DID I SAY 'PUP' OR 'PUB'? AN ANALYSIS OF FOREIGN LANGUAGE LEARNERS' PHONOLOGICAL SELF-AWARENESS

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Abstract: *Language users possess knowledge about the second language (L2) phonological system and their own L2 pronunciation, known as phonological awareness and phonological self-awareness, respectively. Higher awareness about the L2 phonology has been shown to be beneficial for L2 pronunciation accuracy (e.g. Kennedy & Trofimovich, 2010), making it relevant to know which features L2 learners are able to notice and how the L2 phonology can be brought into the learners' attention better. The aim of the paper is to examine language learners' awareness about their own pronunciation by investigating which L2 segmental features are noticed, how one's intelligibility is perceived and how participants view their phonological self-awareness abilities. 33 L1 Finnish learners of English enrolled in an English phonetics and phonology course recorded a speech sample and later listened to it by noting down the perceived pronunciation deviations on selected features. The participants also answered a phonological self-awareness questionnaire. The results indicate that the learners noticed segmental deviations in their productions, mainly in relation to consonantal voicing and vowel duration. The participants also perceived themselves as highly intelligible and reported it to be easy to notice the gap in their pronunciation, to identify pronunciation deviations in other speakers' speech and to identify Finnish-accented English. Nevertheless, the overall verbalization of noticing was scarce and the participants manifested difficulties in explaining the noticed phenomena. The discussion relates the phonological self-awareness findings to pedagogical applications.*

Keywords: Phonological self-awareness; L2 pronunciation; Pronunciation instruction; Noticing; Intelligibility.

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1 Introduction

A pendulum movement has been observed in relation to which aspects second language (L2) learners should emphasize in order to communicate effectively in L2 and what the aims of L2 pronunciation instruction should be. For decades, accuracy, that is, the target-likeness, was seen as the aim with the ultimate objective being a native speaker of the target language (the so called *nativeness principle*, Levis, 2005). Studies about 'successful' L2 learners were published (e.g., Bongaerts et al., 1997; Ioup et al., 1994) and research on L2 pronunciation usually employed native speakers as the models to which L2 learners' pronunciation was compared to (e.g., Flege, 1988; Major, 1987; Munro, Flege, & MacKay, 1996; Peltola et al., 2003). As the native-like 'successful' cases were seemingly rare and more was learned about the effects of Age of Onset of Learning and other factors on L2 pronunciation acquisition, the focus shifted from nativeness to intelligibility. *The intelligibility principle* (Levis, 2005) presents the idea that learners need to be intelligible to the interlocutors. *Intelligibility* is understood as the degree to which the speaker is understood by the listener (Munro & Derwing, 1995a). For some time, the focus on intelligibility meant embracing foreign-accentedness (the degree to which one's pronunciation differs from a native variety, Munro & Derwing, 1995a) and rejecting any focus on the phonetic form (e.g., meaning-focused instruction methods such as Communicative Language Teaching or Content and Language Integrated Learning). Currently it seems that the pendulum has set to a position where intelligibility is a priority but the negative effects of the lack of accuracy are acknowledged. It seems that, certain threshold of accuracy is needed for intelligibility. Additionally, heavily foreign-accented (i.e., inaccurate) speech poses higher processing demands on the listener, which may affect comprehensibility (i.e., the listener's felt ease of understanding, e.g., Munro & Derwing, 1995b), and speaking with a heavy foreign accent entails a social cost (e.g., Dragojevic & Goatley-Soan, 2022; Teló, Trofimovich & O'Brien, 2022). Thus, language learners and instructors should focus on both aspects when the aim is to obtain a high communicative competence in a foreign language.

Intelligibility and accuracy can both be enhanced by explicit pronunciation instruction and phonetic training (e.g., Saito 2021). Both try to bring the phonetic target forms into the learners' attention, that is, raise the learners' consciousness of the features. After years of hypothesizing that foreign languages can be simply picked up from exposure to input (Krashen, 1982), instance-based accounts on L2 acquisition currently postulate that conscious attention to the linguistic form is required for their acquisition (e.g., Ellis, 2005, Robinson, 2003, VanPatten, 1996). Thus, bringing the phonological form into the learner's attention enhances the possibilities of having the learner notice and develop awareness about the feature. The learners can be induced to either notice the target forms (*noticing the form*, Schmidt, 1990) or to notice deviations in their own output *(noticing the gap*, Schmidt & Frota, 1986), an ability which forms part of phonological self-awareness. As higher awareness about the L2 phonology has been shown to be beneficial for L2 pronunciation accuracy (e.g. Kennedy & Trofimovich, 2010), instructors may want to know which features the learners are able to notice and how the L2 phonology can be brought into the learners' attention better.

The present study was motivated by the lack of studies about phonological self-awareness. We approached phonological self-awareness by bringing the phonological form into the learners' attention through an explicit pronunciation task and by examining which features advanced language learners noticed in their own pronunciation (accuracy) and how well they expected other language users to understand them (intelligibility). We further examined the participants' phonological self-awareness by assessing their perceptions of diverse phonological self-awareness abilities.

2 Background to the study

2.1 Phonological self-awareness

Language users possess knowledge about the languages they speak known as *language awareness*. Part of this awareness involves knowledge about the phonological system of the language — *phonological awareness*, referred to also as *pronunciation awareness* (Inceoglu, 2021; Kennedy, Blanchet & Trofimovich, 2014), *metaphononological awareness* (Wrembel, 2015) and *phonetic/phonological sensitivity* (Piske, 2008). Phonological awareness entails knowledge about the segmental and suprasegmental features of the language that have been stored as declarative or proceduralized knowledge (Kivistö de Souza, 2021). Kivistö de Souza (2021) argues that most of phonological awareness consists of proceduralized knowledge, i.e., sensitivity to the language that cannot be verbalized. This type of phonological awareness is present in all language users. Additionally, those language users who have been exposed to linguistics or phonetics and phonology instruction possess varying amounts of declarative phonological knowledge. This type of knowledge is based on knowledge of pronunciation rules and is available for conscious reflection and can thus be verbalized.

Schmidt (1990, 2010) proposed that learning a foreign language entails conscious awareness of the feature to be learned, i.e., the feature must be noticed from the input in order for it to be converted into intake. Schmidt termed this phenomenon as *noticing the form*. Schmidt (2010, Schmidt & Frota, 1986) also hypothesized that L2 learning entails another phenomenon, *noticing the gap*, in which the learner does not attend to the target form, per se, but to their own production and to the gap between it and the target form.

Applying Schmidt's ideas to the realm of L2 phonological awareness, to acquire L2 pronunciation efficiently, the learner should notice the target phonological forms and the deviations in their own L2 pronunciation. This latter ability of noticing the gap in one's pronunciation forms part of phonological self-awareness (Kivistö de Souza, 2021), that is, the ability to notice and reflect upon one's phonological abilities. Noticing the gap in one's pronunciation does not necessarily involve declarative knowledge as this can occur at the level of focal attention only. For example, the learner can notice that their pronunciation of the word <pet> does not sound target-like but not being able to explain why. On the other hand, the learner might notice the gap in their pronunciation and be able to analyze and reflect upon it. For instance, the learner would be able to pinpoint that the pronunciation of <pet> sounded inaccurate because the initial plosive was not aspirated. This latter type of ability would involve declarative knowledge, and is what Schmidt (1990) termed as *understanding*. Noticing is necessary for language learning to occur, whereas understanding can be helpful but not essential (Schmidt, 1990). Accessing language learners' noticing of L2 phonology can be challenging as according to Schmidt (1990):

> the lack of a verbal report cannot be taken as evidence of failure to notice unless the report is gathered either concurrently or immediately following the experience. There are also conscious experiences that are inherently difficult to describe. We may notice that someone has a regional accent without being able to describe it phonetically, or notice a difference between two wines without being able to describe the difference (p. 132).

The difficulties in noticing phonetic phenomena Schmidt (1990) describes above are reflected in the small number of studies investigating phonological self-awareness. Whereas studies about phonetic training and explicit pronunciation instruction are becoming more frequent (e.g. Saito 2021), investigating what learners notice and know about their own pronunciation skills has received much less focus.

Previous research indicates that learners notice more when the learning conditions are more explicit, that is, there is feedback, provision of rules and/or formal instruction (e.g. Rosa & O'Neill,

1999; White & Ranta, 2002). This type of instruction has been termed *consciousness-raising*, that is, the instructors try to make the linguistic aspects they want learners to notice the most salient possible. In the present study, we tried to induce learners' noticing of the gap by creating a task which would explicitly bring L2 pronunciation into the learners' attention. The participants listened to the target words, which were created around selected English phones which are challenging for L1 Finnish learners of English. After listening to the phones in isolation, participants were explicitly encouraged to elaborate on the instances where they noticed a gap.

2.2 Phonological challenges for Finnish learners of English

Finnish and English are typologically very distant languages. Finnish is a non-Indo-European language belonging to the Finno-Ugric language family. However, Finnish learners are very much exposed to English in Finland, for example, via popular culture or (social) media. In addition, attitudes towards English are very positive, and knowledge of English is considered important (Taavitsainen & Pahta, 2003). For these reasons, the general proficiency of English is high in Finland.

Finnish and English have certain structural differences (see, e.g., Morris-Wilson, 2004, for a comprehensive comparison). One generally important difference is the relationship between orthography and phonology. Roughly speaking, sounds and spelling have a very close connection in Finnish, with relatively few exceptions. Therefore, the so-called silent letters in English (e.g., in <debt>) and cases when the same sound can be represented by different letter combinations (e.g., /ʌ/ in <cut>, <son>, <young>, <blood>) are notoriously challenging for Finnish learners of English (Lintunen, 2004: 64). It has been claimed that nearly one third of the pronunciation problems for Finnish learners of English originate in orthography (Paananen, 1999).

Vowels have been found to be easier for Finnish learners of English than consonants (Lintunen, 2004). Finnish has a rich vowel system, and length is a contrastive feature, which means that Finnish speakers are sensitive to vowel durations, but Finnish does not have a contrastive qualitative difference between the so-called tense and lax vowel qualities (e.g., /i-ɪ/; Wiik, 1965). Finnish learners of English, thus, frequently make the distinction between tense-lax vowels based on duration rather than quality (Ylinen et al., 2009). Although vowel durations are generally easy to perceive, Finnish learners find such phenomena as pre-fortis clipping or the tendency for longer vowel durations before voiced plosives hard to master (Suomi, 1980).

Consonants are generally more difficult for Finnish learners, as Finnish has fewer contrastive consonants. Altogether, 11 standard English consonants do not occur as contrastive sounds in Finnish (Lintunen, 2004: 73). For instance, Finnish has two fricative sounds /s, h/ while standard English has nine. In addition, Finnish does not have a voicing opposition in consonants. Furthermore, Finnish plosives do not have clear aspiration (Suomi, 1980). Both lack of aspiration and voicing contrasts in plosives have been found frequent pronunciation challenges for Finnish learners of English (Tergujeff, 2022), leading to possible pronunciation issues in minimal pairs like *pet-bet* in word-initial position or *bat-bad* in word-final position.

The present study set to address a gap in L2 phonological self-awareness research by examining the phonological self-awareness of L1 Finnish learners of English. The following research questions (RQ) were posed:

RQ1: Are advanced language learners able to verbalize the noticing of the gap in their L2 pronunciation and if so, which L2 segmental features attract the most and the least verbalization of noticing?

RQ2: What is the participants' perception about their intelligibility in communicative situations with native and non-native language users?

RQ3: How learners perceive their phonological self-awareness abilities?

3 Method

The data were collected over one academic semester in a public university in Finland. First, the participants answered a linguistic background questionnaire, took a vocabulary size test and recorded a speech sample. Then, the speech samples focusing on selected sounds were played back to the participants who commented their pronunciation and answered a phonological self-awareness questionnaire.

3.1 Participants

The participants to the study were 33 L1 Finnish learners of English enrolled in a mandatory first-year English Phonetics and Phonology course (Table 1). The participants' English proficiency level was estimated to be, on average, on the CEFR level C1 based on participants' LexTale vocabulary size scores (Lemhöfer & Broersma, 2012: 341). This means that the participants were very advanced learners and users of English.

Table 1. The participants' demographic and linguistic characteristics.
The table displays the mean, standard deviation (in brackets), minimum and maximum values. Self-estimated speaking proficiency was measured on a 5-point Likert scale where 1=poor, 5= excellent.

N=33	*M* (SD)	Min-Max
Age	20.82 (2.8)	18-31
LexTale	86.70 (7.3) -> C1	65-98.7
Self-estimated speaking proficiency	3.71	2.5-5
L2 Instruction (in years)	10.12 (.9)	9-13
Time in English-speaking countries (in months)	1.91 (6.6)	0-36
Time abroad (in months)	3.88 (9.8)	0-42

Eighteen of the participants were female, 12 male and three did not disclose gender information. The vast majority of the participants were English majors with only two being English minors. All of the participants reported to speak at least three languages, the most frequent L3 being Swedish (84.8%). Furthermore, 78.8% of the participants (*n*=26) reported speaking four or more languages, the most frequent L4s being Spanish (*n*=7), German (*n*=6) and Swedish (*n*=5). The frequency of Swedish as a foreign language can be explained by it being an obligatory additional language in Finnish schools as the second official language in Finland.

3.2 Instrument

Twelve monosyllabic words forming minimal pairs (*pup-pub, bet-bed, buck-bug, deed-did, beat-bit, peak-pick*) were selected for the participants to record in a word list reading. The target words contained phonemic and allophonic features shown to be difficult for L1 Finnish speakers of English (Lintunen, 2004): voiced plosives, aspiration and selected vowels.

The recordings were played back to the participants as a part of a phonological self-awareness task which consisted of a self-reflective pronunciation assessment and a phonological self-awareness questionnaire (explained in detail in Kivistö de Souza & Lintunen, 2023). In the first part, the participants listened to their own word productions and indicated whether their pronunciation was accurate. The participants were also encouraged to elaborate on the deviations they had perceived. [2]

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[2] In the present manuscript, we analyze participants' open-ended comments on the deviations they noticed in the 12 target words (RQ1), explore participants' perceptions of their intelligibility (RQ2) and analyze participants' perception of their phonological abilities (RQ3). Quantitative data from the instrument is discussed in Kivistö de Souza and Lintunen (forthcoming).

After assessing the accuracy of the 26 target sounds within the 12 target words, the participants estimated their self-perceived intelligibility. With this aim, the participants were asked to indicate the words out of the 12 targets that they believed other (native or non-native) speakers of English would have trouble understanding. The participants also assessed their overall self-estimated intelligibility to native English speakers on a 7-point Likert scale.

The final part was adapted from Kivistö-de Souza (2015), and it asked for participants' self-assessment of their phonological abilities. The participants indicated on a five-point Likert scale whether the ability described in 12 questions was 'very easy', 'quite easy', 'quite difficult' or 'very difficult' or whether they could not perform the described activity at all ('I can't do this at all'). The abilities tapped into Schmidt's (1990) levels on *noticing* and *understanding* and inquired about the participants' abilities to notice and explain L2 speech phenomena in their own and in other's speech.

3.3 Procedures

The data were collected at the beginning and end of a semester with a period of instruction in between. On the first week of the semester, the participants provided the speech sample recordings, took a vocabulary size test and answered a linguistic background questionnaire. After the recordings, the participants attended the regular classes of the undergraduate English phonetics and phonology course. The course presented the English phonological system and familiarized students with phonetic transcription through practical exercises focusing on improving students' fluency, rhythm and pronunciation accuracy. Students were divided into groups depending on their target English variety: Southern Standard British English or General American English. The instructors were native Finnish speakers with ample experience in teaching oral English. The instructors were not aware of the target sounds of the study to avoid teaching bias. Finally, at the end of the semester, the participants performed the phonological self-awareness task as described above. With this aim, the participants downloaded their recordings and the phonological self-awareness questionnaire from Moodle and completed it at the time of their convenience at home. Participation was voluntary and did not result in benefits.[3]

3.4 Analyses

For the RQ1, first, participants' noticing of deviations in their own pronunciation was tallied and subsequently categorized. *Noticing* was here understood as a participant explicitly elaborating in writing on a feature in their pronunciation. For example, under the question: "Did you pronounce the indicated part in _pub_ correctly? If you didn't you can explain shortly why", the participant wrote "sounds more like b", which was taken as an indication of noticing. Noticing was calculated per participant (i.e., how much variation there was in the quantity of noticing between the participants), per lexical item and per phonetic target. Although elaborating on the noticed pronunciation deviations was not obligatory, only five out of the 33 participants did not write any comments about the pronunciation. On average, the participants made 3.28 comments about deviations they had noticed in their pronunciation (*min*=0, *max*=8). In total, there were 92 instances of verbalization of noticing out of the 1,188 possibilities for noticing (12 words x 3 target sounds x 33 participants). It should be noted that the overall degree of pronunciation accuracy within this group was high as verified by perceptual judgements by three expert judges (mean accuracy =97.90%, range: 37.5-100%, for further information, see Kivistö de Souza & Lintunen, 2023) and as target-like productions were not commented, a lower amount of comments was expected.

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[3] The study was approved by the Ethics Committee of the first author's institution under the number 46220821.4.0000.0121.

Finally, the comments were categorized by looking at commonalities between them to determine which aspects of the specific segments called participants' attention. By analyzing frequently occurring terms, we identified key words and classified the comments into 10 categories.

For the RQ2, the participants' self-assessed intelligibility was analyzed in two manners. At a local level, by tallying the words they indicated other English speakers to have trouble understanding, and at a more global level, by examining their scores in the self-estimated intelligibility scale.

To examine participants' perception of their phonological self-awareness abilities (RQ3), the nominal answers to the questionnaire were converted into an ordinal 5-point scale so that higher numbers indicated higher ability. Descriptive statistics were calculated for each questionnaire item and data were inspected through boxplots with the aim of better examining the distribution of responses.

4 Results and discussion

4.1 Noticing the gap

When looking at noticing by item, the word *pub (n=14)*, followed by *bed (n=13)* and *bug (n=13)* received the highest number of comments about noticed mispronunciations. On the contrary, the participants seemed fairly satisfied with their pronunciations of the words *did (n=3)*, *bit* (*n=3*) and *pick* (*n*=4) as these received only few instances of noticing each. Differences between the lexical items could be argued to be contributed to word frequency effects, but we believe this to be unlikely as both high-frequency (*bed*) and low-frequency words (*pub*) (Leech, Rayson & Wilson, 2001) received many comments. Another possible explanation is task effects, which, indeed, seem to have played at least some role. Observing the number of comments to the first, second and third quarter of the items reveals that the participants provided more comments to the items that were presented at the beginning of the task: The first four items received a total of 43 comments, the second four items 30 comments and the final four items received only 19 comments. It thus seems that the participants got more discouraged at verbalizing their noticing as the task advanced. For this reason, we decided to analyze noticing by phonetic targets. For this aim, we grouped the phonetic targets into voiceless plosives (i.e., lack of aspiration), voiced plosives (i.e., lack of voicing) and vowels (problems in quality and duration). The verbalization of noticing by phonetic targets can be seen in Table 2 below.

Table 2. Verbalization of noticing by phonetic targets.

Phonetic target	Noticing	
	Percentage	Instances
Initial voiceless plosive (/p/)	16.3	(15)
Final voiceless plosive (/p,t,k/)	11.9	(11)
Voiceless plosives total	28.2	(26)
Initial voiced plosive (/b,d/)	25	(23)
Final voiced plosive (/b,d,g/)	19.5	(18)
Voiced plosives total	44.5	(41)
/ i-ɪ/	8.6	(8)
/ʌ/	11.9	(11)
/e/	6.5	(6)
Vowels total	27.1	(25)
Total	100	(92)

An analysis of the amount of noticing to target phonetic-phonological features indicates that voiced plosives received the highest number of noticing comments (44.5), followed by similar degrees of noticing for voiceless plosives (28.2%) and vowels (27.1%). Initial plosives—whether voiced or voiceless— attracted more noticing comments than final ones, perhaps because word initial position

was deemed more salient than word final position. Out of the target vowels, the mispronunciation of the mid-vowel /ʌ/ was mentioned the most frequently, followed by the high front vowels /i-ɪ/. Although the Finnish /e/ is quite similar in quality to the English /e/, the participants reported having noticed six mispronunciations of this vowel.

In the next phase, we examined the contents of the comments. Table 3 shows the number of comments in each of the established categories together with some examples.

Table 3. Categories of the noticing comments. Participant codes in brackets.

Category	Number of instances	Item with the target underlined	Comment
			Example comments
Vowel duration: short	12	b<u>u</u>g	*too short* (sp51)
		b<u>e</u>d	*the "e" is a little too short* (sp51)
		d<u>ee</u>d	*should be longer* (sp62)
Vowel duration: long	8	b<u>e</u>d	*length a bit excessive* (sp50)
		b<u>ea</u>t	*vowel sound too long* (sp69)
		b<u>u</u>g	*should be shorter* (sp74)
Vowel duration: unspecified	1	d<u>ee</u>d	*the duration of the vowel is off* (sp80)
Vowel duration total	21		
Vowel quality	1	b<u>u</u>ck	*too round. Sounds like "book"* (sp71)
Vowel quality total	1		
Voicing: Lack of	31	<u>b</u>et	*sounds more like a /p/ than a /b/* (sp61)
			/g/ sounds closer to /k/ (sp58)
		bu<u>g</u>	*too Finnish* (sp57)
		<u>b</u>uck	
Voicing: Too much	4	bi<u>t</u>	*It sounds like I'm saying 'bid'* (sp37)
		bu<u>ck</u>	*could be stronger, sounds a bit like g* (sp38)
			sounds more like b (sp38)
		<u>p</u>ub	
Aspiration: Lack of	14	<u>p</u>ub	*no aspiration* (sp62)
		<u>p</u>up	*not enough aspiration* (sp51)
		pi<u>ck</u>	*too weak /k/* (sp65)
Voicing issues total	49		
Voice or recording quality	4	p<u>u</u>b	*my voice cracked* (sp45)
		<u>p</u>up	*it is very difficult to hear in the recording* (sp66)
Suprasegmentals	3	di<u>d</u>	*a bit stressed towards the end* (sp71)
		p<u>u</u>b	*too much stress* (sp67)
		d<u>i</u>d	*sounds like a question* (sp57)
Allophonic variation	4	be<u>t</u>	*should be a harder /t/ sound* (sp29)
		bi<u>t</u>	*flap* (sp50)
Generic	9	<u>b</u>uck	*not clear enough* (sp28)
		<u>b</u>ed	*wasn't clear enough* (sp55)
		<u>b</u>ed	*I feel like my b is a bit weird* (sp76)
Uncategorized	1	bu<u>g</u>	*sounds more like /gn/ than /g/* (sp80)
Total	92		

The participants were the most attentive to devoicing of the voiced plosives. In total, 31 comments—or one third—involved noticing of insufficient voicing of the initial and final /b,d,g/. What

is noteworthy is that some participants identified insufficient voicing as foreign accented and problematic for intelligibility, as can be seen in the comments below:

- *could be clearer. Can be mistaken for /k/* (sp28 about the final consonant of 'bug')
- *sounds like a Finnish /p/* (sp73 about the initial consonant of 'bet')

Another aspect that called participants' attention was vowel duration. In total, 21 comments were made about vowels being too short or too long. On the contrary, problems in vowel quality led to only one comment. This is interesting as previous research has shown that Finnish learners of English tend to rely more on duration cues than spectral cues when discerning English vowels (Suomi 1980; Ylinen et al., 2009). Overreliance on duration cues could be explained by the learners transferring an L1 strategy into the L2 as Finnish is a quantity language in which vowel duration is used phonemically. Alternatively, it has been suggested that temporal cues are perceptually more salient than spectral cues, making it easier for L2 learners to access vowel duration than vowel quality (Bohn, 1995). The large number of vowel duration comments suggests that the participants noticed deviations involving vowel duration more easily than vowel quality. Whether the participants actually produced too short or too long vowels is not the focus of the present study, so the question remains whether the participants were noticing actual deviations in vowel duration or over-relying on duration distinctions and not noticing deviations in vowel quality. The participants also did not seem to be aware of allophonic variation in vowel duration due to the following phonetic context. None of the comments on vowels or final consonants mentioned vowel lengthening before voiced consonants. On the contrary, participants' comments about the noticed deviations on final voiced plosives involved solely devoicing. As devoicing of final voiced plosives is a natural phenomenon of English and native English speakers have been shown to discern final voiced consonants from voiceless ones based on the duration of the preceding vowel (e.g., Flege, 1989), it is possible that what the participants in the present study identified as lack of voicing of the final voiced plosives was, in fact, inadequate duration of the preceding vowel.

The participants also indicated to notice the lack of aspiration in their voiceless plosive productions. Out of the 14 comments involving insufficient Voice Onset Time (VOT), 12 were about initial /p, t, k/ and two about final voiceless plosives. The two participants who commented on the lack of aspiration in word final position might have been unaware of aspiration being optional in this context. In fact, although the majority of the noticing comments were about contrastive phenomena, non-contrastive features in the speech signal such as voice and recording quality or pitch called some participants' attention.

The results to the RQ1 show that the participants did verbalize their noticing of the gap, although the verbalization got scarcer as the task unraveled. The participants reported to notice deviations in the production of voiced plosives the most, and lack of voicing was the feature that was commented on the most, followed by lack of aspiration and incorrect vowel duration. On the contrary, vowel quality did not attract participants' attention.

4.2 Self-perceived intelligibility

Whereas the first research question examined participants' perceptions of their pronunciation accuracy, the second research question looked into participants' perceived intelligibility. Intelligibility was approached in two manners. At the item level, we asked the participants to list the pronounced words they believed could be misunderstood by other English speakers. On a global level, the participants rated their perceived overall intelligibility to native English speakers on a scale of 1 to 7, in which 1 indicated 'extremely hard to be understood' and 7 indicated 'extremely easy to be understood'.

On average, the participants rated their global self-assessed intelligibility highly (M=5.63, SD=.78, range:4-7). The lowest scores fell to the midway of the scale indicating that the participants

who rated themselves the lowest, still considered themselves to be intelligible to native English speakers. These self-assessed intelligibility scores seem comparable to participants' actual proficiency level (on average, C1).

Examining intelligibility at the word level, 9 out of the 33 participants (27%) considered their productions 100% intelligible. Three participants did not answer the question, and the remaining 21 participants indicated at least one item that they considered to have pronounced in a way that may lead to intelligibility problems. The item that was mentioned the most frequently as being possibly unintelligible was *pub* (*n*=7), with several participants mentioning that it could be easily confused with *pup*. Other items identified were *buck* (*n*=5) and *bug* (*n*=3), with most comments involving confusability between the minimal pair items. Other items deemed to have caused communication breakdowns were *bet, bit*, *beat* and *peak*, each with two mentions. When crossing the noticing of the gap data with the comments about item intelligibility, it can be observed that the participants deemed that the previously noticed features of devoicing, lack of aspiration and vowel quantity occasionally lead to communication breakdowns. Several participants specified, however, that in normal communicative situations the context would remedy for the non-target-like productions:

> *- I think that in context I'd be understood but in a situation like this, some of the vowels I pronounce could cause confusion* (sp40)
> *- without context 'pub' could easily be mistaken for 'pup'* (sp28)

One participant also commented on the difficulty of the task in accessing this type of metaphonological knowledge:
> *- It is a bit difficult to say what a native speaker would not be able to understand, but I think a native speaker would at least hear abnormalities in my pronunciation with most of the words* (sp48)

The issue of accentedness was mentioned by many of the participants as being something noticeable for other speakers but not hindering to the point of causing misunderstandings:
> *- I think I would be well understood, but some of my consonant pronunciation should be stronger* (sp74)
> *- Buck might be harder to understand. I feel like pub and bed were also pronounced a bit strange, but are probably still understandable* (sp76)

Overall, the participants, thus, considered themselves highly intelligible acknowledging that in regular interaction, context contributes to the meaning making process and foreign accent rarely interferes with comprehension.

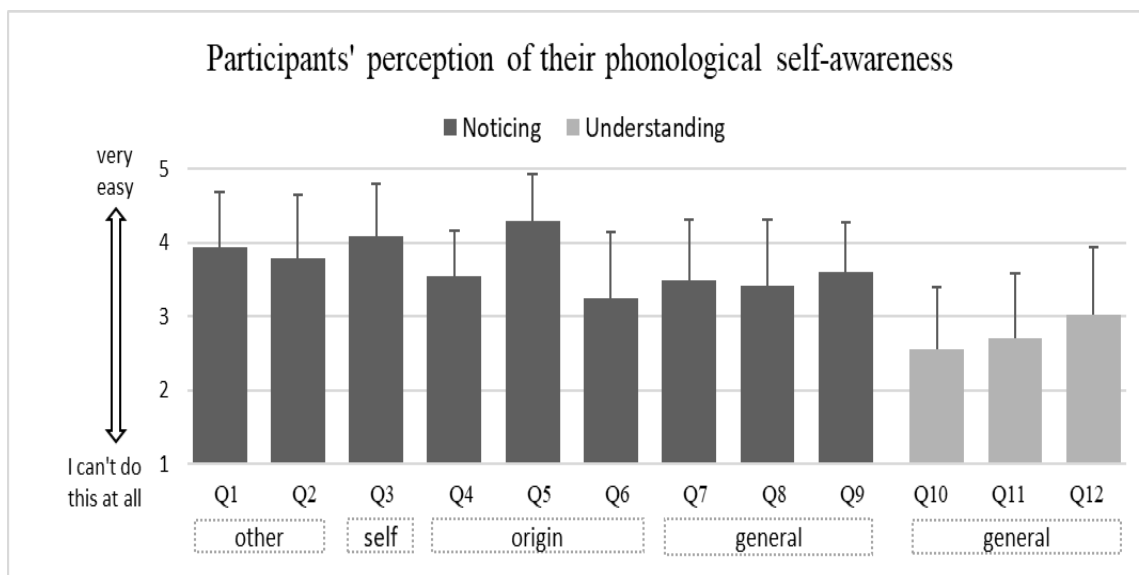## 4.3 Phonological self-awareness abilities

The third research question focused on examining participants' responses to the final part of the instrument. The participants rated questions about their self-perceived phonological abilities. The questions, together with the descriptive statistics, can be seen in Table 4 below.

Nº	How easy it is for you to…	Mean (*SD*)	Min-max
Q1	notice pronunciation mistakes in the production of *individual sounds* in other non-native English speakers' speech?	3.9 (.7)	2-5
Q2	notice pronunciation mistakes in *intonation and rhythm* in other non-native English speakers' speech?	3.7 (.8)	2-5
Q3	notice pronunciation mistakes in *your own* English speech?	4.0 (.7)	3-5
Q4	tell where a *native* speaker of English comes from based on their accent?	3.5 (.6)	2-5
Q5	tell whether a non-native speaker of English is *Finnish* based on their English accent?	4.3 (.6)	3-5
Q6	tell where a *non-native* speaker of English (not Finnish) comes from based on their English accent?	3.2 (.9)	2-5
Q7	*notice* whether a sound combination you hear is possible in English or not?	3.5 (.8) (n=32)	2-5
Q8	*notice* whether the intonation and rhythm you hear in an English sentence are possible or not?	3.4 (.9) (n=32)	2-5
Q9	*notice* whether an individual sound you hear is pronounced correctly in English or not?	3.6 (.6)	2-5
Q10	*explain* why a sound combination you hear is possible or impossible in English?	2.5 (.8) (n=32)	1-4
Q11	*explain* why the intonation and rhythm you hear are correct or incorrect in English?	2.7 (.8)	1-5
Q12	*explain* why an individual sound you hear isn't pronounced correctly in English?	3.0 (.9)	1-4

Overall, it can be seen that there was quite a lot of individual variation in the answers, with some participants rating their abilities very highly and others considering the abilities very difficult. To examine better the participants' perceptions of their abilities, they were further divided into five categories focusing on: perceiving deviations in other speakers' speech (Q1-Q2), noticing deviations in one's own speech (Q3), noticing the origin of another English speaker based on their accent (Q4-Q6), noticing deviations in English in general (Q7-Q9) and explaining why the heard deviations occur (Q10-12). The first nine questions involved awareness at the level of noticing, whereas the final three questions involved awareness at the level of understanding. Figure 1 below depicts the distribution of the answers by groups.

Figure 1. Average agreement to phonological self-awareness statements (*n*=33). Whiskers indicate SD.

As expected, the participants showed more difficulties in awareness at the level of understanding (Q10-Q12). These were the only questions where some participants rated themselves with the lowest item on the scale, stating that they were not able to explain the phonetic phenomena in question. This is perhaps surprising as the testing was performed at the end of an English phonetics and phonology course, which, at least theoretically, provided the participants with information about the English pronunciation together with the necessary metalanguage to describe it. Perhaps the formulation of the questions in a more abstract, rather than specific level (i.e., by providing examples) made it difficult for the participants to relate the questions to real world communicative situations. It is also possible that although the participants had likely acquired quite a lot of declarative knowledge about the English phonological system, they had yet to automatize the knowledge and put it into practice. This is supported when the scores to questions 7-9 are compared with questions 10-12. As seen in Table 4, the questions inquire about the same phenomena with questions 7-9 focusing on noticing and questions 10-12 focusing on the understanding of the phenomena. Comparing the mean ratings and the range of answers shows that the participants reported to be able to notice the phenomena quite well but found it difficult to explain them.

The participants found noticing pronunciation mistakes in other speakers' speech quite easy (Q1-Q2). Pronunciation deviations at the segmental level were reported to be easier to be noticed than pronunciation mistakes at the suprasegmental level, although the difference was small. What is promising for the present study is that the participants reported identifying the gap in their own pronunciation quite easy (Q4) and the ability to observe deviations in one's own speech was rated higher than the ability to spot deviations in other's speech. Nevertheless, caution has to be employed when interpreting this finding. As noticing the gap is notoriously difficult, it is likely that having completed the noticing the gap activities prior to answering the questionnaire heightened the participants' awareness about their own pronunciation. Answers could be different if the question had been posed before the participants listened to their speech samples and indicated their accuracy.

Being able to recognize deviations from the norm in the L2 speech signal and relating the deviations to a specific L1 background tells about a heightened awareness of the characteristics of the L2 speech system, but also about the characteristics of the L1 speech system and L1-accented L2 speech. In other words, if a speaker is able to say that a specific speech sample is 'Finnish-accented English', it means that the speaker is able to recognize deviations from the target norm and pinpoint the origin of these deviations to the presence of another (familiar) phonological system. The participants reported it to be very easy to tell whether an English user is Finnish based on their accent. In fact, this ability was

the one that the participants considered the easiest. Instances of this ability in practice were observed in the qualitative comments to RQ1, when some participants described their segmental productions as 'too Finnish' or their voiced bilabial plosives sounding 'like a Finnish /p/'. More difficulties were reported in knowing the origin of a native English speaker based on their accent and knowing where other L2 users of English came from based on their accent. Lower ratings in these two skills are likely to be due to participants' unfamiliarity with different native and non-native English varieties. A more practical task in which the participants would choose the native variety of a speaker after listening to a speech sample might be more useful in determining which varieties are easier to recognize.

The results to the final research question showed large individual variation in self-reported phonological awareness skills. Overall, awareness at the level of understanding was considered more difficult than awareness at the level of noticing. The participants reported to find it easy to spot segmental and suprasegmental deviations in other speakers' speech, to identify Finnish-accented English and to notice the gap in their own pronunciation.

5. Conclusion

The study set to examine advanced language learners' phonological self-awareness. More specifically, the objectives were to examine i) noticing of the gap in L2 segmental production through metaphonological comments, ii) participants' views on their self-perceived intelligibility and iii) participants' perceptions on their phonological self-awareness abilities. The participants were 33 L1 Finnish speakers of English enrolled in an obligatory university-level course on English phonetics and phonology. The participants listened to their own speech samples, elaborated on the noticed gaps and possible intelligibility problems and answered a phonological self-awareness questionnaire.

The results showed that the participants possessed some phonological self-awareness, both at the level of verbalizing the noticing of the gap in their own production, and at the level of thinking about their knowledge about the English phonological system. The participants reported to notice the gap with the devoicing of the voiced plosives, lack of aspiration and vowel quantity. L1 Finnish speakers have been shown to struggle with these aspects of English pronunciation, so it is positive that learners possessed some degree of awareness about these features.

The participants also manifested phonological self-awareness when rating their abilities to notice and understand L2 speech phenomena. Noticing pronunciation deviations in other speakers' and their own speech were considered quite easy, as was recognizing Finnish-accented English. Although the participants were enrolled in a phonetics and phonology course, they still found it quite difficult to provide explanations to the speech phenomena they could notice.

As accuracy, to some extent, and intelligibility are both essential for successful L2 communication, we were interested in examining participants' perception on both domains. Overall, the participants were aware that their segmental production deviated from the norm as evidenced by almost every participant commenting at least once on having noticed the gap. They also showed awareness about the presence of minimal pairs and that inaccurate production of a target segment could easily lead to misunderstandings. However, the participants also rated themselves as highly intelligible and, overall, did not consider many of their accented productions entirely unintelligible.

When interpreting the results, some caution should be employed. The 92 comments the participants provided can be taken as indication of noticing, but noticing does not necessarily involve verbalization. In other words, it is likely that the participants noticed much more than what was registered. Some evidence was also found that the participants verbalized their noticing less as the task advanced, so it is likely that not all that was noticed was, in fact, verbalized.

As seen here, putting phonetic phenomena into words is complex, even for learners familiarized with phonetics and phonology who should possess the necessary terminology and the capacity to think

about language as an object. 92 comments of noticing from 33 participants might seem representative, but considering that each participant produced 12 words with three target sounds each, there were in total 1,188 segmental productions. The participants in the study had a high language proficiency and it was not the objective of the present study to examine how many segmental inaccuracies they, in fact, produced, but it is likely that it was more than what was reported[4]. Furthermore, some of the questions were possibly formulated in a manner too abstract for some participants and further research should look into a different methodology which would take this into account. One suggestion would be to present written or auditory examples to illustrate what was meant with each of the phonological self-awareness abilities studied.

The findings of the present study bring some applications for instructed foreign language settings. On the one hand, it could be observed that foreign language learners possess metaphonological awareness and that they are able to think about their pronunciation, as well as to indicate possible deviations. On the other hand, it was seen that even for the target population of the study — on average C1 level English majors studying English phonetics and phonology— verbalizing the noticing of the gap was challenging. As phonological self-awareness is beneficial for L2 speech development, our recommendation is to bring learners' attention to the L2 phonology through explicit pronunciation instruction. The small sections on English language course books about pronunciation are not likely to be enough for learners to effectively notice a specific L2 speech phenomenon and to put that knowledge into practice. Numerous pronunciation instruction books are available for instructors to complement the regular class materials (e.g., Celce-Murcia et al., 2010; Silveira, Zimmer & Alves, 2009). It is also important for the instructors to focus attention on those aspects of speech that matter for intelligibility. Some irrelevant features of the speech signal called the participants' attention in the present study. It is perhaps expected that speakers pay attention to contrastive and non-contrastive aspects of the speech signal, but it would be beneficial to direct learners' attention to the contrasts in speech that carry meanings. Jenkins (2002) proposes one solution to this matter (for Finnish learners of English, see also Tergujeff, 2022).

Our findings suggest that language learners possess some awareness about their pronunciation accuracy, intelligibility and phonological abilities. This awareness is unlikely to develop naturally from regular L2 contact only. The L2 instructor has a crucial role in guiding the learners to develop their awareness by employing consciousness-raising activities and drawing learners' attention to pronunciation explicitly.

REFERENCES

1. Bohn, O.-S. Cross language speech perception in adults: First language transfer doesn't tell it all. In W. Strange, editor. Speech Perception and Linguistic Experience: Issues in Cross-language research. Timonium, MD: York Press; 1995. p.279-304.

2. Bongaerts, T., van Summeren, C., Planken, B., Schils, E. Age and ultimate attainment in the pronunciation of a foreign language. Studies in second language acquisition. 1997. 447-465.

3. Celce-Murcia, M., Brinton D. M, Goodwin, J. M., Griner, B. Teaching Pronunciation: A Reference for Teachers of English to Speakers of Other Languages. New York, NY, Cambridge University Press; 2010.

4. Dragojevic, M., Goatley-Soan, S. Americans' attitudes toward foreign accents: Evaluative hierarchies and underlying processes. Journal of Multilingual and Multicultural Development. 2022. 43(2), 167–181.

5. Ellis, N. C. At the interface: Dynamic interactions of explicit and implicit language knowledge. Studies in Second Language Acquisition. 2005. 27, 305-352.

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[4] Kivistö de Souza and Lintunen (2023) compared pronunciation accuracy to reported instances of noticing and in fact, participants noticed only around one fourth of the pronunciation deviations present.

6. Flege, J. E. Factors affecting degree of perceived foreign accent in English sentences. The Journal of the Acoustical Society of America. 1988. 84(1), 70-79.

7. Flege, J. E. Chinese subjects' perception of the word-final English/t/–/d/contrast: Performance before and after training. JASA. 1989. 86(5), 1684-1697.

8. Inceoglu, S. Exploring the relationship between explicit instruction, pronunciation awareness, and the development of L2 French connected speech processes. Language awareness. 2021. 30(4), 336-354.

9. Ioup, G., Boustagui, E., El Tigi, M., Moselle, M. Reexamining the critical period hypothesis: A case study of successful adult SLA in a naturalistic environment. Studies in second language acquisition. 1994. 16(1), 73-98.

10. Jenkins, J. A sociolinguistically based, empirically researched pronunciation syllabus for English as an international language. Applied linguistics. 2002. 23(1), 83-103.

11. Kennedy, S., Blanchet, J., Trofimovich, P. Learner pronunciation, awareness, and instruction in French as a second language. Foreign Language Annals. 2014. 47(1), 79-96.

12. Kennedy, S., Trofimovich, P. Language awareness and second language pronunciation: A classroom study. Language Awareness. 2010. 19(3), 171–185. https://doi.org/10.1080/09658416.2010.486439

13. Kivistö de Souza, H. Phonological awareness and pronunciation in a second language. Unpublished doctoral dissertation. University of Barcelona, Barcelona, Spain; 2015.

14. Kivistö de Souza, H. Consciência fonológica In: Investigando os sons de línguas não nativas: Uma introdução.1 ed.: Editora da Abralin, 2021, v.1, p. 153-174.

15. Kivistö de Souza, H., & Lintunen, P. "Thinking about your pronunciation": Examining phonological self-awareness with a novel task. In Henderson, A., Kirkova-Naskova, A. (Eds.), Proceedings of the 7th International Conference on English Pronunciation: Issues and Practices, 2023. pp. 138-148. https://hal.science/EPIP

16. Kivistö de Souza, H., & Lintunen, P. Focus on phonetic form: Examining noticing the gap in L2 pronunciation instruction. Manuscript in preparation.

17. Krashen, S. Principle and practice in second language acquisition. Oxford: Pergamon Press; 1982.

18. Leech, G., Rayson, P., Wilson, A. Word frequencies in written and spoken English: based on the British National Corpus. Longman, London; 2001. ISBN 0582-32007-0

19. Lemhöfer, K., Broersma, M. Introducing LexTALE: A quick and valid lexical testcfor advanced learners of English. Behavior Research Methods. 2012. 44, 325–343. http://dx.doi.org/10.3758/s13428-011-0146-0

20. Levis, J. Changing contexts and shifting paradigms in pronunciation teaching. TESOL Quarterly. 2005. 39 (3), 369–377.

21. Lintunen, P. Pronunciation and Phonemic Transcription: a Study of Advanced Finnish Learners of English. Turku: University of Turku; 2004.

22. Major, R. C. English voiceless stop production by speakers of Brazilian Portuguese. Journal of Phonetics. 1987. 15(2), 197-202.

23. Morris-Wilson, I. English Segmental Phonetics for Finns. Oulu: Oulu University Press; 2004.

24. Munro, M. J., Derwing, T. M. Foreign accent, comprehensibility and intelligibility in the speech of second language learners. Language Learning. 1995a. 45, 73–97. 10.1111/j.1467-1770.1995.tb00963.x https://doi.org/10.1111/j.1467-1770.1995.tb00963.x

25. Munro, M. J., Derwing, T. M. Processing Time, Accent, and Comprehensibility in the Perception of Native and Foreign-Accented Speech. Language and Speech. 1995b. 38(3), 289–306. https://doi.org/10.1177/002383099503800305

26. Munro, M., Flege, J., Mackay, I. The effects of age of second language learning on the production of English vowels. Applied Psycholinguistics. 1996. 17(3), 313-334. doi:10.1017/S0142716400007967

27. Paananen, M. Difficulties in English obstruents experienced by Finnish school children. In J. Järvikivi, J. Heikkinen, editors. Out Loud: Papers from the 19th meeting of Finnish phoneticians. Joensuu: University of Joensuu; 1999. p. 86–100.

28. Peltola, M. S., Kujala, T., Tuomainen, J., Ek, M., Aaltonen, O., Näätänen, R. Native and foreign vowel discrimination as indexed by the mismatch negativity (MMN) response. Neuroscience letters. 2003. 352(1), 25-28.

29. Piske, T. Phonetic awareness, phonetic sensitivity and the second language learner. In J. Cenoz, N. H. Hornberger, editors. Encyclopedia of language and education Vol. 6: Knowledge about language New York: Springer Science; 2008. p. 155-166.

30. Robinson, P. Attention and memory during SLA. In C. Doughty, M. Long, editors. The handbook of second language acquisition New York: Blackwell; 2003. p. 631-678.

31. Rosa, E., O'Neill, M. Explicitness, intake, and the issue of awareness. Studies in Second Language Acquisition. 1999. 21, 511-556.

32. Saito, K. What characterizes comprehensible and native-like pronunciation among English-as-a-second-language speakers? Meta-analyses of phonological, rater, and instructional factors. TESOL Quarterly. 2021. 53(3), 866–900. https://doi.org/10.1002/tesq.3027

33. Schmidt, R. Attention, awareness, and individual differences in language learning. In W. M. Chan, S. Chi, K. N. Cin, J. Istanto, M. Nagami, J. W. Sew, T. Suthiwan, I. Walker, editors. Proceedings of CLaSIC 2010, Singapore, December 2-4 Singapore: National University of Singapore, Centre for Language Studies; 2010. p. 721-737.

34. Schmidt, R. W. The role of consciousness in second language learning. Applied linguistics. 1990. 11(2), 129-158.

35. Schmidt, R., Frota, S. Developing basic conversational ability in a second language: A case study of an adult learner. In R. Day, editor. Talking to learn: Conversation in second language acquisition. Rowley, MA: Newbury House; 1986. p. 237-369.

36. Silveira, R., Zimmer, M., Alves, U. Pronunciation Instruction for Brazilians: Student Book. New Castle upon Tyne, UK: Cambridge Scholars Publishing; 2009.

37. Suomi, K. Voicing in English and Finnish Stops: a typological comparison with an interlanguage study of the two languages in contact. Turku: University of Turku; 1980.

38. Taavitsainen, I., Pahta, P. English in Finland: Globalisation, language awareness and questions of identity. English Today. 2003. 19(4), 3-15.

39. Teló, C., Trofimovich, P., O'Brien, M. Disentangling professional competence and foreign accent. Journal of Second Language Pronunciation. 2022. Published online 29 September 2022. https://doi.org/10.1075/jslp.22013.tel

40. Tergujeff, E. Intelligibility and the gravity of segmental deviations in L1 Finnish speakers' L2 English. In T. Seppälä, S. Lesonen, P. Iikkanen, S. D'hondt, editors. Language, Change and Society. Jyväskylä: AFinLA; 2022. p. 307–324

41. VanPatten, B. Input processing and grammar instruction in second language acquisition. Norwood: Ablex Publishing; 1996.

42. White, J., Ranta, L. Examining the interface between metalinguistic task performance and oral production in a second language. Language Awareness. 2002. 11, 259-290.

43. Wiik, K. Finnish and English vowels. Turku: University of Turku; 1965.

44. Wrembel, M. Metaphonological awareness in multilinguals: A case of L3 Polish. Language Awareness. 2015. 24(1), 60-83.

45. Ylinen S, Uther M, Latvala A, Vepsäläinen S, Iverson P, Akahane-Yamada R, Näätänen R. Training the brain to weight speech cues differently: a study of Finnish second-language users of English. J Cogn Neurosci. 2010 Jun;22(6):1319-32. doi: 10.1162/jocn.2009.21272. PMID: 19445609.