The Relationships between Test-Wiseness and the English Listening Test Scores

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Introduction

Background

Item response theory (IRT) models, which have been widely utilized in major language tests such as the TOEFL and TOEIC, are based on the premise that the measured ability is unidimensional. In other words, the premise is that only one underlying construct is to be measured by a set of items in a test. However, if we, for example, consider measuring listening comprehension ability, we can conceive of a large number of variables underlying that ability. Even though some researchers have stated that this assumption of unidimensionality cannot be strictly met because of several cognitive, personality, and test taking factors (e.g., Hambleton, Swaminathan and Rogers, 1991), it is important to understand what factors and how much they contribute to the test scores. These questions should come to mind every time we check the unidimensionality of the test data.

Buck (2001) has used a flow chart approach to describe the listening processes. First, the input is held briefly in echoic memory. At this stage affective factors, such as interest or motivation may strengthen or weaken the input. This input is processed in working memory by an executive processor, and then passed to long-term memory. There the input is compared to and synthesized with other types of knowledge including linguistic, contextual or relevant general knowledge, and the information is recycled as necessary (p. 26).

In this model, however, we can find several possible factors that are relevant to listening tests even though there is a dominant factor. For example, the test-takers who have more memory capacity will have an advantage over those who have smaller memory capacity. Test anxiety as well as background knowledge differences might affect comprehension. In addition, those who can utilize the knowledge of test-wiseness may score higher than those who cannot.

Thus, even though IRT model has an assumption of unidimensionality, and even though the assumption is fulfilled by the existence of a “dominant” factor, listening test scores might be

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affected by many irrelevant factors. To what degree do those factors affect test scores? The purpose of this study, therefore, is to examine especially the influence of test-wiseness factors, in other words, to what extent does test-wiseness is involved in listening ability. The answer to this question also shows us the degree of appropriacy using TOEFL or TOEIC to measure English listening ability.

Literature Review

Test-wiseness

Throndike (1951) first presented the concept of test-wiseness, and he discussed its influence on test reliability. Since then, test-wiseness has had an increasing interest among educational researchers. Some of them agreed and others disagreed about the nature of the construct and its relevance for test scores. According to Millman, Bishop and Ebel (1965), test-wiseness is "a subject's capacity to utilize the characteristics and formats of the test and/or the test taking situation to receive a high score" (p. 707). They also add that test-wiseness is logically independent of the examinee's knowledge of the subject matter for which the items are supposedly measures. In their paper, they summarized the references into 6 categories of strategies and described fully about each strategy with examples.

Though many of the studies on test-wiseness are extensive, most of them are about testing in general or L1 ability. In Brown (1998), Allan (1992) and his questionnaire are cited as one of the most important studies on test-wiseness in ESL testing among these. According to Allan (1992), test-wiseness is "the ability to use test-taking strategies to select the correct response in multiple-choice tests, without necessarily knowing the content or using the skill that is being tested" (p. 101). He developed a test-wiseness test based on the Millman, Bishop and Ebel inventory, and attempted its validation. He referred to Slater, Koehler, and Hampton (1970) in order to consider over whether he should use fictions information to create test-wiseness test items or not. After all, the test-wiseness test for ESL students (TOTWESL) was created. It consists of 33 items representing 11 strategies, and was administered to ESL students in Hong Kong. 3 categories in the test were taken from the Millman, Bishop and Ebel inventory of test-wiseness (Millman, Bishop, & Ebel, 1965). TOTWESL showed reasonable internal consistency. However, the results showed that the students are differentially skilled in test taking and that the scores of some learners may be influenced by skills which are not the focus of the test.

Nevo (1989) conducted a study of the effect of test-taking strategies on language testing. Forty-two tenth grade students of French, whose first language was Hebrew, took a multiple-choice reading comprehension test in both languages. He concluded that it is possible to get feedback from the subjects about test-taking strategies, and that there was a transfer from L1 to

L2. Moreover, he finally found that both stimulus and response formats of the test influence the selection of strategies.

Cohen (1984) also conducted a study on test-taking strategies using self-reports. He asked many university students to report on how they take reading cloze and multiple-choice tests, and examined the fit with the intention of the test constructors. He pointed out several methodological problems which self-report approaches have, and concluded that some items need to be revised for a closer fit.

Self-reporting seems a common approach to examine test-wiseness and test-taking strategies. However, it has methodological problems such as subjectivity and cognitive limitation on reporting while answering the questions as Cohen (1984) pointed out. Moreover, it is necessary to obtain quantitative data to examine the extent of the influence of test-wiseness on listening test scores. Therefore, the present research adopts the test of test-wiseness (TOTWESL) by Allan (1992) to investigate test-takers' use of test-wiseness.

Purposes of the Study

In the present research, therefore, I would like to examine the relationship between the test-takers' test-wiseness and their listening ability with the following purposes.

(a) Can we measure test-wiseness? Does TOTWESL work?

(b) Is there any relationship between test-wiseness and English listening ability?

Hypotheses

The following hypotheses are tested in order to answer the research questions raised in the previous section.

(a) We can measure test-wiseness fairly with TOTWESL as in Allan (1992).

(b) There is a significant relationship between test-wiseness and English listening ability.

Method

Participants

The participants are all 4-year university students majoring in various fields in Japan. Though 71 students participated, only 67 of them could be used for the data. It is because there are some students who were absent from one of the tests or who could not answer all the questions. They are all at the age of 18-20, and their proficiency is from the beginners to the lower intermediate level.

Carrying out this study on university students is proper because they are appropriate for test-takers. Since listening test items such as the ones included in TOEFL or TOEIC require a

certain level of listening ability, vocabulary, and other linguistic knowledge, they are not suitable for junior high school students, or even for many high school students.

Materials

Test of test-wiseness. TOTWESL test made by Allan (1992) was administered to Japanese university students, and the author examined its relationship with listening test scores. It consists of 33 items representing 11 strategies, and the 4 categories in the test are shown as examples below. Three of them were taken from the Millman, Bishop and Ebel inventory (Millman, Bishop, & Ebel, 1965). The sentences of the stems were provided with their translation in Japanese to avoid measuring the effect of participants' English reading ability (TOTWESL (Japanese version)).

Stem-options: 3. Charles Dickens' book 'Hard Times' is about

（チャールズ・ディケンスの本＝『ハード・タイムス』は……についてのものだ。）

(a) international finance in the modern world

(b) life in the twentieth century

(c) the adventures of a strong man

(d) the difficult life of a factory worker

Grammatical cues: 2. Mr. Brown's dismissal caused the union's Grievance Committee to

（ブラウン氏の免職は組合の苦情処理委員会の……をひき起こした。）

(a) complaint

(b) protest

(c) angry

(d) dismissed

Similar option: 16. The Karamajong tribesmen were easily frightened by the soldiers because they were

（カラマジョン族は兵隊を容易に恐れる。それは彼らが……だからだ。）

(a) not warlike

(b) non-aggressive

(c) peace-loving

(d) unarmed

Give away: 21. The Karamajong tribesmen were

（カラマジョン族は……だった。）

(a) vegetarians

(b) great story-tellers

(c) threatened by soldiers

(d) interested in the outside world

English listening test. Since the purpose of this study is to see the relationship between listening test scores and test-wiseness, the result of the scales for test-wiseness was analyzed its relationship with the listening test score.

For the listening test, the author used the listening section of TOEFL Sample Test (6th edition) published by Educational Testing Service (ETS). Though TOEFL is now being administered on computers as a computer-based test (CBT), the present study used its paper-pencil edition for the following reasons. First, it is meaningful for the author to use the questions in TOEFL since it employs IRT in the analyses. Secondly, each response data is not all available in TOEFL CBT since CBT provides different questions to the test-takers of different proficiency levels. Finally, it is not available for the calculation of personal research use yet. TOEFL sample test, paper-pencil version of TOEFL, was chosen for those reasons.

The paper-pencil version of TOEFL originally has three sections, (a) Listening Comprehension (50 items), (b) Structure and Written Expression (40 items), and (c) Reading Comprehension (50 items), but the present study utilizes only the listening section. The listening section of the test consists of 50 multiple-choice questions with four options. It will take about 35 minutes to finish all the listening section items.

In the first part of the listening section (Part A), participants are to hear short conversation between two people, and asked to choose the best answer to the question they have heard. Here is an example.

Example: (man) It's a beautiful day today. Want to go roller skating ?

(woman) Any other time would be great, but today I'm working on a paper.

(narrator) What does the woman mean ?

(A) She doesn't like roller skating.

(B) She's writing a story about roller skating.

(C) She's too busy to go roller skating.

(D) The man shouldn't be going roller skating.

In Part B, the participants hear longer conversations, and are asked to choose the answers to the questions they have heard.

Example: (man) Hey Sue, I was wondering if you could fill me in Monday's class. I had to go to the dentist for an emergency and I missed Professor Smith's lecture. What was it on?

(woman) I was pretty interesting. She talked about volcanoes, active volcanoes, under the ...uh, West Antarctic ice sheet.

(man) There are active volcanoes under the ice ?

(woman) Apparently so. She said they help protect the ice sheet and prevent melting. Flooding would be pretty bad if that ice melted not only there, but all over the world.

(man) You lost me there. Volcanoes are hot. How can something hot prevent ice from melting ?

(woman) Wait a minute. Let me check my notes...yeah, here it is. Volcanic heat melts just enough ice to create slippery surface on the bottom of the glacier. This water allows ice to flow out into the ocean, so the solid interior ice is protected from the ocean's warmth. Does that make sense ?

(man) Sort of. You mean that because the ice is flowing out to the ocean, the warmer ocean water can't flow in ?

(woman) Exactly. And the ice that melts is constantly being replaced by snow. Professor Smith said if the ice sheet ever broke up and melted, the sea level would go up seven meters. Then we'd have those floods.

(man) Is that really possible, or is it one of those exaggerations you hear all the time ?

(woman) As far as I can understand, it is possible because of Global warming. I mean, if the ocean got a lot warmer, that interior ice would be very likely to melt.

(man) Thanks for telling me about the lecture. Sounds like I missed a pretty important class.

(narrator) Why did the man ask the woman about the lecture ?

(A) His lecture notes weren't very good.

(B) He didn't understand the lecture.

(C) He couldn't attend the lecture.

(D) His research was on the same topic as the lecture.

(three more questions on this conversation)

In the last part, Part C, the participants are to hear several short talks. After each talk, they choose the answers to the questions they have heard.

Example: (man) I'm sure almost every one of you looked at your watch or at a clock before you came to class today. Watches and clocks seem as much as part of our life as breathing or eating. And yet, did you know that watches and clocks were scarce in the United States until the 1850's ?

In the late 1700's, people didn't know the exact time unless they were near a clock. Those delightful clocks in the squares of European towns were built for the public - after all, most citizens simply couldn't afford a personal time piece. Well into the 1800's - in Europe and the United States, the main purpose of a watch, which, by the way, was often on a good chain, was to show others how wealthy you were.

The word "wristwatch" didn't even enter the English language until nearly 1900. By then the rapid pace of industrialization in the United States meant that measuring time had become essential. How could the factory worker get to work on time unless he or she knew exactly what time it was? Since efficiency was now measured by how fast a job was done, everyone was interested in time. And since industrialization made possible the manufacture of large quantities of goods, wristwatches become fairly inexpensive. Furthermore, electric lights kept factories going around the clock. Being on time had entered the language - and life - of every citizen.

(narrator) What does the professor mainly discuss?

(A) Reasons for increased productivity.

(B) How wristwatches are manufactured.

(C) The industrialization of the United States.

(D) The development of individual timepieces.

(three more questions on this talk)

Procedure

TOTWESL was administered in class on the same day after completing the listening section of TOEFL sample test. The relationships are examined by the correlations between the variables. All the data was input into the spreadsheets and analyzed using SPSS version 11.0. The result of TOTWESL (Japanese version), in other words, the participants' test-wiseness was correlated with the listening test scores in TOEFL sample test.

Results

Descriptive statistics

A test-wiseness test found in Allan (1992) was attempted on Japanese university students, but it shows low reliability (Cronbach alpha = .39). One possible explanation for this is that the test includes difficult words, and it was hard for them to understand though many students noticed the strategies in the test and obtained high scores. However, another possible explanation is that this test of test-wiseness taps many sides of the construct in various ways, and therefore, it lacks internal consistency. On the other hand, the listening section of TOEFL sample test showed enough reliability value in the present study (Cronbach alpha=.76).

Table 1
Descriptive Statistics for Each Measure

	N	Range	Minimum	Maximum	Mean	
					Statistic	Std. Error
TOTWESL	67	14	8	22	13.97	0.41
TOEFL	67	34	6	40	17.22	0.79

			Skewness		Kurtosis	
	Std. Deviation	Variance	Statistic	Std. Error	Statistic	Std. Error
TOTWESL	3.32	11.03	0.24	0.29	-0.57	0.58
TOEFL	6.46	41.69	1.06	0.29	1.81	0.58

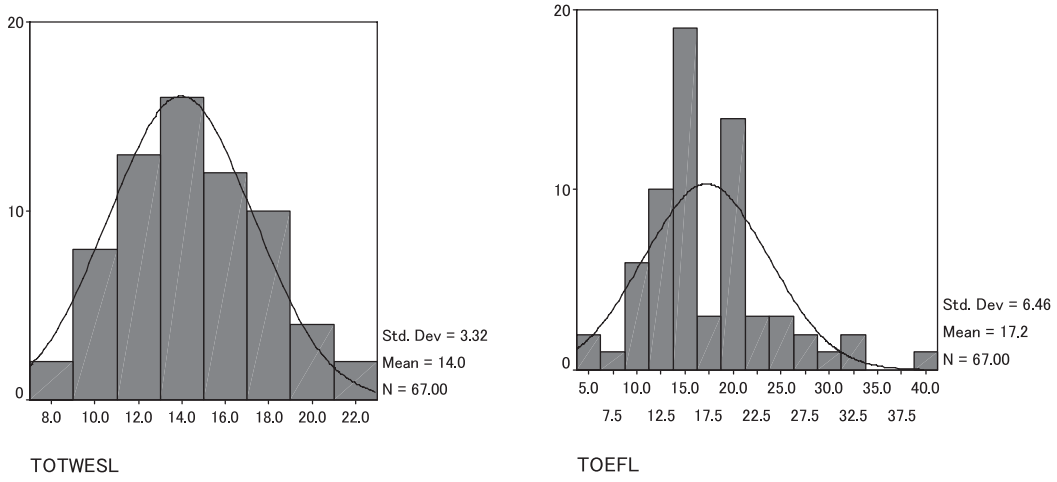

Figure 1. Distributions of the scores in each test

As it is shown in the tables and figures, TOTWESL (Japanese version) was not too difficult. As is shown in the figure and the values in kurtosis and skewness, the distribution is close to a normal distribution. However, as in the table and the graph, the listening section of TOEFL sample test was rather difficult. From the distribution, we can see that several participants found the test difficult. In fact, although the test was for intermediate or lower-intermediate learners, some participants were still at the beginner level.

Correlational analysis

As they are shown in Table 1 and Figure 2, the distribution of TOEFL listening test scores are positively skewed and shows leptokurtosis. Since correlational analysis requires a normal distribution of the data, some data transformation was attempted. Among all the methods presented in Tabachnick and Fidell (2001), the present study chose log10 transformation

described as:

$$NEWX=LOG10(X)$$

where:

NEWX is the value newly obtained by the transformation,

X is the raw score.

The descriptive statistics and the distribution of each measure after the transformation are shown below. And as they are shown in the table and figure, both skewness and kurtosis were improved, and they also passed the criterion provided by Tabachnick and Fidell (2001, p.72). It is especially noticeable that the distribution of the scores of the listening section of TOEFL sample test shows a normal curve.

Table 2
Descriptive Statistics for Each Measure after the Log Transformation

					Mean	
	N	Range	Minimum	Maximum	Statistic	Std. Error
TOTWESL	67	0.44	0.90	1.34	1.13	0.01
TOEFL	67	0.82	0.78	1.60	1.21	0.02

			Skewness		Kurtosis	
	Std. Deviation	Variance	Statistic	Std. Error	Statistic	Std. Error
TOTWESL	0.11	0.01	-0.24	0.29	-0.58	0.58
TOEFL	0.16	0.03	-0.26	0.29	0.67	0.58

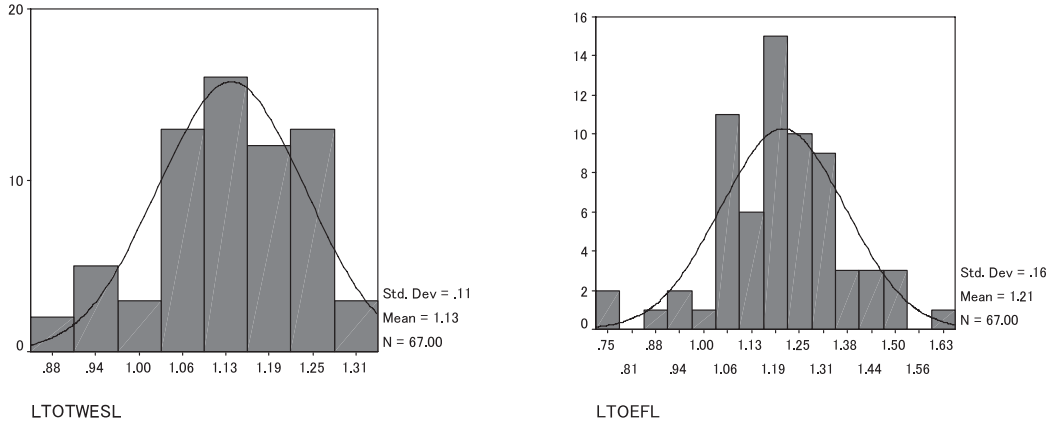

Figure 2. Distributions of the scores in each test after the log transformation

After the normalization, the data of test-wiseness (LTOTWESL) was correlated with the listening test score (LTOEFL), and as a result, we found a significant correlation (r=.38 p<.00). This probably means that the participant's test-wiseness measured in this test influences English listening scores. Judging from the value of the correlation, the score of the test-wiseness explains only 15% of the listening test score. However, it is surprising that we traced this relationship with the p-value lower than .00.

Table 3
Correlation between the Transformed Scores of TOTWESL (*Japanese version*) *and Those of the Listening Section of TOEFL Sample Test*

	LTOTWESL	LTOEFL （listening）
LTOTWESL		0.38**
LTOEFL （listening）		

** Correlation is significant at the 0.01 level(2-tailed)

Discussions

The results of the present study can be summarized as follows:

1. We could not obtain enough consistency in measuring test-wiseness.
2. There was a significant relationship between test-wiseness and English listening ability.

The first result was very unfortunate. TOTWESL (Japanese version) did not show enough internal consistency. This could be because the test was too difficult for them, or because TOTWESL (Japanese version) measured many aspects of test-wiseness inconsistently. In either way, more effort will be required to validate and improve the test.

Nevertheless, for the second result, it is reasonable and did not contradict our intuition. The participants' test-wiseness influences English listening scores. In other words, students with higher English ability utilized more of their knowledge of test-wiseness. Of course, there is a possibility that their English reading ability might have influenced the scores of TOTWESL this time. In other words, the students with higher English reading ability understood the items of TOTWESL better and utilize more of their knowledge of test-wiseness. However, in the present study, it is impossible to pursue this point since the author did not measure the participants' English reading ability. This could be one of the limitations in the present study.

It was predictable that the participant's test-wiseness influences English listening scores to some degree. Nevertheless, this turns into a more complicated problem since the participant's test-wiseness should not be included in English listening ability.

Bachman (1990, 1996) introduces the concepts, interactiveness and authenticity. Interactiveness is a function of the extent and type of involvement of the test taker's language

ability (language plus metacognitive strategies), and affective schemata in accomplishing a test task. On the other hand, authenticity is the degree of correspondence of the characteristics of a given language test task to the characteristics of a TLU (target language use) task. According to him, both of them are relative to construct validity and both are inversely proportional to each other. When interactiveness increases, in other words, non-linguistic factors are more involved, authenticity decreases. We need to conclude that the present research demonstrated that there is a certain degree of interactiveness in the listening test score.

Conclusion

There are some limitations of this study. First of all, it is regrettable that TOTWESL (Japanese version) did not show enough consistency. This problem will be improved through excluding or rewriting some items for Japanese students. The author should attempt an analysis by G-theory as for increasing the test reliability. Moreover, the listening test score data in the present study did not form a normal distribution at first. Though the data was normalized in order to execute the correlational analysis, it is desirable to have normal-distributed data from the first. With a bigger sample size, it will be possible. Finally, this is a one-shot experiment, and it is very important for us to take this result in a modest way. Though I do not yet have a definite idea on how we should consider the problem of construct validity related to the problem of test-wiseness, the results of the present study clearly have some suggestions on our item writing. We had better devise the test format and procedure so that the test-takers need not employ non-linguistic strategies such as test-wiseness.

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Appendix

Test of Test-wiseness

◎このテストには今まであなたが見たことも無いような単語が含まれています。しかし、あるスキルとコツで回答できる問いです。

各問に選択肢は 4 つあり、1 つだけが正解となります。解答用紙中の正しいと思った選択肢の記号を○で囲んでください。

1. The doctor who discovered the cause of leprosy was Hansen. This horrifying disease which has ruined the lives of thousands of people is sometimes known as

（ライ病の原因を発見した医者はハンセンである。何千人もの命を奪ったこの恐ろしい病気は…としても知られている。）

(a) Dr. Joseph Lister's Disease
(b) Schuweitzer's Complaint
(c) Dr. Elizabeth Blackwell's Syndrome
(d) Hansen's Disease

2. Mr. Brown's dismissal caused the union's Grievance Committee to

（ブラウン氏の免職は組合の苦情処理委員会の……を引き起こした。）

(a) complaint
(b) protest
(c) angry
(d) dismissed

3. Charles Dickens' book 'Hard Times' is about

（チャールズ・ディケンスの本『ハード・タイムス』は……についてのものだ。）

(a) international finance in the modern world
(b) life in the twentieth century
(c) the adventures of a strong man
(d) the difficult life of a factory worker

4. This connoisseur does not collect objects like these because they

（この鑑定家はこのようなものは集めない。なぜならそれらは……だからだ。）

(a) are not precious
(b) do not have much value
(c) are nearly worthless
(d) are quite common

5. The bark of the silver birch tree
（シダレカバの樹皮は……だ。）

(a) is dark and smooth
(b) is thick and rough
(c) appears to shine in the sun
(d) cannot be easily removed

6. Elizabeth Blackwell was
（エリザベス・ブラックウェルは……だ。）

(a) a doctor
(b) a writer
(c) a politician
(d) a musician

7. Of all the board games, Caissa's is
（全てのボードゲームの中でカイサスは……だ。）

(a) the least difficult to play
(b) the easiest to play
(c) a game for those who do not like hard games
(d) mentally challenging

8. He explained that 'dormilona' referred to a
（彼は「ドーミローナ」とは……のことだと説明した。）

(a) inner pain
(b) undeveloped thought
(c) sensitive plant
(d) uneasy sleeper

9. Everyone agrees that he is a similitude of his father. This means
（彼が彼の父親にそっくりだということには誰もが同意する。これは……という意味である。）

(a) he looks like his father
(b) he is influenced by his father
(c) he obeys his father
(d) he works for his father

10. There are many osteomancers but only one of them
（整骨士はたくさんいるが、そのうち一人だけが……だ。）

(a) solve our problem
(b) help us to attain our ambition
(c) explains what we want to know
(d) cure our illness

11. Someone suffering from hemeralopia
（昼盲症で苦しむ人は……だ。）

(a) seldom has trouble seeing in daylight
(b) usually has trouble seeing in daylight
(c) rarely has trouble seeing in daylight
(d) infrequently has trouble seeing in daylight

12. A silver birch is a
（シダレカバは……だ。）

(a) valuable racehorse
(b) tree
(c) treasure
(d) rare type of dog

13. He is suffering from malacia so he
（彼は香辛料嗜癖に苦しんでいる。だから、彼は……だ。）

(a) often desires spiced food
(b) unceasingly desires spiced food
(c) constantly desires spiced food
(d) always desires spiced food

14. When you see a marinorama you are looking at a
（マリノラマを見るということは……をみることだ。）

(a) small animal
(b) part of the night sky
(c) panoramic view of the sea
(d) long building

15. The most common form of recreation in Erewhon is
（エレウォンでの最も一般的な娯楽は……だ。）

(a) computer games
(b) outdoor games
(c) electronic games
(d) automated TV games

16. The Karamajong tribesmen were easily frightened by the soldiers because they were
（カラマジョン族は兵隊を容易に恐れる。それは彼らが……だからだ。）

(a) not warlike
(b) non-aggressive
(c) peace-loving
(d) unarmed

17. The Olympian did not win because he
（そのオリンピック選手は勝たなかった。なぜなら……だったからだ。）

(a) did not train hard enough
(b) misjudged her jump
(c) jumped badly
(d) did not jump properly

18. Caissa invented a
（カイサは……を発明した。）

(a) machine
(b) game
(c) program
(d) medicine

19. Malacia is a
（香辛料嗜癖は……だ。）

(a) spiteful person
(b) kind of bamboo
(c) town in Spain
(d) human disorder

20. A writer who composes a cycle of legends is
（時代の伝説を記録する人は……だ。）

(a) a storyteller
(b) a narrator
(c) a cyclographer
(d) an authority

21. The Karamajong tribesmen were
（カラマジョン族は……だった。）

(a) vegetarians
(b) great story-tellers
(c) threatened by soldiers
(d) interested in the outside world

22. The boy who rescued his sister from drowning was
（妹がおぼれているのを助けた少年は……だ。）

(a) fearless
(b) bravely
(c) gratitude
(d) survived

23. The student practiced by auscultating an
（その学生は……を聴診することで練習を積んだ。）

(a) wise, older person
(b) radio program
(c) writing exercise
(d) empty box

24. Sidney and Beatrice Webb wrote many epistles to each other so they were skilled in the art of
（シドニーとベアトリスは書簡を多く書いたので、……が上達した。）

(a) reading books
(b) epistolography
(c) drawing
(d) speech-making

25. The book stated that all kinds of amphicrania
（その本は全ての両側性頭痛は……だと述べている。）

(a) costs more than most people can afford
(b) is worth investigating
(c) has great importance
(d) are to be taken seriously

26. The hunters chose that part of the forest because it
（猟師達は森のその部分を選んだ。なぜならそこは……だったからだ。）

(a) was rich in animal life
(b) was legal to hunt there
(c) sheltered many animals
(d) contained a lot of potential prey

27. The use of a chemical agent to obtain a result usually obtained by surgery is referred to as
（通常手術によって得られる結果を得るのに化学薬品を使用することを……という。）

(a) preventive surgery
(b) heroic surgery
(c) chemosurgery
(d) cosmetic surgery

28. The dispute between the two countries was settled by an
（その２カ国間の論争は……によって解決された。）

(a) diplomatic intervention
(b) peace treaty
(c) elected commission
(d) series of negotiations

29. The Boating Club is
（そのボートクラブは……にある。）

(a) in Tall Tree Road
(b) at the end of West Avenue
(c) at the corner of High Street and Broad Street
(d) in Riverside Way

30. Hemeralopia is a
（昼盲症は……である。）

(a) visual problem
(b) low blood count
(c) calorie deficiency
(d) breathing difficulty

31. Sidney Webb’s wife was called
（シドニー・ウェッブの妻は……と呼ばれていた。）

(a) Annette
(b) Beatrice
(c) Angela
(d) Caissa

32. The Saint Andrew Society headquarters are situated in
（聖アンドリュー協会の本部は……にある。）

(a) Liberty Plaza
(b) Andrew Street
(c) Independence Square
(d) Capital Avenue

33. Amphicrania is clearly described in
（両側性頭痛については……に明確に描写されている。）

(a) a series of newspaper articles
(b) a letter
(c) a series of TV program
(d) a book