Understanding Discriminative Difficulties in Perceiving English Vowel Minimal Pairs

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概　要

学習者の実際のパフォーマンスと自己評価に基づき、英語の8つの母音のミニマルペアー（最小対立）の識別の難易度に関する調査を行った。分散分析ならび多重比較検定の結果、日本人英語学習者は/ʌ/－/ɑ/や /ɔ:/－/ou/のミニマルペアーの識別を難しいと感じていること等が明らかになった。さらに、学習者の実際のパフォーマンスと自己評価の間のギャップの大きさを調べたが、相関分析により/æ/－/ʌ/ は相対的にギャップが大きいミニマルペアーで、また、/i/－/i:/ は相対的にギャップが小さいミニマルペアーであること等が明らかになった。

Background

Most books of English phonetics and pronunciation practice have sections of minimal pairs (e.g. Takebayashi et. al 1998 and Kawagoe 1999). Although this does not necessarily suggest that minimal pairs are the most important in teaching English pronunciation, it can be at least understood that their value is widely recognized. Actually there are a number of studies which show how to use minimal pairs in the classroom (e.g. Avery & Ehrlich 1992 and Celce-Murcia 1996), but it can be claimed that they are not empirically-researched and much of the nature of learning and teaching minimal pairs remains unexplored. Review of the literature shows, for example, that the following fundamental questions have not been fully answered yet:

1) What types of minimal pairs are the most difficult and the easiest for Japanese learners of English to discriminate when exposed to them?
2) What types of minimal pairs are the most difficult and the easiest for Japanese learners of English to discriminate when pronouncing them?
3) What are the relationships between discriminative abilities to perceive and pronounce minimal pairs?
4) What types of instructions are the most effective for developing learners' discriminative abilities to perceive minimal pairs?

5) What types of instructions are the most effective for developing learners' discriminative abilities to pronounce minimal pairs?
6) How big are gaps between learners' self-evaluation and actual performance in discriminating minimal pairs?
7) How big are gaps between learners' self-evaluation and actual performance in pronouncing minimal pairs?

Kawashima (2002) is an investigation which, targeting seven consonant minimal pairs, makes some contribution toward obtaining the answers to two of these questions; namely 1) and 6). This study suggests that two-alternative forced-choice identification tasks, which have been used in previous studies, can hardly measure discriminative difficulties of minimal pairs accurately, and that four-alternative ones be employed for that task. For this reason the study claims that even if subjects, who find themselves confident about sound discrimination, are successful in discriminating certain minimal pairs, there is always a 50% possibility that the success is accidental: they can wrongly respond to the articulated word in two-alternative forced-choice identification tasks. The study, thus using four-alternative forced-choice identification tasks, examines the discriminative difficulties of seven consonant minimal pairs and the magnitude of gaps between learners' self-evaluation and actual performance of discriminating them, and concludes that they may be described as in Figure 1 and Figure 2 respectively:

Figure 1: Continuum of Difficulty of Sound Discrimination

Difficult (/ʃi/−/si/=/l/−/r/=/dz/−/z/) (/n/−/ŋ//s/−/θ//b/−/v/) (/f/−/h/) Easy

(Discrimination difficulty in the middle division is found between /n/−/ŋ/ and /b/−/v/.)

Figure 2: Continuum of Magnitude of Gaps between Learners' Self-Evaluation and Actual Performance of Sound Discrimination

Big (/s/−/θ/ /dz/−/z/ /ʃi/−/si/ /f/−/h/) (/b/−/v/ ≒ l/−/r/ ≒ /n/−/ŋ/) Small

These figures only offer partial answers to the two fundamental questions above. In order to obtain perfect ones, more research must be conducted. The current study reports the results of one such research, which, using the same research framework, investigated the discriminative difficulties of vowel minimal pairs and the magnitude of gaps between learners' self-evaluation and actual performance of discriminating them.

Current Study

The research designs are presented below, and the results are reported and discussed.

1. Research Designs

1.1. Research Questions

The study, which deals with eight vowel minimal pairs (Nema 1986: /i/－/i:/, /æ/－/ɑ/, /ʌ/－/ɑ/, /æ/－/ʌ/, /ɔ:/－/ou/, /e/－/æ/, /ə:r/－/ɑ:r/ and /ʌ/－/ə:r/), includes three main research questions:

1) Which vowel minimal pair do learners feel the most difficult and easiest to discriminate?
2) Which vowel minimal pair are actually the most difficult and easiest to discriminate?
3) In which vowel minimal pair are the greatest and smallest gaps found between learners' self-evaluation and their actual performance?

1.2. Materials

A seven-point scale was used in order to measure learners' self-evaluation in discriminating the eight vowel minimal pairs. In the scale, 7 is the easiest, 4 normal and 1 the most difficult that learners feel in discriminating them (see Appendix A).

Special care was taken in order to measure learners' actual performance in discriminating the eight vowel minimal pairs more accurately. First, 40 sets of minimal pairs of different words were prepared (5 sets per pair). Second, four different combinations of three words were made for each set using these words, which were printed on research sheets. Third, in order to examine learners' sound discrimination ability, a combination of each set was chosen as the "answer", which was recorded into a cassette tape by a native male speaker of American English (see Appendix B).

1.3. Subjects

The subjects are the same as those of Kawashima (2002), in which 93 students of the faculty of technology at a national university and of a special school participated in this investigation.

1.4. Procedures

The investigation was conducted in the same final classes named "Comprehensive English" and "General English" in February as in Kawashima (2002). The subjects had received general instruction about English phonetics in classes from the onset of April in 1999 to the first of February in 2000. About forty minutes of each of the final classes were allotted for the investigation. The main procedures can be summarized as follows:

1) The subjects were given a research sheet and the final instruction about the difference in sound between the first minimal pair /i/−/i:/.
2) The subjects verified the difference and rated the subjective difficulty in discriminating it.
3) The subjects listened to the cassette tape twice and then chose the combination articulated.
4) The subjects repeated this process until the last minimal pair /ʌ/−/ə:r/.

2. Data Collection and Scoring

All the research sheets were collected. First, every mean score of the learners' self-evaluation of the difficulties in discriminating the eight vowel minimal pairs was calculated as well as its standard deviation, maximum and minimum.[1)] They are presented in Table 1, in which the greater the mean is, the easier learners feel in discriminating minimal pairs:

Table 1: Descriptive Statistics (Self-Evaluation of Sound Discrimination)

	/i/−/i:/	/æ/−/ɑ/	/ʌ/−/ɑ/	/æ/−/ʌ/	/ɔ:/−/ou/	/e/−/æ/	/ə:r/−/ɑ:r/	/ʌ/-/ə:r/
S.D.	1.369	1.557	1.297	1.494	1.579	1.411	1.572	1.514
Min.	1	1	1	1	1	1	1	1
Max.	7	7	7	7	7	7	7	7
Mean	5.409	4.452	2.667	4.505	3.086	3.516	3.914	3.892

Next, learners' actual performances were computed. Since five sets of minimal pairs of different words were used to measure the performance of discriminating one vowel minimal pair, first the mean score of the five sets and then its standard deviation, maximum and minimum were calculated. They are presented in Table 2, in which the greater the mean is, the easier it is to discriminate minimal pairs:

Table 2: Descriptive Statistics (Actual Performance of Sound Discrimination)

	/i/－/i:/	/æ/－/ɑ/	/ʌ/－/ɑ/	/æ/－/ʌ/	/ɔ:/－/ou/	/e/－/æ/	/ə:r/-/ɑ:r/	/ʌ/-/ə:r/
S.D.	0.155	0.128	0.227	0.182	0.241	0.207	0.260	0.187
Min.	1	1	1	1	1	1	1	1
Max.	5	5	5	5	5	5	5	5
Mean	0.931	0.927	0.323	0.925	0.587	0.665	0.705	0.839

3. Data Analysis

3.1. Analysis of Variance (Self-Evaluation of Sound Discrimination)

To identify which vowel minimal pair learners feel it the most difficult and easiest to discriminate, first each mean score in Table 1 was placed in order of magnitude. This continuum is presented in Figure 3:

Figure 3: Continuum of Mean Score (Self-Evaluation of Sound Discrimination)

	/ʌ/-/ɑ/	/ɔ:/-/ou/	/e/-/æ/	/ʌ/-/ə:r/	/ə:r/-/ɑ:r/	/æ/-/ɑ/	/æ/-/ʌ/	/i/－/i:/	
Low	(2.67)	(3.09)	(3.52)	(3.89)	(3.91)	(4.45)	(4.51)	(5.41)	High

In order to analyze[2] this continuum, One-Way Repeated Measures ANOVA was conducted. The basic results of the analyses are presented in Table 3:

Table 3: One-Way Repeated Measures ANOVA (Self-Evaluation of Sound Discrimination)

	df	SS	MS	F-Value	P-Value	G-G	H-F
Subject	92	733.866	7.977				
Mean Score	7	490.172	70.025	51.696	.0001	.0001	.0001
Subject×Mean Score	644	872.328	1.355				

Epsilon Factors for df Adjustment (G-G Epsilon = .804, H-F Epsilon = .862)

This table shows that the mean scores more or less vary statistically across the eight vowel minimal pairs and that a certain order of difficulty does exist in the sound discrimination based upon learners' self-evaluation [$F(7, 644)=51.696$, $p=.0001$]. In order to clarify it, multiple comparisons by contrast were conducted between adjacent pairs of the mean scores in Figure 3. The basic results of the analyses are presented in Table 4:

Table 4: Multiple Comparisons by Contrast (Self-Evaluation of Sound Discrimination: Adjacent Pairs)

Pair			df	SS	MS	F-Value	P-Value	G-G	H-F
/ʌ/−/ɑ/	VS.	/ɔ:/−/ou/	1	8.177	8.177	6.037	.0143	.0201	.0182
/ɔ:/−/ou/	VS.	/e/−/æ/	1	8.602	8.602	6.351	.0120	.0173	.0155
/e/−/æ/	VS.	/ʌ/−/ə:r/	1	6.586	6.586	4.862	.0278	.0354	.0330
/ʌ/−/ə:r/	VS.	/ə:r/−/ɑ:r/	1	.022	.022	.016	.8998	.8525	.8686
/ə:r/−/ɑ:r/	VS.	/æ/−/ɑ/	1	13.441	13.441	9.923	.0017	.0034	.0028
/æ/−/ɑ/	VS.	/æ/−/ʌ/	1	.134	.134	.099	.7529	.6948	.7137
/æ/−/ʌ/	VS.	/i/−/i:/	1	37.935	37.935	28.006	.0001	.0001	.0001

This table shows that statistically significant difference in mean score is found between /ʌ/−/ɑ/ and /ɔ:/−/ou/ (p=.0143), between /ɔ:/−/ou/ and /e/−/æ/ (p=.0120), between /e/−/æ/ and /ʌ/−/ə:r/ (p=.0278), between /ə:r/−/ɑ:r/ and /æ/−/ɑ/ (p=.0017), and between /æ/−/ʌ/ and /i/−/i:/ (p=.0001). This result suggests two points, for example, firstly that learners feel it the most difficult to discriminate /ʌ/−/ɑ/ and the easiest to discriminate /i/−/i:/ of the eight vowel minimal pairs, and then secondly, that they feel that /ʌ/−/ə:r/ and /ə:r/−/ɑ:r/, and /æ/−/ɑ/ and /æ/−/ʌ/ are the same in terms of discrimination difficulty. This leads to Figure 4, in which a continuum of the difficulty of sound discrimination based upon learners' self-evaluation is presented in six divisions:

Figure 4: Continuum of Difficulty of Sound Discrimination Based upon Self-Evaluation

/ʌ/-/ɑ/ > /ɔ:/-/ou/ > /e/-/æ/ > (/ʌ/-/ə:r/=/ə:r/-/ɑ:r/) > (/æ/-/ɑ/=/æ/-/ʌ/) > /i/-/i:/

Great (2.67) (3.09) (3.52) (3.89) (3.91) (4.45) (4.51) (5.42) small

3.2. Analysis of Variance (Actual Performance of Sound Discrimination)

To identify which vowel minimal pair is the most difficult and easiest to discriminate, first each mean score in Table 2 was placed in order of magnitude. This continuum is presented in Figure 5:

Figure 5: Continuum of Mean Score (Actual Performance of Sound Discrimination)

/ʌ/-/ɑ/ /ɔ:/-/ou/ /e/-/æ/ /ə:r/-/ɑ:r/ /ʌ/-/ə:r/ /æ/-/ʌ/ /æ/-/ɑ/ /i/−/i:/

Low (0.32) (0.59) (0.67) (0.71) (0.84) (0.93) (0.93) (0.93) High

In order to analyze this continuum, One-Way Repeated Measures ANOVA was conducted. The basic results of the analyses are presented in Table 5:

Table 5: One-Way Repeated Measures ANOVA (Actual Performance of Sound Discrimination)

	df	SS	MS	F-Value	P-Value	G-G	H-F
Subject	92	4.566	.050				
Mean Score	7	29.743	4.249	106.9	.0001	.0001	.0001
Subjects × Mean Score	644	25.597	.040				

Epsilon Factors for df Adjustment (G-G Epsilon=.797, H-F Epsilon=.855)

This table shows that mean scores more or less vary statistically across the eight vowel minimal pairs and that a certain order of difficulty does exist in sound discrimination [F(7, 644)=106.9, p=.0001]. In order to clarify it, multiple comparisons by contrast were conducted between adjacent pairs of the mean scores in Figure 5. The basic results of the analyses are presented in Table 6:

Table 6: Multiple Comparisons by Contrast (Actual Performance of Sound Discrimination: Adjacent Pairs)

Pair			df	SS	MS	F-Value	P-Value	G-G	H-F
/ʌ/−/ɑ/	VS.	/ɔ:/−/ou/	1	3.254	3.254	81.856	.0001	.0001	.0001
/ɔ:/−/ou/	VS.	/e/−/æ/	1	.279	.279	7.012	.0083	.0129	.0114
/e/−/æ/	VS.	/ə:r/-/ɑr/	1	.078	.078	1.953	.1627	.1637	.1637
/ə:r/−/ɑ:r/	VS.	/ʌ/−/ə:r/	1	.827	.827	20.798	.0001	.0001	.0001
/ʌ/−/ə:r/	VS.	/æ/−/ʌ/	1	.344	.344	8.657	.0034	.0061	.0052
/æ/−/ʌ/	VS.	/æ/−/ɑ/	1	2.151E-4	2.151E-4	.005	.9414	.9026	.9158
/æ/−/ɑ/	VS.	/i/−/i:/	1	.001	.001	.022	.8831	.8310	.8480

This table shows that a statistically significant difference in mean score is found between /ʌ/−/ɑ/ and /ɔ:/−/ou/ (p=.0001), between /ɔ:/−/ou/ and /e/−/æ/ (p=.0083), between /ə:r/−/ɑ:r/ and /ʌ/−/ə:r/ (p=.0001), and between /ʌ/−/ə:r/ and /æ/−/ʌ/ (p=.0034). This result suggests, for example, 1) that /ʌ/−/ɑ/ is the most difficult to discriminate and /æ/−/ʌ/, /æ/−/ɑ/and /i/−/i:/ the equally easiest of the eight vowel minimal pairs, and 2) that /e/−/æ/ and /ə:r/−/ɑ:r/ are the same in terms of discrimination difficulty. This leads to Figure 6, in which a continuum of difficulty of sound discrimination is presented in five divisions:

Figure 6: Continuum of Difficulty of Sound Discrimination

/ʌ/-/ɑ/ >/ɔ:/-/ou/> (/e/-/æ/=/ə:r/-/ɑ:r/) >/ʌ/-/ə:r/> (/æ/-/ʌ/=/æ/-/ɑ/=/i/-/i:/)

Great	(0.32)	(0.59)	(0.67)	(0.71)	(0.84)	(0.93)	(0.93)	(0.93)	Small

3.3. Analysis of Correlation

In order to elucidate gaps between learners' self-evaluation and actual performance of sound discrimination, first their correlations were examined throughout the eight vowel minimal pairs. Table 7 presents correlation coefficients among the scores on Table 1 and Table 2, in which they are placed in order of magnitude:

Table 7: Correlations among the Scores of Learners' Self-Evaluation and Actual Performance of Sound Discrimination

Minimal Pair	Number	Correlation Coefficient	P-Value
/i/−/i:/	93	.35	.000
/æ/−/ɑ/	93	.19	.034
/ʌ/−/ɑ/	93	.26	.006
/æ/−/ʌ/	93	.14	.087
/ɔ:/−/ou/	93	.23	.015
/e/−/æ/	93	.20	.028
/ə:r/−/ɑ:r/	93	.36	.000
/ʌ/−/ə:r/	93	.24	.011

This table shows that learners' self-evaluation correlates significantly with their actual performance in discriminating the pairs:/i/−/i:/, /æ/−/ɑ/, /ʌ/−/ɑ/, /ɔ:/−/ou/, /e/−/æ/, /ə:r/−/ɑ:r/, /ʌ/−/ə:r/ (p=.000, .034, .006, .015, .028, .000, and .011 respectively). In order to understand such statistic significances clearly, next, the probabilities of concordance and discordance between two variables were calculated (Shiba and Haebara 1997). Table 8 presents how likely learners' self-evaluation may agree or disagree with their actual performance in discriminating the eight vowel minimal pairs:

Table 8: Probabilities of Concordance and Discordance between Learners' Self-Evaluation and Actual Performance of Sound Discrimination

Minimal Pair	Number	Probability of Concordance	Probability of Discordance
/i/－/i:/	93	.61	.39
/æ/－/ɑ/	93	.56	.44
/ʌ/－/ɑ/	93	.58	.42
/ɔ:/－/ou/	93	.57	.43
/e/－/æ/	93	.56	.44
/ə:r/－/ɑ:r/	93	.62	.38
/ʌ/－/ə:r/	93	.58	.42

This table shows that learners' self-evaluation agrees 61 times and disagrees 39 times out of 100 with their actual performance in discriminating /i/－/i:/; 56 agreements and 44 disagreements in discriminative /æ/－/ɑ/; and 58 agreements and 42 disagreements in discriminative /ʌ/－/ɑ/; 57 agreements and 43 disagreements in discriminating /ɔ:/－/ou/; and 56 agreements and 44 disagreements in discriminating /e/－/æ/; 62 agreements and 38 disagreements in discriminating /ə:r/－/ɑ:r/; and 58 agreements and 42 disagreements in discriminating /ʌ/－/ə:r/.

In order to examine the difference in magnitude among these seven probabilities of discordance, first, Cochran's Q test was conducted. The result is that the seven probabilities of discordance are more or less different in magnitude [χ^2 (6) = 24.21, p=.000]. Second, to spot such difference, multiple comparison tests were conducted, in which McNemar tests and Ryan's procedure were employed. The result is that statistically significant differences are found in probabilities of discordance between/ə:r/－/ɑ:r/ and any of /æ/－/ɑ/ and /e/－/æ/ (both p=.05). It follows from these examinations that learners' self-evaluation disagrees at almost the same rate with their actual performance in discriminating the seven vowel minimal pairs and that its rate is around 40%. Figure 7 presents in two divisions a continuum of magnitude of the gaps between learners' self-evaluation and actual performance in sound discrimination:

Figure 7: Continuum of Magnitude of Gaps between Learners' Self-Evaluation and Actual Performance of Sound Discrimination (Two Divisions)

Big　/æ/－/ʌ/　(/æ/－/ɑ/=/e/－/æ/　/ɔ:/－/ou/　/ʌ/－/ɑ/=/ʌ/－/ə:r/　/i/－/i:/　/ə:r/－/ɑ:r/)　Small

(The left division finds significant difference only between /ə:r/－/ɑ:r/ and any of /æ/－/ɑ/ and /e/－/æ/)

4. Summary & Discussion

4.1. Discrimination Difficulty

Figure 4 and Figure 6 show some obvious findings. First, the pairs /ʌ/−/ɑ/ and /ɔ:/−/ou/ are very difficult for the learners to discriminate, and the learners have a very strong feeling of difficulty about them. Especially, the difficulty of the former pair is worthy of attention. Second, there is no single easy pair: the three pairs /æ/−/ʌ/, /æ/−/ɑ/, /i/−/i:/ have the same discrimination difficulty, although the learners find it the easiest to discriminate /i/−/i:/. Thirdly, the difficulty of each of the three pairs with the phoneme /ʌ/ can be clearly described on the same single line, where /ʌ/−/ɑ/ is difficult, /ʌ/−/ə:r/ less difficult, and /ʌ/−/æ/ least difficult.

The findings which Figure 4 and Figure 6 present, including these three, are based upon actual data. Are there any systematic theories to reinforce them? To be sure, it is possible to offer a very limited explanation for the easy pair /i/−/i:/, for example, by claiming that the two phonemes are different both in length and sound and that their combination makes it easier for learners to discriminate the pair. Unfortunately, however, there seems to be no theory at present which can explain all the findings of the current study. Contrastive phonetics (Takebayashi 1996), for example, which generally holds that unfamiliar phonemes should be difficult for learners to discriminate, is no good. The sound system of the Japanese language does not include the phonemes in the current study, and all it claims is that they are just difficult. Contrastive phonetics does not offer any information about their internal difficulties.

Review of the literature shows that great efforts have been made in order to obtain a clear understanding of the acoustic characteristics of vowels using spectrographs. However, there has been no clear objective picture of English vowels which can quantitatively show the closeness in sound between certain vowels and others. If such a picture is obtained, it would be possible to give systematic explanations for the findings to a certain degree and to reach a higher understanding of discriminative difficulties in perceiving English vowel minimal pairs.

It is quite clear, however, that two types of approach are needed to understand discriminative difficulties in perceiving vowel minimal pairs: data-driven approach and theory-driven approach. Even if a clear objective picture of vowels which can quantitatively show the closeness in sound between certain vowels and others is obtained, it does not mean that the picture can completely describe discrimination difficulty in perceiving minimal pairs. It is quite conceivable that there would be some areas which theory-driven approach alone fails to explain. After all, combinations of two different approaches, which reinforce each other, would be the key to understanding of

discriminative difficulties in perceiving vowel minimal pairs. The current study holds that all of its findings reflect upon one aspect of its nature.

4.2. Gaps between Actual Performance and Self-Evaluation

Figure 7 is rather complicated, in the sense that the gaps can not be presented on the same single line. There are several obvious findings, however. One of them is that the minimal pair /æ/－/ʌ/ has the greatest gap between actual performance and self-evaluation. It can be assumed that since both Figure 4 and Figure 6 show that the pair is rather easy to discriminate, the gap between actual performance and self-evaluation of discriminating it should be relatively small, but as the results show, it is great. One possible reason for this could be that the subjects were overconfident about discriminating the pair.

It can be likewise assumed that since both Figure 4 and Figure 6 show that the pair /ʌ/－/ɑ/ is the most difficult to discriminate, the gap between actual performance and self-evaluation in discriminating it should be relatively small. The actual result is small as was assumed. It seems that the subjects were quite aware of the difficulty in discriminating the pair /ʌ/－/ɑ/.

The same kind of interpretation can be applied to the pair /ɔ:/－/ou/. According to Figure 4 and Figure 6, the pair is extremely difficult to discriminate, and the gap between actual performance and self-evaluation in discriminating it should be relatively small. The actual result is small, too, as was assumed. This may be because the subjects were quite aware of the difficulty in discriminating the pair /ɔ:/－/ou/, too.

One last pair to be discussed is the pair /i/－/i:/. Both Figure 4 and Figure 6 show that it is quite easy to discriminate, and the gap between actual performance and self-evaluation in discriminating it should be relatively small. The actual result is small, too, as was assumed. One possible reason for this could be that the subjects were quite aware of the difficulty in discriminating the pair /i/－/i:/, too.

The interpretations of the gap of the other pairs are not easy, because correspondences in pair among the three continuum in Figure 4, Figure 6, and Figure 7 are not very clear. Further studies are needed to understand them.

Concluding Remarks

The results of the current study should be viewed as tentative and must be reexamined from several experimental perspectives. First, more subjects must be used, and their backgrounds should be considered in terms of familiarity with the English

sound system. Second, the speed the subjects listen to combinations of three words must be controlled. Higher speed is considered to make it difficult for learners to discriminate minimal pairs. Third, voices of native speakers of English must be controlled. Subjects need to discriminate minimal pairs recorded by different native speakers of English. This may give some influence to the results. It is well known that some native speakers are more difficult or easier to understand than others. Further studies with these points in mind will take us closer to the complete map of discriminative difficulties of English vowel minimal pairs.

Notes

1) The software used for basic data processing is EXCEL STATISTICS (Version 5.0: Esumi)
2) The software applications used for data analysis are EXCEL STATISTICS (Version 5.0:Esumi) and SUPER ANOVA (Abacus Concepts, Inc.)

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Appendix A (a partial example)

/i/-/i:/の識別力に関して7段階で自己評価を行いなさい。
該当するところに○をつけなさい。

普通

最も難しい（ 1　2　3　4　5　6　7 ）最も易しい

Appendix B (a partial example)

テープから聞こえてくる単語の組み合わせを選び，
該当するものに○をつけなさい。

heart　heart　hurt　（　）
heart　hurt　heart　（　）
hurt　heart　hurt　（　）
hurt　hurt　heart　（　）

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