitations, this instrument is a useful tool that can be used to address the complex aspects of phonological awareness, and it may help shed more light on how language users perceive their own pronunciation.





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Appendix

Thinking About Your Pronunciation Answering Sheet

Instructions in a nutshell:	
1. Download your recording from Moodle ("Thinking about your pronunciation homework")	
2. Make sure that you are in a quiet place where you can concentrate. If you have headphones, please use them.	
3. Keep this answering sheet and a pen ready and play the recording. You will hear each word three times and each time you should pay attention to different parts of the word.	
4. Listen carefully and tick the answer that applies. If you're unsure, you can listen to the word again. You can also stop the recording to have more time to answer.	
5. Once you have listened to all words, answer the questions at the end.	
6. Return the answering sheet to your teacher on the class 16 th November. Alternatively, you can take pictures or scan your answers and upload them on Moodle.	

Part 1. Did you pronounce the indicated part of the word correctly? If you didn't, you can explain shortly why.

There is a longer pause and a beep before the next word is presented. If you need more time before the next word, pause the recording when you hear the beep.

1. Pup

The initial consonant p up	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel pu p	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant pu p	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)

2. Pub

The initial consonant p ub	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
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The vowel <u>pu</u> b	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant pu <u>b</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
3. Bet			
The initial consonant <u>b</u> et	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>be</u> t	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant be <u>t</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
4. Bed			
The initial consonant <u>b</u> ed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>be</u> d	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant be <u>d</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
5. Buck			
The initial consonant <u>b</u> uck	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>bu</u> ck	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant bu <u>ck</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
6. Bug			
The initial consonant <u>b</u> ug	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>bu</u> g	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant bu <u>g</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> N	(Why not?)
7. Deed			
The initial consonant <u>d</u> eed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>de</u> ed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant de <u>d</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
8. Did			
The initial consonant <u>d</u> id	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>di</u> d	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant di <u>d</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
9. Beat			
The initial consonant <u>b</u> eat	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>be</u> at	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant bea <u>t</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
10. Bit			
The initial consonant <u>b</u> it	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>bi</u> t	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant bi <u>t</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
11. Peak			
The initial consonant <u>p</u> ea <u>k</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>pea</u> k	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant pea <u>k</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
12. Pick			
The initial consonant <u>p</u> ic <u>k</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The vowel <u>pi</u> ck	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)
The final consonant pic <u>k</u>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	(Why not?)

About the authors

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