A Comparison of Spelling Test Formats Among Japanese EFL Learners for Diagnostic Purposes

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Abstract

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Japanese EFL Learners for Diagnostic Purposes

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This study investigated effective test formats assessing Japanese EFL learners' spelling knowledge, focusing on task differences. Formats of diagnostic spelling tests in previous studies varied, assessing dimensions of vocabulary knowledge in relation to cognitive aspects or proficiencies. However, because spelling knowledge must be measured with specially designed tasks, this study examined and compared spelling test formats in previous studies and developed several tasks to identify weaknesses of spelling knowledge in the aspect of vocabulary knowledge for diagnostic purposes.

Each word has three symbolic codes related to "form and meaning" (Nation, 2001): sound (pronunciation), letter (spelling), and meaning (comprehension). The tests developed for this research targeted spelling knowledge as well as sound and meaning. A series of experiments using target words from junior and senior high curricula reveals that most participants accurately pronounced and defined despite almost half being unable to write the correct spellings. The results also indicated that "implicational scaling" (Hatch & Lazaraton, 1991) is appropriate for defining task difficulties.

The thesis concluded that lack of spelling knowledge in EFL learners is a crucial problem—educational researchers need diagnostic tests and effective

instructional program. Without correct spellings, written communication would be ineffectual; thus, we should not view spelling knowledge as a minor skill in language acquisition.

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Chapter 1   Introduction

1.1 Background

Although accurate spelling is a very important literacy skill among native English speakers, in L2 or EFL, spelling receives much less attention than vocabulary acquisition, reading comprehension, or writing skills. Classified as an alphabetic writing system—having strong relationships with sounds as well as letters—English spelling rules contain many exceptions and are complicated compared to other language writing systems. The rules of sound-letter correspondences are essential to read (i.e., pronounce) and write (i.e., spell) words. In English-speaking countries, spelling skill is an important, basic, and essential skill; thus it is considered a "major facet of literacy (e.g., Allred, 1984; Pollo, Treiman, & Kessler, 2008)."

Spelling acquisition in the early stages of language learning has been widely studied (e.g., Bruck & Treiman, 1990; Drake & Ehri, 1984; Ehri, 1997; Ehri & Wilce, 1987; Harley, 2001; Griffith, 1991; Stanovich, Cunningham, & Cramer, 1984; Stuart & Masterson, 1992; Treiman & Bourassa, 2000a; Yopp & Yopp, 2000). Studies of spelling acquisition in L2 or EFL are fewer in English-speaking countries. As Mori (2007) pointed out, spelling ability does not draw much attention compared to the other aspects of language acquisition, such as reading. Given that even children whose native language is English have difficulty acquiring English spelling rules, it is reasonable to assume that learners of English as a second/foreign language must make considerable effort to acquire rules of English spelling. Researchers of second/foreign languages seemed to have paid little attention to spelling acquisition because this skill

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seems to be too basic. However, acquiring spelling rules is quite important in English acquisition.

Spelling knowledge has often been classified as a sub-skill of writing ability and categorized in the "mechanics of writing" in writing evaluation standards. However, in a certain case, the purpose of evaluating learners' writing performance is to check whether they can write and express their idea about the given topics. If the spelling skill is not a main target in the research, spelling errors are considered as minor errors and those errors do not affect their writing test scores. Moreover, while writing, learners tend to choose only words with which they feel confident in using (i.e., choosing those words that he or she knows to spell). That is to say, the relationship between the quality of spelling in writing and performance of spelling is not consistent (e.g., Croft, 1982). Thus, when we determine learners' spelling acquisition, we should not use writing tests in substitution for spelling tests, but employ certain spelling tests. Evaluating writing tests has a little chance of precisely evaluating learners' spelling skills due to the different purpose of assessing learners' abilities.

The purposes of this research are (a) to investigate the spelling acquisition of English words among Japanese EFL learners using various spelling tests and (b) to verify the task difficulties among English spelling tasks with implicational scaling by comparing the test performance.

1.2 Organization of the Dissertation

This research involved a series of experiments to examine various spelling test formats among Japanese EFL learners and investigated the task difficulties of each task with using implicational scaling.

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This dissertation consists of eight chapters:

Chapter 1 gives a brief background for this research and summarizes the entire project.

Chapter 2 summarizes previous studies related to diagnostic spelling tests: first, the characteristics of the language tests (2.1); second, the aspects of vocabulary knowledge based on Nation's (1990, 2001) definition (2.2); third, the types of the spelling tests or the theories of spelling acquisition (2.3); fourth, the purpose of this dissertation and the research questions (2.4).

Chapter 3 examines several spelling test formats (i.e., story form, timed dictation, list form, and multiple-choice) derived from previous studies to show whether the consistent results can be found in L2/EFL learners.

Chapter 4 also examines several types of spelling test formats (i.e., story form, timed dictation, list form, multiple-choice, and matching task) in order to compare the learners' performances with the results of Chapter 3. The participants in Chapter 3 were high school students; the participants in this chapter were university students.

Chapter 5 examines the test formats from Nation's (2001) suggestion to develop twelve spelling tests (i.e., six recall tasks and six recognition tasks) focusing on aspects of vocabulary knowledge and the task types. University students participated in this study.

Chapter 6 summarizes the results of studies 1, 2, and 3, and compares them with the study in this chapter. Study 4 uses twelve spelling tests (i.e., six recall tasks and six recognition tasks).

Chapter 7 examines ten test formats (i.e., six recall tasks and four recognition tasks) based on the results from Chapters 5 and 6. The six test

formats in the recognition tasks were modified and reconstructed with four test formats. Various types of English words' spellings are examined through chapters 5, 6, and 7).

Chapter 8 summarizes the findings of all experiments, providing implications, limitations, and suggestions for further research.

1.3 Summary of Chapter 1

This chapter provided a brief background of the research and explained the purpose of the dissertation. The next chapter summarizes and gives detailed explanations of previous studies and provides several test formats that are related to this research.

Chapter 2   Literature Review

2.1 Characteristics of the Language Tests

2.1.1 NRTs and CRTs

This section briefly summarizes the types of the language tests and their development. According to Brown (1996), there are two families of tests: norm-referenced tests (NRTs) and criterion-referenced tests (CRTs). Currently, the distinctions between these are considered important in educational and psychological measurement (Brown, 1996); therefore, we should not discuss language tests without noting these distinctions: NRTs are designed to measure overall language abilities such as English language proficiency, academic listening ability, or reading comprehension. CRTs are usually conducted to measure specific instructional goals during the language course; that is, tests that can be categorized as CRTs are given to the learners by the end of the course or the end of the term in order to check whether the test-takers acquired the contents of the course. Looking at the detailed examples of NRTs and CRTs will be more helpful to understand their characteristics.

The tests in language programs can be categorized into four broad types (Brown, 1996): proficiency, placement, diagnostic, and achievement. In some cases, progress tests are also included (Alderson, Clapham, & Wall, 1995). Each test has different objectives. Proficiency tests and placement tests are categorized as NRTs, and diagnostic tests and achievement test are categorized as CRTs. Table 2.1 shows the differences between NRTs and CRTs, which were summarized in Brown (1989, 1990, 2008). Table 2.1 describes the five characteristics of NRTs and CRTs: type of measurement, type of interpretation,

score distribution, purpose of testing, and knowledge of questions.

Table 2.1

Differences Between Norm-Referenced Tests (NRTs) and

Criterion-Referenced Tests (CRTs) (Brown, 1989, 1990, 2008)

Characteristic	NRT (e.g., proficiency tests, placement tests)	CRT (e.g., diagnostic tests, achievement tests)
(1) Type of Measurement	To measure general language abilities or proficiencies.	To measure specific objectives-based language points.
(2) Type of Interpretation	Relative (a student's performance is compared to that of all other students).	Absolute (a student's performance is compared only to the amount, or percent, of material learned).
(3) Score Distribution	Normal distribution of scores around a mean.	If all students know all of the material, all should score 100%.
(4) Purpose of Testing	Spread students out along a continuum of general abilities or proficiencies.	Assess the amount of material known, or learned, by each student.
(5) Knowledge of Questions	Students have little or no idea what content to expect in the questions.	Students know exactly what content to expect in test questions.

The first is the content test characteristic, "type of measurement": the NRTs measure general language abilities or proficiencies; CRTs measure specific objective-based language skills. Second, the "type of interpretation" can be relative or absolute: NRTs' type is relative, which means test-takers' performance is compared to the performance of all other students; CRTs' type of interpretation is absolute, which means that test-takers' performance is compared only to the amount or percent of material. Third is "score distribution": NRTs' normal

distribution of scores around a mean is expected. However, in CRTs, normal distribution of scores is not expected because if all students know the tested material, they all should score 100%, which means that all test-takers can answer the test. Fourth, "purpose of testing" is different in NRTs and CRTs: in NRTs, the purpose of the test is to understand general abilities or proficiencies; CRTs are interested in assessing the amount of material that each student knows or learns. Fifth concerns the "knowledge of questions," that is test-takers' knowledge of what is going to be tested: concerning NRTs, test-takers have little or no idea of what is going to be tested. However, in CRTs, students know exactly the content of test questions. For instance, on TOEIC or TOEFL, learners do not know what kind of questions to expect; on the contrary, the contents of CRTs are easy to predict because students have already learned the materials and the purpose of testing is to examine whether they have learned the necessary material, as mentioned above.

In sum, the characteristics of NRTs and CRTs can be described as follows: NRTs assess learners' general abilities or proficiencies and are designed primarily to achieve the normal distribution of the test-takers' performances (Brown & Hudson, 2002). Tests assessing abstract language ability, such as overall ESL proficiency, lecture listening ability, and academic reading comprehension are called 'NRTs', and the examinee's score is called a relative 'decision' because the scores on NRTs describe an examinee's position within the normal distribution (i.e., bell curve). On the other hand, criterion-referenced tests (CRTs) are designed to assess learners' achievement in particular language programs. Compared to NRTs, CRTs focus on individuals.

2.1.2 Categories of Tests

In addition to the differences between norm-referenced tests (NRTs) and criterion-referenced tests (CRTs), it is important to understand the characteristics of test variation of NRTs and CRTs. Bachman (1990) described the way to classify language tests in educational settings: it is important to focus on what we want to measure when classifying language tests; language tests include selection, entrance, and readiness tests for admission decision; placement and diagnostic tests for identifying the appropriate instructional level or particular areas in which instruction is needed; and progress, achievement, attainment, or mastery tests for making the decisions about how learners should proceed through the program or how well they are attaining the program's objectives.

Bachman's (1990) detailed classification is helpful in understanding the various test types. Nevertheless, tests can be simply categorized into five types: placement, progress, achievement, proficiency, and diagnostic (e.g., Alderson, Clapham, & Wall, 1995).

Diagnostic tests administered at the beginning or middle of the term to check learning processes. Compared to achievement tests, diagnostic tests focus on eliminating learners' weaknesses. Each test has specific objectives and characteristics, which educators should understand. Along with the previous section (2.1.1), this section (2.1.2) explained the characteristics of the tests of NRTs and CRTs. Brown (2008) indicated that compared to the NRTs, the fact that the CRTs have not been used much in language testing seems strange, even though CRTs have been a part of educational testing for a long time. A limited number of researchers seem interested in studying CRTs; therefore, the author of the current study decided to focus on the CRTs, especially for the diagnostic

objectives. Table 2.2 summarizes various characteristics of each test type.

Table 2.2

Classifications of Test Types (summarized from Alderson, Clapham, & Wall, 1995, p.11-12)

NRT or CRT	Test Type	Characteristic
NRT	Placement Test	Assessing students' level of language ability so that they can be placed in the appropriate course of class.
CRT	Progress Test	In order to see what the students have learnt throughout a language course.
CRT	Achievement Test	Given to the students at the end of the course. Focusing on both progress and achievement test based on the syllabus or the language course.
NRT	Proficiency Test	To show whether students have reached a given level of general language ability or to show whether students have sufficient ability to be able to use a language in some specific area.
CRT	Diagnostic Test	To identify the areas in which a student need further help. (e.g., To identify weaknesses in a student's use of grammar.)

2.1.3 Brief Summary of Reliability and Validity in CRTs

Before describing the aspects of CRTs, it is important to discuss the statistical method in NRTs. As Brown and Hudson (2002) described in their book, in some cases, similar approaches are used to analyze NRTs and CRTs. Regarding test consistency, three important issues—reliability (in NRT), dependability (in CRT), and fit (in NRT)—should be considered. NRT reliability estimations rely mainly on correlational approaches that use the Pearson product-moment

correlation coefficient: (a) test-retest reliability, (b) equivalent forms reliability, and (c) internal consistency reliabilities (including split-half adjusted in Spearman-Brown prophecy formula, alpha, K-R20, and K-R21).

Two general approaches can be used to estimate consistency: threshold-loss methods and generalizability theory. The former includes the original agreement and kappa coefficients and the latter includes discussion of single and multiple source of error. Lastly, NRT contains a key concept known as unidimensionality, which suggests that each test or subtest measures a single trait. Unidimensionality is a useful concept in CRT testing because the CRT tests are "typically designed to measure well-defined domains of relatively homogeneous content" (Brown & Hudson, 2002, p.150).

As noted above, consistency is a very important issue. In any set of test scores, "variance need not always be a negative factor" (Brown & Hudson, 2002, p.150) because the variations may be due to other factors such as actual changes in test-takers' ability that are caused by errors. We need to consider the causes of variance and understand the consistency in the set of test scores.

According to Brown and Hudson (2002), consistency in NRTs might be described as reliability while in CRTs consistency might be described as dependability. The consistency of NRTs may be assessed by stability, equivalence, and internal consistency. On the other hand, the consistency of CRTs is generally discussed in terms of the dependability of the classifications made based on the test results, such as *master* or *non-master* and *pass or fail*.

Validity is "the meaning of test scores" (Messick, 1995) and "different types of evidence are needed to support any claims for the validity of scores on a test" (Weir, 2005). Historically, there are three types of validities such as content

validity, criterion validity, and construct validity: however, Messick (1995) unified those validities and he suggested that "construct validity as a superordinate category for test validities" (Weir, 2005). This approach had beforehand pointed out by Backman (1990).

According to Messick (1995) there are six aspects of construct validity such as (a) content, (b) substantive, (c) structural, (d) generalizability, (e) external, and (f) consequential aspects. Content aspect is traditionally examined by "expert professional judgment, documentation of which serves to address the content aspect of construct validity." Evidence from substantive aspects may derive from "think-aloud protocols or eye movement records during task performance." For the structural aspects, "the internal structure of the assessment (i.e., interrelations among the scored aspects of task and subtask performance) should be consistent with what is known about the internal structure of the construct domain." The generalizability aspect depends on "the degree of correlation of the assessed tasks with other tasks representing the construct or aspects of the construct." The external aspect "refers to the extent to which the assessment scores' relationships with other measures and nonassessment behaviors reflect the expected high, low, and interactive relations implicit in the theory of the construct being assessed." Finally, the consequential aspect includes "evidence and rationales for evaluating the intended and unintended consequences of score interpretation and use in both the short-and long-term (Messick, 1995, pp.744-747)."

In relation to six aspects of construct validity which was indicated by Messick (1995), one way of assessing the construct validity of a test is checking correlations among tests. If there are several tests expecting to measure different

aspects, those correlations must be fairly low (+.30 to +.50). Thus, if the tests correlate highly with each other (for instance +.90), there might have possibilities of testing the same things (e.g., Alderson, Clapham, & Wall, 1995). Another way of assess construct validity of a test is factor analysis. There are two varieties in the factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The formar, EFA, "explores the data to try and make sense of the factors that emerge", which means try to check "which tests relate most closely to which factors and labelling the factors accordingly" (Alderson, Clapham, & Wall, 1995, p.186). The latter, CFA, "the researcher predicts which tests or components will relate which others and how, and then carries out tests of 'goodness of fit' of the predictions with the data" (Alderson, Clapham, & Wall, 1995, p.186), which means this approach focuses on how the data fit into the predictions.

Fewer studies focused on the reliability and validity of CRTs compared to NRTs (Kunnan, 1992): using NRT reliability estimates with CRT test scores would be inappropriate; this is also true for score interpretations. Due to the characteristic differences between NRTs and CRTs, a different analytical method is needed to analyze both types of tests. This paper focuses on diagnostic tests as CRTs. Several approaches such as content analysis, item-objective congruence analysis, the Guttmann scalogram analysis, exploratory, and confirmatory factor analysis, experimental studies, and the multitrait-multimethod (MTMM) approach may assess the construct validity of CRTs (Kunnan, 1992).

One type of approach, the Guttmann scalogram analysis (Guttmann scaling or implicational scaling) is very effective for producing data that can predict the orderliness of test items. This method assesses the construct validity of the tests

utilized by language studies. Next section explains in detail the use of implicational scaling.

2.1.4 Hierarchical Analysis on CRTs: Implicational Scaling

To understand the hierarchical aspects of collected data, we need to use a particular method to analyze the data. According to Brown and Hudson (2002), implicational scaling is one type of approach to investigate and demonstrate the construct validity of a test. This is called the hierarchical-structure approach to construct validity. Subtests of items on a test are in some kind of apparent hierarchical relationships based on a theoretical background. The items in the tasks are expected to reflect theoretically predicted difficulty (Brown & Hudson, p.234). This analysis was first presented in Guttmann, subsequently, the method was used in educational studies.

Implicational scaling sometimes called 'Guttmann procedure' ('scaling') is a statistical procedure designed to facilitate the understanding of the orderliness in the language-learning process (Hatch & Lazaraton, 1991). Although generally used to analyze the acquisition of the grammatical knowledge (e.g., morpheme), it can also clarify learners' acquisition process in an exploratory way. In fact, Takanami (2012a, 2012b) partially confirmed the plausibility of this method using various types of spelling tests, indicating that the levels of difficulty describe the acquisition order of English spelling among Japanese high school learners. With this method, we can understand how learners acquire the target items in the learning process. Utilizing the implicational scaling requires several steps to calculate the scalability of the data (i.e., using formulas and drawing matrices).

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Using implicational scaling requires four steps to calculate the value of scalability. In the first step, coefficient of reproducibility (C_{rep}) must be calculated with an aim to predict participant performance from the matrix (figure). This value should be greater than .90 (i.e., value > .90) to fulfill the criterion of validity. Following formulas were derived from Hatch and Lazaraton (1991, pp.210-212).

$$C_{rep} = 1 - \frac{\text{number of errors}}{(\text{number of Ss})(\text{number of items})}$$

(Hatch & Lazaraton, 1991, p.210)

The second step, requires calculation of marginal reproducibility (MMrep) to assess predictability without errors in the matrix. This should be less than the value of the coefficient of reproducibility (i.e., value < [the value of the C_{rep}]).

$$MM_{rep} = \frac{\text{maximum marginals}}{(\text{number of Ss})(\text{number of items})}$$

(Hatch & Lazaraton, 1991. p.211)

In the third step, the margin of the coefficient of reproducibility and the minimum marginal reproducibility is calculated to see the *percent improvement in reproducibility* (henceforth % improvement).

$$\% \text{ improvement} = C_{rep} - MM_{rep}$$

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Coefficient of scalability (henceforth C_{scal}) is determined using the following three values: C_{rep}, MMrep, and % improvement.

$$C_{scal} = \frac{\text{\% improvement in reproducibility}}{1 - MM_{rep}}$$

This indicates whether the items in the matrix are scalable and unidimensional. The value of C_{scal} must be greater than .60 (i.e., value > .60).

Sakai (2008) applied Pienemann's processing theory in his research, focusing on second language development and developmental stages of Japanese university students' speaking performance. He used implicational scaling to examine that there are no contradictions to processability theory because the results showed high scalability using the collected speech data. Other studies also used implicational scaling to check processability theory (e.g., Glahn, Hakansson, Hammarberg, Holmen, Hvenekilde, & Lund, 2001).

Subsequently, Andersen (1978) studied morphemes with approximately 1000 Puerto Rican students in public school ESL classes. After using quantitative analysis, he analyzed the data using implicational scaling analysis, which is a qualitative analysis. All these studies were based on some criteria of language acquisition order. Thus, implicational scaling is effective for monitoring and verifying the acquisition order in language learning process.

However, other studies, for instance one on listening strategy (e.g., Young,

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1997), have used different types of approaches with implicational scaling. Young used implicational scaling in an exploratory way to investigate learners' listening strategies and to determine if a trend underlay the test-takers' choices of listening comprehension strategies. In their study of strategy, Chesterfield and Chesterfield (1985) used implicational scaling to understand natural order of children's acquisition of second language learning strategies, and Young (1997) used implicational scaling in an exploratory way to investigate serial ordering of listening comprehension strategy. I decided to use this method in an exploratory way to assess spelling acquisition order among Japanese EFL learners.

Implicational scaling can be used to investigate or demonstrate construct validity of a test, especially in terms of hierarchical-structure. As indicated in several studies, acquisition of English spelling is hierarchical. Frith (1980, 1985) determined three stages of spelling acquisition: logographic, phonological, and orthographic. However, it is said that this development is too simplistic. Thus, it is important to investigate the acquisition order of spelling acquisition.

How EFL learners acquire spelling knowledge in their learning process has not been clearly explained. This qualitative analysis will shed light on spelling acquisition of EFL learners using implicational scaling.

2.1.5 Developing Tests : Test Specifications

Specification (syllabus) is extremely important when writing tests to insure appropriate measurement of the targeted ability or knowledge. It is said that "developing and publishing test specifications and syllabuses is a central and crucial part of the test construction and evaluation process" (Alderson, Clapham, & Wall, 1995, p.9). Test writers should consider the dimensions proposed in

Alderson, Clapham, and Wall (1995), summarized in Table 2.3.

Table 2.3

Test Specification for Test Writers (summarized from Alderson, Clapham, & Wall, 1995, pp.11-14)

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(1) What is the purpose of the test?

(2) What sort of learners will be taking the test?

(3) How many sections/papers should the test have, how long should they be and how will they be differentiated?

(4) What target language situation is envisaged for the test?

(5) What text types should be chosen: written and/or spoken?

(6) What language skills should be tested?

(7) What language elements should be tested?

(8) What sort of tasks are required?

(9) How many items are required for each section?

(10) What test methods are to be used?

(11) What rubrics are to be used as instruction for candidates?

(12) Which criteria will be used for assessment by markers?

These test specifications enable test writers and teachers to develop appropriate tests. The content of the test should be appropriate for the targeted participants; thus, test specification will vary according to the test-takers. Test specification is important for various stakeholders such as teachers, admissions officers, publishers, textbook writers and editors. Different purposes require different test specifications, and users will have specific requirements.

This study specifically focuses on the spelling knowledge in vocabulary acquisition. Thus, following sections explain some important aspects in vocabulary acquisition.

2.2 What is Involved in Vocabulary Acquisition?

2.2.1 Receptive and Productive Distinction in Vocabulary Knowledge

Vocabulary knowledge is fundamental to language acquisition; thus, many studies have focused on vocabulary instruction of English as a second language (L2) or English as a foreign language (EFL). As Nation (2001) pointed out, "words are not isolated units of language, but fit into many interlocking systems and levels" (Nation, 2001, p.23): knowing a word involves knowing many aspects of that word. To recognize one of the major aspects of vocabulary knowledge, we need to take a close look at the distinctions between receptive skills and productive skills.

According to Nation (1990, 2001), vocabulary knowledge can be classified according to three major aspects: (a) form, (b) meaning, and (c) use. Each aspect has three subdivisions that indicate the features of form, meaning, and use. Additionally, we have to consider the distinction between receptive and productive knowledge discussed in the previous passage. Therefore, we can form 18 aspects, (3 major aspects x 3 subdivisions x 2 distinctions) of knowing a word (Mochizuki, 2008). The items in Table 2.4 and the explanation of each item derive from Nation (2001).

Table 2.4

The 18 Aspects of Knowing a Word (Nation, 2001, pp.26-28)

Aspects of Knowledge	Form	R or P	Explanation
Form	spoken	**R**	What does the word sound like?
			→ *being able to recognize the word when it is heard*
		P	How is the word pronounced?
			→ *being able to say it with correct pronunciation including stress*
	written	**R**	What does the word look like?
			→ *being familiar with its written form so that it is recognized when it is met in reading*
		P	How is the word written and spelled?
			→ *being able to write it with correct spelling*
	word parts	**R**	What parts are recognizable in this word?
			→ *recognizing that it is made up of the parts and being able to relate these parts to its meaning*
		P	What word parts are needed to express the meaning?
			→ *being able to construct it using the right word parts in their appropriate forms*
Meaning	form and meaning	**R**	What meaning does this word form signal?
			→ *knowing that _____ signals a particular meaning*
		P	What word form can be used to express this meaning?
			→ *being able to produce the word to express the meaning '___'*
	concept and referents	**R**	What is included in the concept?
			→ *knowing what the word means in the particular context in which it has just occurred*
		P	What items can the concept refer to?
			→ *being able to produce the word in different contexts to express the range of meanings of '_____'*
	associations	**R**	What other words does this make us think of?
			→ *knowing the concept behind the word which will allow understanding in a variety of contexts*
		P	What other words could we use instead of this one?
			→ *being able to produce synonyms and opposites for '_____'*
			→ *knowing that there are related words like '_____'*
Use	grammatical functions	**R**	In what patterns does the word occur?
			→ *being able to recognize that _____ has been used correctly in the sentence in which it occurs*
		P	In what patterns must we use this word?
			→ *being able to use the word correctly in an original sentence*
	collocations	**R**	What words of types of words occur with this one?
			→ *being able to recognize that words such as and _____ are typical collocations*
		P	What words or types of words must we use with this one?
			→ *being able to produce words that commonly occur with it*
	constraints on use	**R**	Where, when, and how often would we expect to meet this word?
			→ *knowing that _____ is not an uncommon word and is not a pejorative word*
	(register, frequency…)	**P**	Where, when, and how often can we use this word?
			→ *being able to decide to use or not use the word to suit the degree of formality of the situation*

Mochizuki also emphasized these 18 aspects of knowing a word (e.g., Mochizuki, 2008; Mochizuki, Murata, Uemura, Aizawa, Tono, Sugimori, Ishikawa, Iso, Koizumi et al., 2010). According to Mochizuki (2008), three dimensions of vocabulary are important: how many words learners know (i.e., vocabulary size/breadth of knowledge), how well learners know about the word (i.e., depth of knowledge), and how fast they can recognize the word (i.e., access speed). Vocabulary size and breadth/depth of vocabulary knowledge are described in the following section.

In general, receptive skills are related to reading and listening—they receive language input; productive skills are related to speaking and writing—they produce language forms. However, the distinction between receptive and productive skills is somewhat obscure; when listening to and reading the language, learners try to produce its meaning. It seems that receptive skills include productive skills. Thus, some researchers used the terms "passive" and "active" as synonyms for receptive and productive skills (e.g., Laufer, 1998; Meara, 1990).

Although the use of suitable expressions for receptive and productive skills is still controversial, and both expressions have been used in the recent research, this paper uses the words productive and receptive to explain distinctions in vocabulary knowledge because the term "passive" is not a perfect alternative for explaining the specific nature of reading and listening. When we listen to or read in another language, we need to search and produce the meaning. Basically, as noted above, receptive skills are related to reading and listening and productive skills are related to speaking and writing (e.g., Laufer & Goldstein, 2004). However, it is important to consider more complex distinctions, specifically the

direction of transforming one language to another. For example, for Japanese, the receptive direction is from L2 (English) to L1 (Japanese) and the productive direction is from L1 (Japanese) to L2 (English). In other words, producing L1 meaning is a receptive knowledge and producing L2 words (form) is a productive knowledge of English words.

Several researchers have focused on vocabulary knowledge or receptive and productive distinctions; however, their concepts or descriptions of vocabulary knowledge vary (e.g. Henriksen, 1999; Meara, 1996; Nation, 2001). Acknowledging variations, this study follows Nation's (2001) definition of the aspects of vocabulary knowledge and the receptive and productive knowledge.

It is said that the size of receptive vocabulary is approximately twice that of productive vocabulary because productive knowledge of vocabulary is much more difficult to acquire. However, when using an experimental design, researchers must decide which task to use, recognition or recall (Nation, 2001). For this reason, Webb (2008) pointed out that his study is not sufficient to compare receptive vocabulary size and productive vocabulary size, in that it used both recognition and recall tests. In order to clear up the questionable points of task type differences, Webb compared both receptive vocabulary size and productive vocabulary size with translation tasks.

Other studies found that receptive vocabulary was larger compared to productive vocabulary (i.e., Laufer, 1998; Laufer & Paribakht, 1998). Nonetheless, all these studies used Nation's (1990) Vocabulary Levels Test to measure receptive vocabulary and Laufer and Nation's (1999) Productive Vocabulary Levels Test to measure productive vocabulary. However, the problem of task differences makes the use of recognition testing for receptive vocabulary

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and recall testing for productive vocabulary uncertain. Thus, Webb (2008) decided to compare receptive vocabulary size and productive vocabulary size with the same type of task: translation task. Results showed that learners' receptive vocabulary size is larger than productive vocabulary size, which is consistent with the previous studies.

The previous studies showed that it was more challenging for learners to produce target words than to recognize the words. Other aspects of vocabulary knowledge are breadth and depth.

2.2.2 Breadth and Depth of Vocabulary Knowledge

The breadth and depth of vocabulary knowledge are also important aspects of vocabulary acquisition. The breadth of vocabulary refers to a number of words each person knows; it is usually used in reading research area to understand the relationships between vocabulary size and reading comprehension (Nation & Webb, 2011). The most well-known test for measuring non-native speakers' vocabulary size is Nation's (1990) Vocabulary Levels Test (VST). This is a kind of matching test in which test-takers must select from six options the correct definition or synonym for three words. This is a recognition test that has a possibility of guessing the answer from the options. The Mochizuki Vocabulary Size Test (1998) can also be used to measure EFL learners' vocabulary size. Designed for Japanese learners, test-takers choose the correct meaning of two questions from six options. This test is widely used by English education researchers in Japan.

Depth of vocabulary is more specific and relates to Nation's 18 aspects of knowing a word (Mukarto, 2005). The depth of vocabulary reflects each word

and indicates how well learners know the word. Qian (1999) stated that depth of vocabulary includes several components: pronunciation, spelling, meaning, register, frequency, morphology, syntactic, and collocation.

Word Associates Test (Read, 1993), well known for measuring depth of vocabulary knowledge, asks learners to select four words related to stimulus words. In order to reduce guessing, there are eight options in the testing format. The words are drawn from academic vocabulary.

From the view point of tasks, Webb's approach seems to be the most practical (e.g., Webb, 2005, 2008). He focused on the knowledge of written form, form and meaning, grammatical functions, collocation, and association with ten types of tests. The results of his study suggest that various types of tasks should be utilized to measure each aspect of vocabulary knowledge. In other words, using multiple tests gives us more information on the learners' knowledge. In sum, various types of tasks (or tests) should be used to measure learners' precise vocabulary knowledge in terms of depth of vocabulary knowledge.

This study focuses on spelling knowledge of Japanese EFL learners, one aspect of depth of vocabulary knowledge. The next section describes spelling acquisition and previous studies that focus on spelling tests.

2.3 Spelling Tests

2.3.1 Spelling Acquisition

In a literate society, writing is an important skill (e.g., Kohnen, Nickels, & Castles, 2009); accurate spelling is crucial in various situations and extremely important for successful writing. English spelling is classified as an alphabetic writing system that follows various rules of orthography. In this system, the

relationships between sounds and letters are extremely strong.

Rebecca Treiman is one of the most famous researchers who studies spelling acquisition and literacy skills among children (e.g., Bourassa & Treiman, 2001; Bowman & Treiman, 2004; Kessler & Treiman, 2003; Treiman, 2006; Treiman & Bourassa, 2000a; Treiman & Kessler, 2005). Other studies focus on adults who still struggling with their spelling abilities (e.g., Holmes & Malone, 2004; Masterson, Laxon, Lovejoy, & Morris, 2007; Perin, 1982; Shaw & Berg, 2008; Valtin & Naegele, 2001; Visse & Austin, 2005). Also spelling development is focused on the studies of spelling (e.g., Bourassa & Treiman, 2001; Ganske, 1999; Notamicola, Angelelli, Judica, & Zoccolotti, 2012; Shaw & Berg, 2008). Added to this, the learners who suffer from dyslexia or language disorders are also targeted in the area of spelling acquisition research (e.g., Gregg, Bandalos, Coleman, Davis, Robinson, & Blake, 2009; Wanzek, Vaughnm, Wexler, Swanson, Edmonds, & Kim, 2006).

English spelling rules are said to be complicated compared to other language writing systems due to the number of exceptions to the rules. Since these exceptions are difficult to acquire, knowledge of sound-letter (letter-sound) correspondence is essential for reading (pronouncing) and writing (spelling) in English. In English-speaking countries (L1), spelling skill is one of the most important literacy skills. Added to this, letter knowledge is also important for acquiring English spellings (Blaiklock, 2004).

It is natural to assume that the process of acquiring reading and writing skills would differ for L2 or EFL learners. However, according to Cook's research (1997), the spelling errors produced by L2 learners and native English speakers were almost the same—similar tendencies with spelling errors between

native speakers of English and L2 (or EFL) learners. Some researchers compared the L1 orthographical backgrounds for the L2 orthography acquisition (e.g., Akamatsu, 1999, 2002, 2003; Hamada & Koda, 2008; Koda, 1998) showing that the effects of L1 orthographical knowledge are not so clear for the acquisition of L2 orthography. However, recently, the results showed that L1 orthography seemed to affect L2 word recognition and reading procedures.

Some researchers describe spelling skill as "a major facet of literacy" (e.g., Allred, 1984; Pollo, Treiman, & Kessler, 2008). Compared to the number of studies on English spelling conducted among L1 learners (e.g., Drake & Ehri, 1984; Ehri, 1997; Griffith, 1991; Stuart & Masterson, 1992; Treiman & Bourassa, 2000a; Yopp & Yopp, 2000), far fewer studies assessed spelling among L2 or EFL learners (e.g., Mori, 2007). As Mori (2007) indicated, fewer researchers in EFL focus on spelling ability compared to the other aspects of language acquisition (such as reading).

It is said that learning to spell is more difficult compared to learning to read (Alcock & Ngorosho, 2003); thus, many children can read even if they cannot correctly spell the words. Also, poor spellers have problems with reading (Treiman, 1997). Recent studies focused on children's spelling acquisition found that phonological (or phonemic) awareness plays an important role in spelling acquisition. Yopp (1992, 1995a, 1995b) especially focused on how to develop phonemic awareness among children and examined the validity and reliability of phonemic awareness test (Yopp, 1988). It seems that development of phonological awareness draws much attention (Anthony & Francis, 2005). The test called phonemic (or phonological) awareness test is to assess learners' sensitivity to phonemes. According to Gillon (2007), it seemed that there are

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various types of phonological awareness tests in the previous studies; however, it is not too much to say that those tests were basically created in order to assess learners' weaknesses on understanding English phonemes.

Alcock and Ngorosho (2003) summarized various spelling development theories. In the past, learning spelling by rote memory seemed to be appropriate for learning English spelling. Accordingly, the role of phonological knowledge such as phonological or phonemic awareness or generalizations of spelling knowledge did not appear important: spelling errors might occur because of learners' inadequate or incorrect memory of a word. However, this might be true only for deep orthographies because in deep orthographies, it seemed that phonological knowledge or generalizations are not so useful for learning to spell.

A well-known model for spelling acquisition is Frith's (1980, 1985) model, which divides spelling development into logographic, phonological, and orthographic stages. Some argue that this model is too simplistic because these stages relate to each other when children acquire their knowledge of English spelling.

Kohnen, Nickels, and Castles (2009) stated that "one component of successful writing is accurate spelling (p.113)" and that spelling is fundamentally important for teachers or employers. However, in an L2 or EFL environment, the importance of correct spelling might be viewed as unimportant.

We need to develop diagnostic spelling tests; otherwise we would not be able to understand learners' spelling ability, therefore, unable to assess which words they can or cannot spell correctly. Poor spellers might use only words that they can spell correctly in their writing, and this might be the reason for our misunderstanding their achievement level.

2.3.2 Theories of Spelling Acquisition

Some developmental theories of spelling were developed based on the previous studies (e.g., Ellis, 1994; Frith, 1985; Henderson & Templeton, 1986). The theories of spelling assume that orthographic and morphological knowledge follows developmental steps (e.g., Frith, 1985). The concept of these "stage and phase" models is studied in child development, showing that the ability to spell in English is acquired gradually within some particular sequence of stages (Bowman & Treiman, 2004). This theory considers spelling errors as an important factor for understanding developmental stages of spelling. However, spelling acquisition does not always follow the particular developmental stages.

The second model represents the "dual route" theory of spelling (i.e., dual-route model) created from the studies of adult poor-spellers who had suffered various kinds of injuries. This model has two routes: lexical spelling route (whole-word procedure) and sublexical spelling route (sound-letter procedure). Although basic assumptions of stage or phase model and dual-route model seemed contradictory, they are compatible (e.g., Beech, 2005).

The purpose of this study was to construct a developmental model of EFL learners' spelling knowledge utilizing various kinds of spelling tests that include various aspects of vocabulary knowledge. Therefore, two examples of stage and phase model were used to explain the theoretical background of constructing acquisition order model. The following sections explain two models constructed by Ehri (1997) and Frith (1980).

2.3.3 Ehri's (1997) Model

In a study on reading development, Ehri (1997) summarized the

similarities and the differences in reading and spelling phenomena. She described five aspects that we need to consider. The first aspect is the familiarity of spellings. Regardless of whether the words are familiar, this aspect affects learners' recognition. Not surprisingly, the word recognition studies contained the dimension of word familiarity and the frequency in association with word access speed.

The second aspect considers two types of spelling knowledge: (a) words in the general alphabetic system comprising spelling regularities and the patterns of grapheme-phoneme correspondences or phoneme-grapheme correspondences, and (b) the specific spellings of words, which rely on learners' experiences through reading and writing.

The third aspect concerns the types of literacy acts involving words. There are three types of literacy acts: (a) reading words to identify their pronunciations and meanings, (b) producing spellings of words, and (c) recognizing whether words are correctly spelled or misspelled. This aspect is related to the knowledge of the alphabetic system, for instance, the knowledge of whether the learners recognize letters, word units, or relations between phonemes and graphemes. To write a correct spelling requires learners to actually understand the alphabet knowledge and the correspondences between sounds and letters. Spelling is used to decode sound; therefore, spelling knowledge is sometimes discussed with phoneme-grapheme correspondences.

The fourth aspect addresses the ways in which words are processed. Words can be read and spelled in three ways: by memory, by invention, and by analogy. By memory means that information obtained from words, especially from specific and familiar words that individuals encountered, is stored in memory. By

invention involves assembling pronunciation from letters, learners think of plausible spellings by generating letters. Analogy assist in processing unfamiliar words: analytical procedures are used to read or spell words, or to recognize misspellings in the learning processes.

The fifth aspect concerns the levels of development: levels 1 to 4. According to Beech (2005), Ehri's (1995) paper on model of phases of learning to read is one of the most cited papers in the Journal of Research in Reading. This model consists of four phases: pre-alphabetic, partial alphabetic, full alphabetic, and consolidated alphabetic. These developmental levels are called stages or phases in these kinds of studies. Although the stages include word-reading development and word-spelling development separately, the procedures of these developments are related. The first level, pre-alphabetic, is a stage for pre-readers (beginner learners) who know little about the alphabetic system. The second level, partial alphabetic, concerns how novices (beginners with little knowledge) process. The third level, full alphabetic, concerns students with more complete knowledge of grapheme-phoneme correspondences or of forming words with grapheme-phoneme units. The fourth level, consolidated alphabetic, represents more advanced learners who have knowledge of letter patterns and grapheme-phoneme units (have enough knowledge compared to other stages). Table 2.5 summarizes the basic concepts of Ehri's (1997) model.

Table 2.5

Processes to Read Words, to Spell Words, and to Recognize Misspelling of Words:

Familiar Words and Unfamiliar words (derived from Ehri, 1997, p.241)

Reading Processes	Spelling Processes	Misspelling Recognition Processes
Reading Familiar Words	Spelling Familiar Words	Recognizing Misspellings of Familiar Words
[BY MEMORY] Access representation in lexical memory on seeing written form; retrieve pronunciation-meaning amalgam.	[BY MEMORY] Access representation in lexical memory on hearing word; retrieve sequence of letters.	[BY MEMORY] Verify match or detect mismatch between spelling in view and representation of target word held in lexical memory.
Reading Unfamiliar Words	Spelling Unfamiliar Words	Recognizing Misspellings of Unfamiliar Words
[BY DECODING] Generate plausible pronunciation by sounding out and blending (assembling) units. Knowledge sources possibly used: (a) Phonological awareness (blending), (b) Grapheme-phoneme units, (c) Letter patterns, (d) consolidated units, (e) Morphographs (roots, affixes).	[BY DECODING] Generate plausible spelling by stretching out pronunciation and segmenting it into units. Knowledge sources possibly used: (a) Phonological awareness (segmentation), (b) Phoneme-grapheme units, (c) Letter patterns, (d) consolidated units, (e) Morphographs (roots, affixes), (f) Partial memory for correct letters.	[BY DECODING] Apply knowledge of the alphabetic system to verify match or detect mismatch between letters in spelling and sounds in pronunciation of target word.
[BY ANALOGY] Access familiar word with analogous spelling pattern in lexical memory; blend analogous part with new parts.	[BY ANALOGY] Access familiar word with analogous pronunciation in lexical memory; retrieve relevant letters; generate remaining letters.	[BY ANALOGY] Verify match or detect mismatch between spelling of word in view and representation of analogous word held in lexical memory.
Developmental Levels (Phases, Stages)		
Reading Words	Spelling Words	
1. Prealphabetic, logographic 2. Partial alphabetic 3. Full alphabetic 4. Consolidated alphabetic, orthographic	1. Precommunicative 2. Semiphonetic, letter-name 3. Phonetic, phonemic 4. Transitional, morphemic, within word pattern	

Ehri (1997) explained that "the act of reading involves one response, that of pronouncing a word." However, concerning spelling, she stated that "the act of spelling involves multiple responses that of writing several letters in the correct sequence (Ehri, 1997, p.264)." That is to say, spelling words accurately is more difficult compared to reading words accurately in memory. When investigating EFL learners' spelling acquisition, it is helpful to understand the models of spelling development used with native speakers of English.

2.3.4 Frith's (1980) Model

Cognitive developmental theory was adopted to create Frith's (1980, 1985) model that includes three phases with three strategies: logographic, alphabetic, and orthographic. Logographic skill is the instant recognition of familiar words. Alphabetic skill is a knowledge and use of individual phonemes and graphemes and the phone-grapheme correspondences. This is an analytic skill with a systematic approach; the process is called "decoding grapheme-by-grapheme." Alphabet letter order and phonological factors or information are the decisive factors in this stage. Learners in this stage need to pronounce novel and nonsense words. However, correct pronunciations are not necessarily needed due to the developmental procedure.

Orthographic skill is the instant formation of words into orthographic units. Phonological convention does not need to be followed in this process. Frith (1985) pointed out that after orthographic skills become established, previous strategies such as logographic or alphabetic might become less accessible because the orthographic skill is the final phase of this model: learners mastered the skills related to reading and writing. This three-phase theory specifies a strict

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sequential order. However, it has been modified into a less rigid six-step model.

In order to explain developmental model in more visible way, Frith's (1985) six-step model will be helpful. Figure 2.1 illustrates the model of reading and writing acquisition skills.

Step	Reading	Writing
1a	*logographic*$_1$	(symbolic)
1b	logographic$_2$	logographic$_2$
2a	logographic$_3$	*alphabetic*$_1$
2b	alphabetic$_2$	alphabetic$_2$
3a	*orthographic*$_1$	alphabetic$_3$
3b	orthographic$_2$	orthographic$_2$

Figure 2.1. The six-step model of skills in reading and writing acquisition (cited from Frith, 1985, p.311).

Figure 2.3 depicts six steps. Briefly, Step 1 is logographic skill, Step 2 is alphabetic skill, and Step 3 is orthographic skill. According to this model, there are sequential steps in reading and writing. Looking at the beginning, reading skills are acquired before writing skills because writing is more difficult. (Figure 2.1 describes that writing skills start from symbolic.) In order to write the words, learners need to recognize the alphabet letters first. For beginners, alphabet letters are just shapes. They gradually learn to name the shapes and subsequently how to read (pronounce) the shapes. After acquiring reading skills, writing skills are acquired.

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2.3.5 Purposes and Variations of the Spelling Tests

Spelling knowledge is sometimes recognized as a subcategory of writing ability. However, the studies on spelling showed that spelling and writing abilities must be evaluated independently. Measuring spelling ability through learners' writing does not allow assessment of which words they can actually spell correctly. In order to assess spelling ability precisely, we need to conduct a series of spelling tests.

Spelling tests, the history of which dates back to the 1930s, are usually used to check the writing ability of learners. Almost all studies focused on L1 (English as a first language) because the ability to spell correctly is very important in English-speaking countries. However, in L2 (English as a second language) or EFL (English as a foreign language), the importance of spelling knowledge seems to be different. Hence, there are a limited number of studies on English spelling among L2 or EFL learners although a considerable number of studies have been conducted with L1.

Northby (1936) compared five types of diagnostic spelling tests: (a) story form (i.e., filling in the appropriate words in a given passage), (b) timed dictation (i.e., writing whole sentences in a limited time), (c) list form (i.e., writing the words as pronounced—the basic type of spelling test used in English lessons), (d) multiple-choice (i.e., choosing one correctly spelled word among five options including four distractors), and (e) oral form (i.e., spelling words orally). Northby's basic assumption on spelling tests was that learners' spelling ability must be consistent across tests. The results indicated that written (or recall type) spelling test (i.e., story form, timed dictation, and list form) was more appropriate compared to recognition test (i.e., multiple-choice) and that the best

possible test type was list form.

After Northby (1936), Moore (1937) compared four types of spelling tests derived from Northby's tests. Moore focused on written spelling tests (excluding oral form from the study) obtaining the same results as Northby's. Based on the results of these studies, it can be postulated that different test formats influence performance on spelling tests and, therefore, indicate different stages or levels of spelling ability.

Since then, several studies have compared spelling tests to explain their characteristics as well as clarify the features that each is to measure. All previous studies used the dictation test and found it appropriate for evaluating spelling acquisition. In addition, list form, which required writing the words as pronounced, was also adequate and appropriate for measuring learners' spelling ability. However, Brody (1944) pointed out that list form does not help us understand learners' spelling ability because spelling the words in a contextual setting was more difficult. Therefore, Brody added dictated paragraph and proofreading tests with contextual settings.

Considering these findings, some studies conducted after Brody's used proofreading tests and compared the results with list form types of tests (e.g., Allred, 1984; Croft, 1982; Westwood, 1999). They concluded that using only one type of spelling test was insufficient; instead, spelling assessments should consist of combinations of different kinds of tests. Test formats could affect test scores; therefore, different spelling tests could measure different spelling abilities. In addition to this, studies have continuously compared multiple-choice tests with production test, emphasizing the convenience of the multiple-choice type test.

With the progress in comparative studies of spelling tests, some

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researchers began to investigate the relationship between spelling abilities and other cognitive functions. The results showed that performance on spelling tests did not have a strong relationship with writing tests (e.g., Freyberg, 1970; Westwood, 1999), proficiency tests (e.g., Carpenter & Carpenter, 1978), and cognitive function tests (e.g., Allen & Ager, 1965). In short, the function of spelling tests' measurement differed from other types of tests (e.g., writing tests, proficiency tests, and cognitive function tests) that did not focus on measuring spelling ability. In other words, spelling ability should be measured independently from other tests that have other purposes. Table 2.6 summarizes examples of previous studies of spelling tests.

Table 2.6

Examples of Previous Studies of Spelling Tests (Table continues)

Studies grade/number	Test Formats	Results and Findings
Brody (1944) L1: fourth through ninth grade (*N*=1231)	(1) list test (2) sentence (=timed dictation) (3) dictated paragraph (4) proofreading ※Dictated paragraph and proofreading on three levels: easy, average, and difficult	Dictated paragraph was difficult compared to sentence test and list test. The text difficulty affected the scores. Each spelling test has a different function and the characteristics of each test are unique.
Allen & Ager (1965) L1: twelfth grade (*N*=100)	(1) check-list (recognition) (2) dictation-in-context (3) write-in correction (4) multiple-choice (Wellesley Spelling Scale) ※ Added to these were other tests that assess participants' cognitive function (personality, spatial, perceptual, and intellectual) and a proficiency test.	Spelling ability was independent and unrelated to the cognitive function. All spelling tests were categorized with 'general spelling ability.' Special instruction needed if the spelling ability is independent.

Table 2.6 Examples of Previous Studies of Spelling Tests (Table continued)

Studies grade/number	Test Formats	Results and Findings
Freyberg (1970) L1: first through sixth grade (*N*=506)	(1) writing test, (2) dictated word test, (3) multiple-choice test.	Accuracy of spellings in writing and dictated word test was highly correlated. The correlation between (2) and (3) was high. Thus, it is diagnostically important to use both tests.
Carpenter&Carpenter (1978) L1: grade four (*N*=45)	(1) Larsen-Hammill Test of Written Spelling (TWS) Dictation format (consisting of predictable and unpredictable words) (2) California Achievement Test (CAT) (consisting mainly of three sections: Reading, Mathematics, and Language. The spelling test is included in the Language section)	Comparing spelling tests and the proficiency test, TWS measured general ability of English spellings such as predictable-unpredictable spellings. TWS scores could not predict CAT scores, thus measured only the ability to spell English in writing.
Croft (1982) L1: third and fourth grades (*N*=80)	(1) proofreading/correction (2) multiple choice/cloze format (3) traditional dictation. (1) and (3) production type (2) recognition type.	Production type tests, such as (1) and (3), were more difficult compared to recognition type test (2). To evaluate the accuracy of participants' spelling ability, the test, which includes production tasks, seemed to be valid.
Allred (1984) [L1: first through sixth grade (*N* = 3024)]	(1) standardized spelling test (= proofreading), (2) written test. To investigate whether the test scores varied with grade, sex, or ordering of the test.	(1) and (2) were highly correlated. For measuring both comparative and general knowledge of English spelling, proofreading is appropriate. To understand learners' actual spelling knowledge, use written spelling tests.
Westwood (1999) L1: second through fifth grade (*n*=93)	(1) dictated list (2) proofreading (3) correcting spelling errors (4) multiple-choice (5) unaided story writing	Correlations among five tests were high and all the tests seemed to be valid. All tests measured 'general spelling ability.' The five tests in this study should be used together. It is important to use all tests.

As stated above, it is difficult to simply integrate the results from the previous studies. However, consistent results may be found by dividing them into (a) production tests, such as dictation and list form, and (b) recognition tests, such as multiple-choice and proof reading tests; that is, production tests tend to be more difficult compared to recognition tests. In addition, if the difficulty of spelling tests is evident from the test scores, the degree of difficulty should have then some sort of information that reflect the learner's acquisition process. Implicational scaling is the useful method to examine the acquisition order (Hatch & Lazaraton, 1991). The subsequent section provides detailed information about this method.

Although task differences somewhat affect the results of test scores, we also need to compare the directions of knowledge: receptive and productive distinction. Mochizuki et al. (2008) summarized the four test types according to the past studies; Laufer, Elder, Hill, and Congdon (2004) and Laufer and Goldstein (2004) identified four levels (retrieval methods) of lexical knowledge: productive recall, receptive recall, productive recognition, and receptive recognition. In receptive recognition, L2 to L1 direction, test-takers may choose one answer among options, and in receptive recall, test-takers need to produce the meaning. In productive recognition, L1 to L2 direction, test-takers may choose one answer among options, and in productive recall, test-takers need to write the correct spelling. Thus, considering both task types and the distinction of knowledge, we can produce four types of tasks.

2.3.6 Diagnostic Analysis Using Spelling Tests

According to Bejar (1984), there are two major approaches for educational

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diagnostic assessment: (a) deficit assessment and (b) error analysis. The former focuses on weaknesses of the student and the latter focuses on the kinds of error committed by the learners. Some researchers began to examine spelling ability by using several kinds of spelling tests to identify previously learned knowledge of English spellings. Some studies focused mainly on spelling knowledge (e.g., Allred, 1984; Croft, 1982; Moore, 1937; Northby, 1936; Shankweiler, Lundquist, Dreyer, & Dickinson, 1996). Others focused on the relationships among spelling tests and other types of tests that measure learners' writing ability (e.g., Freyberg, 1970; Westwood, 1999), proficiency (e.g., Carpenter & Carpenter, 1978), or cognitive functions (e.g., Allen & Ager, 1965).

In sum, in the previous studies, researcher examined (a) spelling knowledge or (b) the relationships among other types of tests and the spelling tests. Concerning the latter, the results from previous studies did not indicate a strong relationship between spelling tests and other types of tests. Since previous studies did not include vocabulary size tests (i.e., tests measuring how much vocabulary learners know), it would be interesting to assess the relationships between spelling tests and the vocabulary size test among EFL learners because spelling knowledge reflects a depth of vocabulary knowledge. The present study focused on identifying learners' weaknesses on spelling knowledge; thus, deficit assessment was the main topic.

The Mochizuki Vocabulary Size Test (Mochizuki Test) (1998) has been employed in a number of studies with Japanese learners of English to assess the written receptive vocabulary size (Koizumi & Mochizuki, 2011). Compared to the previously developed vocabulary size tests, Mochizuki Test includes L1 (Japanese) definitions such as meaning. According to Nation (2001), L1

translations are very useful for "testing vocabulary, both receptively and productively, and in recall and recognition items. (p.351)" As Nation pointed out, creating definitions in L2 requires quite sophisticated skill. From this point of view, including L1 translations in testing items seemed to be very effective. Therefore, the Mochizuki Test seemed to be the most suitable for assessing vocabulary size of Japanese learners of English.

2.3.7 Good Reader Poor Speller (R+ S-) Problem

It is said that in the English speaking country, good readers are generally good spellers, and children who have reading problems are generally poor spellers. First-language struggling readers might have underdeveloped spelling ability (August, 2011). The relationship between the sound and spelling of English is not transparent compared to other languages with comprehensible writing systems. As is well known, the complicated sound-letter correspondences of English cause problems both in native speakers' and non-native speakers' learning. Thus, without systematic spelling instruction it is very difficult for adult L2 learners to acquire accurate spellings of the words. Several studies focus on the relationships between reading and spelling skills discrepancies (e.g., Bruck & Waters, 1988; Kamhi & Hinton, 2000; Perin, 1982).

According to Wade-Wooley and Siegel (1997), both L1 and L2 poor readers are affected by slow or inaccurate word retrieval: readers cannot comprehend the given passages because of inaccurate word retrieval. However, if they use verbal knowledge efficiently, they become fluent and demonstrate comprehension owing to their cognitive processes based on their working memory.

Mori (2007) examined the learners of Good Reader Poor Speller (henceforth R+ S-) to investigate the relationships between reading and spelling abilities in L2 learners. R+ S- shows the category of learners whose reading abilities were appropriate but their spelling abilities were insufficient.

Mori (2007, pp.5-8) pointed out three problems that is related to the studies of spelling acquisition. First, compared to L1 research, spelling instruction is considered as the beginner level of learning, even though in English speaking countries acquiring correct English spellings requires effort and is taken as a high cognitive load (Frith, 1980). It is said that there are several stages for acquiring English spellings; it is complicated because of the processes of phonological coding strategy and visual coding strategy. This makes diagnoses of spelling acquisition problems crucial. Second, in L2 research, the relationships between reading and spelling skills are not much studied. Studies focusing on reading skills have attracted many researchers; however, those studies did not focus on relationships between reading and spelling skills among L2 learners. Third, no effective tests measure L2 learners' reading and spelling abilities in an accommodating way. From these backgrounds, Mori (2007) suggested the need to prepare and develop an effective test to diagnose L2 learners' reading (decoding) and spelling abilities.

Other studies do focus on the relationships between pronouncing and spelling skills. Those studies, which are mainly interested in pronouncing skills with spelling skills, used the term "reading skills" for pronouncing skills. Though it seems "decoding" is more accurate to express the ability to pronounce correctly. It is not too much to say that it is important to define the terms clearly in order to provide clarity and accuracy.

In this thesis, the author decided to use the terms in the following manner: "good decoders" for learners, who pronounce the words correctly, "good comprehenders" for those who correctly understand the words' meaning, and "good spellers" for those who write the words' spellings correctly. In a contrasting situation, learners who pronounce the words incorrectly are "poor decoders," those who do not understand the words' meaning are "poor comprehenders," and those who do not write the words' spellings correctly are "poor spellers." Thus, the types of the learners can be summarized in eight patterns as follows:

(1) Good decoder, good comprehender, good speller (D+ C+ S+),

(2) Good decoder, good comprehender, poor speller (D+ C+ S-),

(3) Good decoder, poor comprehender good speller (D+ C- S+),

(4) Good decoder, poor comprehender poor speller (D+ C- S-),

(5) Poor decoder, good comprehender, good speller (D- C+ S+),

(6) Poor decoder, good comprehender, poor speller (D- C+ S-),

(7) Poor decoder, poor comprehender, good speller (D- C- S+),

(8) Poor decoder, poor comprehender, poor speller (D- C- S-).

Previous studies focused on the R+ S- problem to diagnose learners' inconsistent knowledge of reading (or decoding) and spelling abilities. Although we have useful spell checking program in our personal computers, Anderson-Inman and Knox-Quinn (1996) reported the problems of relying too much on spell checkers. Poor spellers might have problems of recognizing and choosing the correct spellings from the suggestion made by the electronic spell checking program. In other words, using spell checking program requires us to

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recognize the correct spellings. The program only gives us alternatives to rewrite misspelled words. On the other hand, good spellers have abilities to pick up the errors from their writings. Thus, instead of teaching learners to use spell checking program, conducting diagnostic tests to check learners' weakness during the language courses would be more fruitful.

2.4 Present Study

2.4.1 Purpose of this Research Project

Diagnostic spelling tests are needed in order to find weaknesses in spelling knowledge among EFL learners. In previous spelling test studies, tasks involved either recall or recognition for diagnoses. Recall tests require spelling while recognition tests require marking the correctly spelled words. Hence, it is necessary to study learners' abilities more precisely using both recall and recognition tasks.

Identifying spelling acquisition weakness requires using various instruments (i.e., test types or materials) to assess knowledge and identify specific skill aspects. Thus, this study measured learners' spelling knowledge using several kinds of tests to assess learners' specific areas of vocabulary knowledge within one research design. Some researchers have used both recall (production) tests and recognition tests for diagnoses. However, task types must be equivalent when exploring specific areas of the vocabulary knowledge, such as receptive and productive differences (Webb, 2008). It is also true that various types of tests can elicit and clarify learners' acquired knowledge and increase our understanding of spelling acquisition; thus, the present project used various kinds of spelling tests with carefully chosen materials including both recall and

recognition tasks. Based on previous test format studies, this research proposed five experiments:

Study 1 compared the knowledge of sound-letter correspondence and the spelling abilities. After comparing the results, Study 2 shifted its focus to vocabulary size and the knowledge of English spelling. The results indicated that in Study 1, learners' knowledge of sound-letter correspondence did not relate much to spelling abilities even though the correlations were high. Looking at the raw data qualitatively, good spellers did not always acquire good English sound-letter correspondences. Thus, Study 2 did not use a sound-letter correspondence test as a measure of participants' abilities. Study 2 followed the first two studies.

The main purpose of Study 3 was to develop diagnostic tests for understanding EFL learners' vocabulary knowledge focusing on form and meaning knowledge. Each of the twelve tests was to measure specific vocabulary knowledge from receptive and productive distinction. Moreover, a vocabulary size test was administered in the experimental session. After this, Study 4 and Study 5 verified the results from Study 3. The three studies used target words based on phonetic symbols. Although the target words in Studies 4 and 5 were chosen differently, the words possessed various types of phonological aspects.

2.4.2 Research Questions

This research examined EFL learners' spelling ability, focusing on two dimensions: receptive/productive and recall/recognition. Generally, spelling ability is classified as a subcategory of writing ability. However, spelling knowledge also plays an important part in vocabulary acquisition. In the studies

on vocabulary learning and acquisition, the relationships between vocabulary knowledge and reading comprehension seem to be a main topic. However, if learners (readers) could not recognize the correct spelling in the text, it might be impossible for them to understand the meaning: knowledge of accurate spelling form (written form) plays an important role in reading.

This series of studies evaluated the spelling knowledge of Japanese EFL learners in various ways. Studies 1 and 2 focused on high school EFL students' spelling ability and investigated the availability of using implicational scaling with the test formats from previous studies. The testing materials in Study 1 derived from previous research. Study 2 focused on university EFL students' spelling ability. Results consistent with the results from high school learners might support the acquisition order of English spelling knowledge. After these experiments, Studies 3, 4, and 5 targeted university students and examined learners' spelling knowledge more precisely using various kinds of spelling tests (or vocabulary tests). In Study 3, the researcher developed materials for Studies 4 and 5. These three studies focused on qualitative analysis of spelling tests and quantitative analysis of spelling knowledge to investigate acquisition order again with the various aspects.

This project proposes the following research questions:

[Study 1]

RQ1-1: Are sound-letter correspondence knowledge and spelling test performance related?

RQ1-2: Do the types of spelling test formats affect learners' spelling test performance?

RQ1-3: What are the characteristics of the scalabilities among ten target words?

[Study 2]

RQ2-1: What are the characteristics of the spelling tests used in this study?

RQ2-2: What relationships exist between estimated vocabulary size (breadth of vocabulary knowledge) and performance on spelling tests (depth of vocabulary knowledge)?

RQ2-3: What are the characteristics of the scalabilities among twelve target words?

[Study 3]

RQ3-1: Do the types of six recall test formats affect spelling test performance?

RQ3-2: Do the types of six recognition test formats affect spelling test performance?

RQ3-3: Are estimated vocabulary size and spelling test performance related?

RQ3-4: What are the characteristics of the scalabilities among thirty-five target words?

RQ3-5: Will diagnostic spelling tests categorize the test-takers?

[Study 4]

RQ4-1: Do task difficulties of recall test formats differ between Study 3 and Study 4?

RQ4-2: Do task difficulties of recognition test formats differ between Study 3 and Study 4?

RQ4-3: Are estimated vocabulary size and spelling test performance related compared to Study 3?

RQ4-4: What are the characteristics of the scalabilities among thirty-two target words focusing on silent letters?

RQ4-5: Are there any learners who can be categorized as poor-decoders, good-spellers, poor-comprehenders (D- S+ C-)?

[Study 5]

RQ5-1: Do task difficulties of recall test formats differ among Study 3, Study 4, and Study 5?

RQ5-2: Do task difficulties of recognition test formats differ among Study 3, Study 4, and Study 5?

RQ5-3: Are estimated vocabulary size and spelling test performance related among Study 3, Study 4 and Study 5?

RQ5-4: What are the characteristics of the scalabilities among thirty-three target words from high school textbooks?

RQ5-5: Are good-spellers (S+) always good-decoders, good-comprehenders (D+ C+)?

2.4.3 Various Spelling Tests in the Present Study

This research project used several types of spelling tests in its five studies. The tests in Studies 1 and 2 were based on the previous studies with additional 5 matching tasks in Study 1, and 5 matching tasks and 6 translation tasks in Study 2 to assess the test-takers knowledge of the meaning of the target words. The researcher based Studies 3, 4, and 5 on the concept of Nation's (2001) definitions of the aspect of vocabulary knowledge, focusing on form and meaning: sound form, written form, sound form and meaning, and written form and meaning. Table 2.6 describes the test formats in this research.

Table 2.7

Test Formats in This Research

Experiment	Targeted participants	Test format	Number of items
Study 1	high school students	(1) Story form (2) Timed dictation (3) List form (4) Multiple-choice (5) Matching task	10
Study 2	university students	(1) Story form (2) Timed dictation (3) List form (4) Multiple-choice (5) Matching task (6) Translation task	12
Study 3	university students	(1) L1 meaning to L2 sound (2) L1 meaning to L2 spelling (3) L2 sound to L2 spelling (4) L2 sound to L1 meaning (5) L2 spelling to L2 sound (6) L2 spelling to L1 meaning (7) L2 spelling recognition (8) L1 meaning to L2 sound (9) L2 sound to L2 spelling (10) L2 sound to L1 meaning (11) L2 spelling to L2 sound (12) L2 spelling to L1 meaning	35 (30)
Study 4	university students	(1) L1 meaning to L2 sound (2) L1 meaning to L2 spelling (3) L2 sound to L2 spelling (4) L2 sound to L1 meaning (5) L2 spelling to L2 sound (6) L2 spelling to L1 meaning (7) L2 spelling recognition (8) L1 meaning to L2 sound (9) L2 sound to L2 spelling (10) L2 sound to L1 meaning (11) L2 spelling to L2 sound (12) L2 spelling to L1 meaning	32 (30)
Study 5	university students	(1) L2 sound to L2 spelling (2) L2 sound to L2 spelling (3) L2 spelling to L2 sound (4) L2 sound to L1 meaning (5) L2 sound to L1 meaning (6) L2 spelling to L1 meaning (7) L2 spelling to L1 meaning (8) L1 meaning to L2 sound (9) (L1 meaning to) L2 spelling (10) L1 meaning to L2 spelling	33

Table 2.8 summarizes the test specifications of diagnostic spelling tests in this research. The lists of test specification are based on Alderson, Clapham, and Wall (1995).

Table 2.8

Specifications for Diagnostic Spelling Tests in the Present Study

(1) These tests proposed to diagnose Japanese EFL learners' spelling knowledge by focusing on various aspects. The aim of this project was to develop diagnostic tests.
(2) Study 1 targeted high school students; Studies 2, 3, 4, and 5 targeted university students.
(3) Study 1 contained five types of spelling tests, Study 2 contained six types of spelling and vocabulary tests, and Study 3 contained 12 types of spelling and vocabulary tests.
(4) Target language is English. Instructions in the tests are all Japanese in order to avoid misunderstanding.
(5) The text types should be spoken in some tests (which require test-takers to recognize the English sound or match the English sound with forms) and should be written in tests, which require test-takers to recognize the spelling of the word or translate the meanings of the words.
(6) Depth of vocabulary knowledge should be tested.
(7) According to Nation (1990: 2001), vocabulary knowledge contains various aspects, and the tests cover the knowledge of form and meaning aspect.
(8) The tests in the studies are objectively assessable because their scoring is simple. The test formats vary; however, these tests attempt to measure individual aspects of vocabulary knowledge. Overall, the results provide a comprehensive conclusion of the aspects of vocabulary knowledge among Japanese EFL learners.
(9) The tests focus on each vocabulary set, with 10 items in study 1, 12 items in study 2, 35 items in study 3, 32 items in study 4, and 33 items in study 5. The tests in this study are expected to measure the accuracy of vocabulary knowledge (especially spelling accuracy). Thus, in all experiments, only correct answers are accepted: correct answers score "1" and incorrect answers score "0." All items are weighted equally.
(10) Each experiment includes various types of tests: multiple-choice, matching, translation, sentence dictation, and spot dictation.
(11) During the experiments, the author briefly explains each test (giving no information about the scoring procedures).
(12) The studies focus on accuracy of vocabulary knowledge.

2.4.4 Analysis

Previous studies used two types of analyses: quantitative and qualitative analysis. With respect to the quantitative analysis, (a) a repeated-measures analysis of variance (ANOVA) was used to understand the difficulty level of each spelling test, (b) a Pearson's correlation was used to examine the relations among sound-letter correspondences knowledge of vocabulary knowledge and the spelling test, (c) Spearman's rank-order correlation was used to survey consistency of test-takers' performance on the tests, and (d) exploratory factor analysis (EFA) was utilized to examine the underlying structure of the constructs used in the present study. These analyses were conducted by SPSS 16.0. On the other hand, implicational scaling (Hatch & Lazaraton, 1991) was used to determine qualitative item differences. This analysis was conducted to take a close look at the difficulties of the tasks used in the study.

2.4.5 Significance of the Present Study

The findings of this study are expected to contribute to our understanding of EFL learners' weaknesses of English spelling knowledge both in recall tasks and recognition tasks

The first half of this paper uses various types of spelling tests adopted from the previous studies; the second half of this paper uses more detailed types of spelling tests to provide meaningful results for language educators who are interested in English spelling ability of EFL learners. The author developed the materials in the latter part of this paper using examples from previous studies or some related area for diagnostic purposes. Thus, this paper will be helpful for teachers to develop spelling tests.

Generally, studies on SLA have used both recall and recognition tasks or measured both receptive knowledge and productive knowledge using a single research design. However, this research used various types of recall and recognition tasks to analyze Japanese EFL learners' spelling ability and understand their spelling knowledge from various perspectives. The results from these materials will produce fruitful information for language teachers to better understand learners' spelling weaknesses in association with vocabulary knowledge.

2.5 Summary of Chapter 2

This chapter reviewed previous studies and provided background information on the (a) characteristics of language tests (2.1) focusing on the distinctions of NRTs and CRTs and explaining the test specifications. The following section explains (b) the notion of vocabulary acquisition (2.2) and (c) the notion of spelling acquisition (2.3) with some examples of spelling tests created for diagnostic purposes in previous studies. This chapter reviewed the purposes and the varieties of spelling test formats developed by the author for this study (2.4). Chapters 3 and 4 provide an overview of previous studies of diagnostic spelling tests.

Chapter 3   Spelling Performance on High School Students: Study 1

3.1 Purpose of the Study

The purposes of this study are (a) to examine the spelling knowledge among Japanese high school students using various spelling tests and (b) to verify the weaknesses of English spelling knowledge with *implicational scaling* by comparing spelling test performance. The study employed five types of spelling tests, namely (a) story form, (b) timed dictation, (c) list form, (d) multiple-choice, and (e) matching task. Except for the matching task, other four tasks (i.e., story form, timed dictation, list form, and multiple-choice) were determined by reference to the previous studies (e.g., Moore, 1937; Northby, 1936).

To be accurate, matching task which was added by the researcher is not a spelling test. Instead, this matching task is a type of vocabulary test which asks vocabulary knowledge of form and meaning. However, it is also important to know whether they know the meaning of the target words. Therefore, matching task was added in the set of tests. The five spelling tests in this study were a series of diagnostic test. All the tests should conduct within one day.

3.2 Methods

The current study investigated the spelling ability of Japanese high school students by using implicational scaling. Based on the results of the previous studies, the study focused on five spelling tests (i.e., story form, timed dictation, list form, multiple-choice, and matching task) and aimed to clarify the difficulty

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of those tests associated with the learners' acquisition order. The research questions are as follows:

RQ1-1: Are sound-letter correspondence knowledge and spelling test performance related?

RQ1-2: Do the types of spelling test formats affect learners' spelling test performance?

RQ1-3: What are the characteristics of the scalabilities among ten target words?

3.2.1 Participants

Overall, 78 first-year high school students participated in the current study. However, five students who could not complete all experimental sessions were excluded from the study. Consequently, 73 students (i.e., 38 men and 35 women) were analyzed in this study. Although the students were from two different classes, their English proficiency levels were assumed almost equal due to the following reasons: these classes were not high level classes and the English teachers in this high school guaranteed that the levels of these classes were equivalent. The average score of their achievement tests were almost equivalent.

3.2.2 Materials
3.2.2.1 Sound-Letter Correspondences Test

There are three sessions in this study. The experiment in this study (Study 1) consisted of a sound-letter correspondence test (Session 1 and Session 2) and five spelling tests (Session 3). A Sound-Letter Correspondences test (hereafter, SLC test) was in the first and the second session intended to measure participants'

already acquired knowledge of the English spellings. This is because, the knowledge of sound-letter correspondences or phoneme-grapheme correspondences are crucial factor of learners' spelling acquisition in L1 studies. Therefore, this study included the test which measures learners' knowledge of sound-letter correspondences. Due to the number of items, SLC test was divided into two sessions. After these SLC tests, spelling tests were given to the participants as the third session. Detailed explanation of spelling tests on Session 3 will be described in the following sections.

Considering the participants' English level in this study, the selected target words should be at junior high school level. Such words were derived from Mori's (2007) regular words list. The list is divided into two patterns: (a) 45 words consisting of 25 consonant patterns and (b) 45 words consisting of 24 vowel patterns (including short-vowel, long-vowel, and diphthong). It has been recommended that spelling tests should include 50-100 words in order to assess participants' orthographic knowledge in a comprehensive way (Masterson & Apel, 2000). Therefore, 90 words included in the SLC test were suitable number of items for assessing the degree of acquisition of the English spellings.

Before conducting SLC test, worksheet (blank answer paper) was given to the test-takers. They wrote the ID number and name on the sheet first. On the sheet, only small frames were printed in order to write the spellings (answers) of the words. The researcher explained the purpose of the test and gave directions to complete the SLC tests. Words were read twice by the researcher and the test-takers wrote the correct spellings of the words in 10 seconds each. Meanings of the words were not given to the participants because the meaning is not focused in sound-letter correspondences test. As mentioned above, the words in

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this session (Session 1) were all junior-high school levels. Needless to say, SLC test is one type of achievement test. If all the participants know the correct answers, all of them will mark perfect scores and vice versa.

3.2.2.2 Spelling Tests and the Target Words

Test formats used in the previous studies were too complicated and less reproducible, and the results varied as explained above. Among those studies, Northby's (1936) tests were very simple and practical, which means easy to modify and arrange for different grades or word levels. They also contained sufficient information for both production skills and recognition skills. In other words, Northby's tests (i.e., story form, timed dictation, list form, and multiple-choice) were user-friendly (teacher-friendly). For these reasons, the present study employed a series of spelling tests based on Northby's formats. However, the original materials from Northby's seemed to be too difficult for the present study's participants in terms of both quantity and quality. Therefore, the researcher decided to modify the material.

The words (i.e., *because, before, birthday, found, guitar, pair, party, piece, shoes,* and *wanted*) were chosen from the reading sections of fourth grade EIKEN (Obunsha, 2004), which include a high probability of misspelling for the test-takers. The descriptions of the spelling tests are shown below. Table 3.1 described the target words in this study. According to JACET 8000 vocabulary list, the levels of target words ranged from level 1 to level 3. In JACET 8000, each level has 1000 word presumably. Level 1 means 1000 word level, Level 2 means 2000 word level, and Level 3 means 3000 word level. The average vocabulary size of Japanese university students are said to be around 3000; thus,

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the target words were mainly chosen from Level 1 and Level 2 words from the EIKEN fourth grade reading passage. In the following sections after Table 3.1, explanations of each test were given.

Table 3.1

Target Words in Study 1

Target Word	JACET 8000	Syllable	Phonetic Symbol
because	1	2	/bikɔ':z/
before	1	2	/bifɔ':r/
birthday	2	2	/bə':rθde`i/
found	2	1	/fa'und/
guitar	3	2	/gitɑ':r/
pair	2	1	/pe'ər/
party	1	2	/pɑ':rti/
piece	1	1	/pi':s/
shoes	2	1	/ʃu':z/
wanted	1	2	/wɑ'ntɪd/

Note. Phonetic symbols in the table were derived from online dictionary of ALC (http://www.alc.co.jp/).

Following are the explanations of each spelling test. Also, the characteristics of tests according to Nation (1990; 2001) are summarized in Table 3.2.

In Chapter 2 (Literature Review), Nation's definition of knowing a word was explained. In order to show the kinds of vocabulary knowledge among the tests, it is important to make a label for each test with Nation's definition. Through the label, we can understand what knowledge we assess with each test.

Table 3.2

Characteristics of the Test Format Employed in the Present Study (Based on Nation, 1990, 2001)

Test formats	Aspects of vocabulary knowledge	Types of Knowledge	Test types
		Receptive (R) or Productive (P)	Recall or Recognition
Story form	F: spoken → written U: grammatical functions	R → P R + P	Recall
Timed dictation	F: spoken → written U: grammatical functions	R →P R + P	Recall
List form	F: spoken → written	R → P	Recall
Multiple-choice	F: written	R	Recognition
Matching task	M: form (written) and meaning	R	Recognition

Note. In column 2, definitions of the aspects of vocabulary knowledge came from Nation's (1990, 2001) distinction. The abbreviations include F for "form," M for "meaning," and U for "use." In the column 3, types of knowledge also came from Nation's distinction of receptive knowledge and productive knowledge. Receptive knowledge relates to listening and reading, and productive knowledge relates to speaking and writing.

a.   Story form

The story form, one form of a recall test focusing on receptive and productive knowledge, is a test that requires test-takers to listen carefully to the one short story and fill in the blanks (i.e., spot dictation). The passage was derived from EIKEN fourth grade reading section (Obunsha, 2004). Ten target words (i.e., *because, before, birthday, found, guitar, pair, party, piece, shoes,* and *wanted*) were included in one short story. During the test, the researcher read

the passage twice and the test-takers filled in the appropriate words in a given passage (see Appendix 3B).

b. Timed dictation

Ten sentences were prepared for this test, each sentence comprising one target word. In order to avoid artificiality, sentences for timed dictation were chosen from online dictionary of ALC (http://www.alc.co.jp/) and Google (http://www.google.co.jp/). Some sentences involving difficult phrases of expressions were modified to make those more sentences appropriate for this study's participants. Because too difficult sentences might affect test-takers' performance and giving them too much frustrations. The researcher read-aloud the sentences twice and the test-takers were required to write the entire sentence (see Appendix 3C).

c. List form

For this test, the researcher pronounced target words two times and the participants had to write down the spelling of the words on the sheet. Test-takers were given about ten seconds to write their answers on the sheet. This test type is the most traditional form of spelling test (see Appendix 3D).

d. Multiple-Choice

Four incorrect spellings (i.e., distractors) and one correct spelling were prepared for each target word. The test-takers had to choose one correctly spelled word and circle the answer. Incorrectly spelled words were chosen based on the samples and observations of misspelled patterns of students in daily English

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classes. The researcher and another English teacher (i.e., who is the colleague of the researcher) confirmed the possibility of the distractors (see Appendix 3E).

e.   Matching task

This test asked participants to compare and match the target words with the Japanese translation of the target words. This test was not included in the Northby's original tests. The process of understanding the meaning of English words is different for second/foreign learners and native speakers of English, suggesting that understanding the pronunciation of the words is not directly related to the comprehension of the words' meaning. Therefore, matching task was needed to assess learners' acquisition of meaning, that is, test-takers' acquired knowledge of the target words' meanings. This task was the last part of the test to avoid interrupting other test formats (see Appendix 3F).

Although the matching task seemed to be too simple to answer, this type of test should be included because other test types such as asking test-takers to translate the meaning in Japanese have too much cognitive load and it was predictable that non-responders might increase during the test. Without this test, other four spelling tests (i.e., story form, timed dictation, list form, and multiple-choice) could not assess learners' semantic acquisition (or meaning understanding). Thus, this task was added to this testing procedure. Appendices 3A to 3F are the examples of test formats.

3.2.3 Scoring

Following Northby (1936) and other studies, correct spellings received "1" point and incorrect spellings received "0" point. However, in the list form, homonyms (e.g., /pí:s/ for *piece, peace* and /péər/ for *pair, pear, pare*) were given "1" point. This was because in the list form, students did not receive contextual clues. In story form and timed dictation, on the other hand, homonyms were not considered correct because these two tests had additional information and the appropriate meaning of the words should be given to answer correctly. Additionally, in a timed dictation test, only target words were checked and scored. Invented spellings (i.e., incorrect spellings but phonologically correct spellings, learners spelling knowledge is developing but not perfectly acquired) are not scored because this study mainly focused on the acquired knowledge of English spellings. Table 3.3 shows the scoring procedure of spelling tests in the present study.

Table 3.3

Scoring Procedure of Spelling Tests in the Present Study

Test Format	Correct	Incorrect	Exceptions (homonyms)
Story form	1	0	0
Timed dictation	1	0	0
List form	1	0	1 *pair, pear, pare* /péər/ *piece, peace* /pí:s/
Multiple-choice	1	0	—
Matching task	1	0	—

Tests such as CRTs are to check test-takers' level of acquisition and the tests in

this studies are diagnostic tests categorized in CRTs. In this study (Study 1) the learners must answer all the items correctly to evaluate as "pass", and the learners whose answers were incorrect evaluated as "fail."

3.2.4 Design

All participants completed all tests because the present study employed a within-subject design. The purpose of diagnostic tests is to find learners' weaknesses through the tests. The spelling tests in this study each measure different abilities related to spelling knowledge; thus, all five tests were a series of diagnostic test and the test-takers who participated the study must complete answering all the tests.

3.2.5 Procedure

In the experiment, testing sessions contained two parts. The first part was the SLC test, which tested test-takers English spelling knowledge from their junior high-school. Overall, 90 words were used in this test and the first 45 words (i.e., including short-vowel, long-vowel, and diphthong) were tested during Week 1. Remaining 45 words (i.e., consonant) were tested during Week 2. Because of its length, this test required two weeks to complete. However, in order to minimize the order effect, test-takers from two classes took the same tests but in a different order. The second part of the session included the five spelling tests described in the previous section.

The test-takers completed these tests in one day in the following sequence (i.e., (a) story form → (b) timed dictation → (c) list form → (d) multiple-choice). Northby (1936) indicated that this order was the most appropriate to diminish the

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practice effect. In addition to these tests, the researcher added (e) matching task at the end. The reason for putting matching task at the end of this testing session is that the matching task includes correct spellings in the test sheet. This might give test-takers clues for writing correct spelling; thus, this test should not put at the beginning of the test. Figure 3.1 show the experimental procedures in this study.

Figure 3.1. Experimental procedures of Study 1.

3.3 Results and Discussion

3.3.1 Analysis

The analysis compared the test scores and acquisition order of English spelling. Regarding test scores, (a) analysis of variance (ANOVA) was used to understand the differences among five types of spelling tests, (b) Pearson's product-moment correlation coefficient was used to examine the relations among the tests, (c) Spearman's rank-correlation coefficient was used to understand the consistency of the test-takers performance among all the tests employed in the study, and (d) factor analysis was used to check the characteristics of the tests. After these analyses, (e) implicational scaling was used to clarify the task difficulties among the series of spelling tests.

3.3.2 Results of Quantitative Analysis

3.3.2.1 Sound-Letter Correspondences Test

Sound-letter correspondence test (i.e., SLC test) was used to verify already acquired knowledge of English spelling rules, especially considering regular spellings (i.e., whose rules of connecting sounds and letters are simple and predictable). The reliability of SLC test was high ($\alpha =.891$). The result suggests that the regular words list from Mori (2007) measures junior high school level knowledge of the English spelling rules reliably.

3.3.2.2 The Differences among Five Spelling Tests

Table 3.4 shows the descriptive statistics, reliability, and item discrimination for the five spelling tests (i.e., story form, timed dictation, list form, multiple-choice, and matching task).

Table 3.4

Descriptive Statistics, Reliability, and Item Discrimination for the Five Spelling Tests (N =73)

Test Formats	k	M	SD	Min	Max	Cronbach's alpha	DIS
Story form	10	5.80	2.09	1	10	.67	.64
Timed dictation	10	6.11	2.07	1	10	.63	.60
List form	10	7.47	1.72	2	10	.54	.51
Multiple-choice	10	8.91	1.23	5	10	.46	.42
Matching task	10	9.93	0.30	8	10	.55	—

Note. k = number of items. *Min* = minimum value. *Max* = maximal value. *DIS* (i.e., item discrimination) was calculated using point bi-serial correlations.

A repeated-measures analysis of variance (ANOVA) was conducted to compare the scores of five spelling tests. Table 3.5 shows the result of ANOVA. The results indicated a significant main effect of test formats, $F(2.51, 180.73) = 188.60$, $p <.001$, showing significant differences among tests. Multiple comparison tests indicated no significant difference between story form and timed dictation ($p =.437$); however, the results revealed significant differences among story form, list form, multiple-choice, and matching task ($p =.000$). The results showed significant differences among timed dictation, list form, multiple-choice, and matching task ($p =.000$). The results are summarized as follows: **story form ≒ timed dictation < list form < multiple-choice < matching task**.

Only ten words were used as target words in this study. It is quite likely that the number of few test items caused the results of low Cronbach's alpha. Further research is needed to examine the reliabilities of these test formats. In

addition, the scores of Matching task showed the ceiling effect that almost all the learners could answer correctly during the test.

Table 3.5

One-way repeated-measures ANOVA for the Differences Among Five Spelling Tests in Study 1

Source	SS	df	MS	F	p	η_p^2
Test	924.329	2.51	368.231	188.600	.000	.724
Error	352.871	180.73	1.952			
Total	1277.200	183.24				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

3.3.2.3 Relationships and Consistency among Five Spelling Tests

Pearson's correlation coefficient was used to verify the relationships among sound-letter correspondences (SLC) test and five spelling tests. The correlations were moderately high to high except for the correlations among matching task with other four tests. The correlation coefficients ranged from .57 to .85. The results of Pearson's correlation coefficient are reported in Table 3.6. The correlation between story form and timed dictation was very high (.80), this is probably because the characteristics of these two tests were similar. A test type used in story form and timed dictation was dictation. The only difference is the amount of given information on the answer sheet. Story form was a spot dictation; thus, one short story with several blanks (for each target word) was printed on the sheet. Compared to the story form, in the timed dictation, test-takers need to write the whole sentences on the answer sheet. However,

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looking at the row scores, timed dictation outperformed story form although there was no significant difference with the two tests.

In the previous studies, test which contained a lot of information affected test-takers' performance. In this case, the information in story form evoked reading passage to the learners. Therefore, as far as we can tell from this result, reading passage gave negative effect to the participants. As noted above, timed dictation required test-takers to write the whole sentences, this might be more stressful test compared to spot dictation. However, the result of the scores showed that story form was more difficult than timed dictation. List form only required test-takers to write the correct spellings on the answer sheet and the correlations with other two recall tests were significantly high: list form and story form (.82) and list form and timed dictation (.85). In sum, there were minor differences among three tests (i.e., story form, timed dictation, list form). This is because all three tests required learners to dictate the words they heard. In other words, it is likely that the characteristics of the tests were close. Multiple-choice was a type of receptive recognition test and it was assumed that this test would not correlate highly with other types of tests such as story form, timed dictation, and list form. The results showed there were moderately high correlations among multiple-choice and other three tests (i.e., story form, timed dictation and list form). Thus, it is reasonable to suppose that these four tests can be defined as a series of "spelling tests." Only multiple-choice and matching task were negatively-correlated (-.05) probably due to the ceiling effect of matching task.

Table 3.6 shows the results of Pearson's Correlation among SLC test and the five spelling tests.

Table 3.6

Pearson's Correlation of the Relationships Among Five Spelling Tests

Variable	SLC	SF	TD	LF	MC	MT
SLC	—					
SF	.400**	—				
TD	.502**	.801**	—			
LF	.518**	.821**	.851**	—		
MC	.287*	.592**	.576**	.615**	—	
MT	.268*	.218	.233*	.275*	-.052	—

Note. *p* <.05., **p* <.01, two-tailed. SLC = sound-letter correspondences test. SF = story form. TD = timed dictation. LF = list form. MC = multiple-choice. MT = matching task.

Spearman's rank-order correlation was used to confirm the consistency of test-takers' performance on five spelling tests. First, the results showed that the correlations among story form, timed dictation, and list form were moderately high to high, ranging from .78 to .84. Second, the correlation coefficients of multiple-choice with story form, timed dictation, and list form were moderately high, ranging from .56 to .59. Third, matching task did not correlate with other tests, which means that the test-takers' scores on the matching task were inconsistent with other test scores.

The results of Spearman's rank-order correlations are reported in Table 3.7. The results of matching task and the other four tests were inconsistent probably due to the ceiling effect of matching task. However, other four tests,

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Table 3.7

Consistency With Scores on the Spelling Tests

Variable	SF	TD	LF	MC	MT
SF	—				
TD	.785**	—			
LF	.813**	.845**	—		
MC	.560**	.568**	.595**	—	
MT	.137	.136	.115	-.124	—

Note. **$p <.01$, two-tailed. SF = story form. TD = timed dictation. LF = list form. MC = multiple-choice. MT = matching task.

3.3.4.4 Factor analysis of Five Spelling Tests

One way to evaluate construct validity of the test, the exploratory factor analysis (EFA) was conducted to investigate the test characteristics. Table 3.8 shows the results of the EFA. EFA revealed two factors in the dataset. The first factor consists of story form, timed dictation, list form, and multiple-choice. The second factor consists only of matching task. This shows that the characteristics of matching task differ from those of other spelling tests. Story form, time dictation, list form were productive recall tasks. Multiple-choice and matching task were receptive recognition tasks. The researcher expected that there were two factors revealing two distinctions of tasks; however, the results showed matching task was only a different factor. As noted in the previous section, it may be due to the ceiling effect of the scores of matching task.

Table 3.8

Grouping of the Five Spelling Tests

Test Formats	Factor 1	Factor 2	Communality
Story form	**.880**	.348	.775
Timed dictation	**.844**	.309	.809
List form	**.840**	.265	.896
Multiple-choice	**.770**	-.207	.636
Matching task	.082	**.558**	.318
factor contribution	2.792	.641	3.433
Cumulative contribution ratio	55.847	68.664	

3.3.2 Results of Qualitative Analysis: Implicational Scaling

Table 3.9 summarized the results of the implicational scaling. Implicational scaling tested the author's question "whether the difficulty of the spelling tests determines the acquisition order of English spelling." The value of C_{scal} (i.e., coefficient of scalability) must be greater than .60 (Hatch & Lazaraton, 1991) to show that the data was scalable. According to the data, only three words, *because, found, party,* were not scalable.

Table 3.9

Results of Implicational Scaling in Study 1

Target Words	Formula			
	C_{rep}	MM_{rep}	% improvement	C_{scal}
because	0.940	0.879	0.060	0.500
before	0.951	0.847	0.104	**0.679**
birthday	0.956	0.841	0.115	**0.724**
found	0.940	0.852	0.088	0.593
guitar	0.989	0.753	0.236	**0.956**
pair	0.956	0.797	0.159	**0.784**
party	0.951	0.907	0.044	0.471
piece	0.962	0.847	0.115	**0.750**
shoes	0.978	0.819	0.159	**0.879**
wanted	0.940	0.847	0.093	**0.607**

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}

Appendices for study 1 (Appendix 3G: 1-10) show the matrices (scalogram) of implicational scaling. Everything to the right of the line should be "1" and everything to the left of the line should be "0" because the learners should acquire the right side of the line. The exceptions found in the right and the left sides, called errors, were marked with circle in the matrix. A total of ten matrices were prepared for each target word. Depending on word, shapes of matrices were varied. In addition, we can see the relationships between knowledge of sound-letter correspondences and the spelling test performance. According to the test scores of sound-letter correspondences test, test-takers were divided into two groups: upper and lower. Looking at the full marks, percentages of upper group and lower group also varied. Figure 3.2 is the sample of implicational scaling used in this study.

Although the scalability was moderately high in Figure 3.2, this figure shows the typical form of matrix of implicational scaling. In the figure, there are SLC scores and group division such as upper or lower. Typically in all figures, upper group is displayed in the upper side of the figures which means, test-takers who got high scores in SLC test could answer correctly among all the tests. However, in the middle of figures, there are some discrepancy of lower group and upper group. It is said that learners who have acquired sound-letter correspondences might score highly on the spelling test. However, looking at the figures, the level of test-takers lack coherence.

ID	SLC	group	SF	TD	LF	MC	MT	Total	Non-fit
74	77	upper	1	1	1	1	1	5	0
67	76	upper	1	1	1	1	1	5	0
14	75	upper	1	1	1	1	1	5	0
56	75	upper	1	1	1	1	1	5	0
65	75	upper	1	1	1	1	1	5	0
9	74	upper	1	1	1	1	1	5	0
62	72	upper	1	1	1	1	1	5	0
63	70	upper	1	1	1	1	1	5	0
71	70	upper	1	1	1	1	1	5	0
12	68	upper	1	1	1	1	1	5	0
59	68	upper	1	1	1	1	1	5	0
32	67	upper	1	1	1	1	1	5	0
42	67	upper	1	1	1	1	1	5	0
60	67	upper	1	1	1	1	1	5	0
20	66	upper	1	1	1	1	1	5	0
34	66	upper	1	1	1	1	1	5	0
37	66	upper	1	1	1	1	1	5	0
27	65	upper	1	1	1	1	1	5	0
64	65	upper	1	1	1	1	1	5	0
69	65	upper	1	1	1	1	1	5	0
26	64	upper	1	1	1	1	1	5	0
66	64	upper	1	1	1	1	1	5	0
19	63	upper	1	1	1	1	1	5	0
24	63	upper	1	1	1	1	1	5	0
28	63	upper	1	1	1	1	1	5	0
38	63	upper	1	1	1	1	1	5	0
73	63	upper	1	1	1	1	1	5	0
35	62	upper	1	1	1	1	1	5	0
36	62	upper	1	1	1	1	1	5	0
46	62	upper	1	1	1	1	1	5	0
68	62	upper	1	1	1	1	1	5	0
58	60	lower	1	1	1	1	1	5	0
13	59	lower	1	1	1	1	1	5	0
70	59	lower	1	1	1	1	1	5	0
77	59	lower	1	1	1	1	1	5	0
4	57	lower	1	1	1	1	1	5	0
6	57	lower	1	1	1	1	1	5	0
23	57	lower	1	1	1	1	1	5	0
45	57	lower	1	1	1	1	1	5	0
17	56	lower	1	1	1	1	1	5	0
11	54	lower	1	1	1	1	1	5	0
5	53	lower	1	1	1	1	1	5	0
7	53	lower	1	1	1	1	1	5	0
44	52	lower	1	1	1	1	1	5	0
75	52	lower	1	1	1	1	1	5	0
76	52	lower	1	1	1	1	1	5	0
22	50	lower	1	1	1	1	1	5	0
15	49	lower	1	1	1	1	1	5	0
21	47	lower	1	1	1	1	1	5	0
43	47	lower	1	1	1	1	1	5	0
1	29	lower	1	1	1	1	1	5	0
18	25	lower	1	1	1	1	1	5	0
39	70	upper	0	1	1	1	1	4	0
30	68	upper	(1)	1	(0)	1	1	4	2
8	65	upper	(1)	(0)	1	1	1	4	2
51	65	upper	0	1	1	1	1	4	0
3	64	upper	0	1	1	1	1	4	0
31	64	upper	(1)	(0)	1	1	1	4	2
57	63	upper	(1)	(0)	1	1	1	4	2
52	61	lower	(1)	(0)	1	1	1	4	2
47	57	lower	(1)	(0)	1	1	1	4	2
2	35	lower	(1)	(0)	1	1	1	4	2
78	62	upper	0	(1)	1	(0)	1	3	2
61	58	lower	0	0	1	1	1	3	0
72	66	upper	0	0	(1)	(0)	1	2	2
41	58	lower	0	0	0	1	1	2	0
53	58	lower	0	0	0	1	1	2	0
49	57	lower	(1)	0	0	(0)	1	2	2
10	52	lower	(1)	0	0	(0)	1	2	2
16	32	lower	0	0	0	1	1	2	0
55	55	lower	0	0	0	0	1	1	0
40	53	lower	0	0	0	0	1	1	0
50	37	lower	0	0	0	0	1	1	0
Total			61	57	64	66	73	321	
Non-fit			9	7	2	4	0		22

Figure 3.2. Scale for because.

In the studies of L1, knowledge of sound-letter correspondences or grapheme-phoneme correspondences rule (GPC rule) is considered as very important fundamental knowledge for spelling ability. In addition, phonological awareness is also important for spelling acquisition. Thus, there are a lot of studies which focused on the relationships between phonological awareness and spelling ability. However, the results from this analysis showed that it was not so clear whether there is a strong relationship between the knowledge of sound-letter correspondences rules and the spelling ability among Japanese EFL learners.

This study also tried to examine the use of implicational scaling in order to define the task difficulties among the several test formats. In the previous studies, implicational scaling was not used in the spelling research. The results showed that implicational scaling (Hatch & Lazaraton, 1991) was beneficial in order to define task difficulties of diagnostic spelling tests among Japanese EFL high-school learners.

3.4 Summary of the Findings: Chapter 3 (Study 1)

3.4.1 Answers to RQ1-1

RQ1-1: Are sound-letter correspondence knowledge and spelling test performance related?

The results of sound-letter correspondence knowledge were related moderately high with story form, timed dictation, and list form. However, only weak correlation coefficients were found with multiple-choice and matching task. It was thought to be due to the test characteristics which include sound form. Sound-letter correspondence test was asking learners to write down the spellings

of the pronounced words. Story form, timed dictation, and list form asked same procedure to the learners. Similar test items tend to relate with each other.

3.4.2 Answers to RQ1-2

RQ1-2: Do the types of spelling test formats affect learners' spelling test performance?

The comparison of the spelling test performance using ANOVA showed that story form and timed dictation were much more difficult compared to list form, multiple-choice, and matching task. As far as we know, story form was a challenging test because it required test-takers to simultaneously read the story, listen to the researcher's utterance, and fill in the words. That is to say, contextual setting affected test-takers' performance as Brody (1944) indicated in the past. For instance, learners who are not comfortable with reading the passage might have confused with understanding the content of story form test.

Concerning timed dictation test, test-takers were required to write down the entire sentences; therefore, this test was too difficult for some learners with lower writing skills. One could argue that contextual clues are effective for understanding or inferring the meaning of the words, however, there are cases in which contextual or sentential information has a negative effect on test-takers' performance, in this case, on spelling test situation. Although the influence of proficiency level remains a possibility, it can be said that the contextual or sentential settings exert a greater influence on learners' spelling test performance.

The relationships among the spelling tests analyzed with Pearson's correlation coefficient showed that each spelling test correlated moderately or

highly with each other except for the correlations of matching task with the other four tests. The significant correlations among the four tests (i.e., story form, timed dictation, list form, and multiple-choice) were consistent with the results of some previous studies (e.g., Allred, 1984; Freyberg, 1970; Westwood, 1999).

The results were consistent with the previous studies in that the production type test was much more difficult compared to the recognition type test. In the present study, production type tests included story form, timed dictation, list form, and recognition type tests included multiple-choice and matching task. It may be possible to categorize matching task as recognition type test because of the task completion procedure. Then, it might be possible to conclude that the consistent results, indicating that the production test is more difficult than the recognition test, could be found for L2/EFL learners.

3.4.3 Answers to RQ1-3

RQ1-3: What are the characteristics of the scalabilities among ten target words?

It would be helpful to show the accuracy rate of each spelling test's score shown in Table 3.10. As described in the previous sections, implicational scaling can be used to understand the task difficulties in language acquisition. The present study arrayed the data by considering the difficulty of each spelling test as predicted by the test scores.

Table 3.10

Accuracy Rates of Target Words Among Five Spelling Tests

Target word	Story form	Timed dictation	List form	Multiple-choice	Matching task	Total
because	83.56	78.08	87.67	90.41	100.00	87.95
before	76.71	72.60	84.93	89.04	100.00	84.66
birthday	79.45	75.34	79.45	86.30	100.00	84.11
found	76.71	78.08	83.56	91.78	95.89	85.21
guitar	60.27	61.64	63.01	91.78	100.00	75.34
pair	60.27	56.16	82.19	100.00	100.00	79.73
party	84.93	87.67	87.67	93.15	100.00	90.68
piece	12.33	15.07	63.01	87.67	100.00	55.62
shoes	15.07	19.18	21.92	65.75	100.00	44.38
wanted	30.14	67.12	93.15	95.89	97.26	76.71
Total	57.95	61.10	74.66	89.18	99.32	76.44

According to the results of implicational scaling, most words in the present study were scalable except for three words, *because, found,* and *party.* The reasons for those unscalable words are as follows. First, the word 'because' was highly frequent word. The accuracy rate from Table 3.10 indicated that test scores for the word 'because' did not vary much across the spelling test formats, which means that the test-takers in the present study had already acquired appropriate usage, spelling, and the meaning of the word. If the scores were consistent among five spelling tests, implicational scaling would not function very well. Next, the word 'found' reflected past tense form. The accuracy rate from Table 3.9 showed that test-takers scored lower on the story form and timed dictation. Although the coefficient of scalability was almost .60, it was not scalable (i.e., C_{scal} was .59, in word *found*).

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It had been discussed that acquiring past tense form is complicated; thus, one must conclude that the results would be different with root, present tense, form 'find.' Further research is needed to verify the result. Last, the word 'party' was highly frequent. It is likely that all learners already acquired this word. Consistently high accuracy rate supports this assumption.

Regrettably, some words were not scalable due to the reasons explained above. However, five words in the present study were highly scalable, such as *birthday, guitar, pair, piece,* and *shoes*. This means that there are high possibilities of the beneficial use of implicational scaling as a practical method for analyzing learners' spelling acquisition and identifying words that are more difficult to acquire compared to other words. The use of implicational scaling was somewhat exploratory. However, the findings from the implicational scaling analysis showed interesting results. The difficulty of the spelling tests used in the study could be displayed in the following way:

Story form < Timed dictation < List form < Multiple-choice < Matching task

(difficult → easy)

In sum, there are four findings: (a) most learners scored high on matching task, showing that they already acquired the meaning of the target words and can choose the appropriate meaning of the words, (b) Many learners scored highly on multiple-choice, indicating that they can choose the correct spelling among distractors, as reflected by the high scores on the recognition test, (c) learners' test scores on the production test were lower compared to the matching task and multiple-choice, and (d) The scores on timed dictation and story form dropped dramatically compared to other tests, confirming that these two tests were highly

loading tests. That is to say, contextual or sentential information was ineffective for the participants in this study to answer English spellings.

3.4.4 Results of Matching Task

As indicated above, the researcher added matching task to confirm that test-takers understood the meaning of the target words. Thus, it seemed that matching task was measuring different ability because this test did not relate to other spelling tests, which was particularly evident from the results of the factor analysis conducted in the present study. However, as said before, the process of understanding the meaning of English words is different for L2/EFL learners and native speakers of English. Therefore, matching task was needed to assess learners' acquisition of meaning, namely test-takers' acquired knowledge of the target words' meanings. The result of matching task indicated a ceiling-effect which means large proportion of participants could answer perfectly with this test. However, we can say that almost all test-takers in the present study understood the meaning of the words, even though the results of Spearman's rank-order correlation coefficient indicated inconsistent test scores. Therefore, the inconsistency in test scores could stem from the difference among the spelling tests.

The present study had two main purposes: (a) to examine the spelling knowledge among Japanese high school students using various spelling tests and (b) to verify the weaknesses of English spelling knowledge with *implicational scaling* by comparing spelling test performance.

First, consistent with the previous studies, we found that the production tests (i.e., story form, timed dictation, and list form) were more difficult compared to recognition tests (i.e., multiple-choice and matching task). Except for the matching task added by the researcher, other four tests correlated significantly, indicating that those tests related to each other.

Second, it was successful to use the implicational scaling to analyze various kinds of spelling tests' scores to clarify the task difficulties among several test formats. Although some exceptions were found in the data, the results clearly showed that implicational scaling is beneficial to define the task difficulties. Statistical differences among five test scores indicated that the production type tests (i.e., story form, timed dictation, and list form) were more difficult compared to the recognition type tests (i.e., multiple-choice and matching task), which was in consistency with the previous studies.

The present study employed implicational scaling procedure in an exploratory way because no other studies used this method to clarify the task difficulties in spelling test formats. Further investigation is needed concerning (a) vocabulary levels and (b) test-takers' proficiency levels utilizing other spelling test formats. In sum, from the pedagogical point of view, it can be concluded that implicational scaling has many possibilities for analyzing learners' spelling knowledge with the various types of test formats.

Chapter 4   Spelling Performance on University Students: Study 2

4.1 Purpose of the Study

The purposes of the present study are (a) to examine the spelling test performance among Japanese university students using various types of tests, (b) to investigate the relationships between vocabulary size and spelling tests, and (c) to verify the weaknesses of English spelling knowledge with *implicational scaling* (Hatch & Lazaraton, 1991) by comparing spelling test performance.

This study, Study 2, examined Japanese university students' spelling knowledge utilizing various kinds of spelling test formats (i.e., story form, timed dictation, list form, multiple-choice, translation task, and matching task) and a vocabulary size test (i.e., the Mochizuki Test, 1998). A vocabulary size test measures learners' breadth of vocabulary knowledge and the spelling tests measure learners' depth of vocabulary knowledge. The breadth and the depth seemed to be not so much related; however, some researchers focused on these two aspects and trying to figure out the relationships between breadth and depth. It is said that if the learners' vocabulary size (breadth of knowledge) is not enough (under 5000 word level), it is worthless to examine learners' depth of vocabulary knowledge (e.g., Meara, 1996).

Nevertheless it is still important to examine the relationships between breadth and depth of vocabulary knowledge, because focusing on one aspect (breadth only or depth only) of vocabulary knowledge is insufficient if we want to investigate and evaluate learners' vocabulary knowledge precisely with various aspects. Added to this, the number of studies focused on the depth of vocabulary knowledge is small compared to the breadth of vocabulary knowledge.

Moreover, it is also important to consider the task difficulties among various types of spelling tests, especially focusing on the depth of vocabulary knowledge, to understand the learners' weaknesses of spelling knowledge. With all these reasons, the research questions for this study are as follows:

RQ2-1: What are the characteristics of the spelling tests used in this study?

RQ2-2: What relationships exist between estimated vocabulary size (breadth of vocabulary knowledge) and performance on spelling tests (depth of vocabulary knowledge)?

RQ2-3: What are the characteristics of the scalabilities among twelve target words?

4.2 Methods

4.2.1 Pilot Study 1

The purpose of Pilot Study 1 was to collect the spelling errors for making multiple-choice test. In order to prepare distractors for multiple-choice test, it might be appropriate to collect errors from real data. Incorrect spelling data were collected from learners affiliated with National College who were in the same year as were this study's participants. The participants in the Pilot Study 1 took the dictation test of one short story. A story which was used in this pilot study was as same as the short story in story form tests in the experimental session. Detailed information about this story will be explained in the following section.

4.2.2 Participants

A total of 95 Japanese first-year university students from two different

universities participated in the present study. However, eleven students who could not take vocabulary size test or could not complete all spelling tests were excluded from the analysis. Eventually the data collected from 84 students were analyzed.

4.2.3 Materials

The materials in this study consisted of the Mochizuki Test (Mochizuki, 1998) and six spelling tests (i.e., story form, timed dictation, list form, multiple-choice, L2 to L1 translation task, and matching task). Since the reliability and validity of the Mochizuki Test have been already verified, this study used the Mochizuki Test to measure participants' vocabulary size. Of the six spelling tests, the researcher developed the L2 to L1 translation task and the matching task using some examples from Webb (2008). Other test formats were derived from previous studies (e.g., Brody, 1944; Moore, 1937; Northby, 1936).

4.2.3.1 Mochizuki Vocabulary Size Test (Mochizuki, 1998)

The Mochizuki Test (1998), consisting of seven levels, was used to measure participants' estimated vocabulary size. This test measured the vocabulary size from 1,000 to 7,000 lemmas (e.g., Koizumi & Mochizuki, 2011). Considering test-takers' skills in the present study, the author decided to use level 1 to level 4 (i.e., 1,000 words level to 4,000 words level) from the Mochizuki Test. In general, the average vocabulary size of university students is around 3,000; however, the average scores on the Mochizuki Test in the present study were around 2,600, which was not so high. This test can be used to increase

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our understanding of how the vocabulary size related to spelling knowledge among EFL university students.

4.2.3.2 Target Words and Spelling Tests

In order to develop materials for a story form test, which will be explained in the following sub-section, we needed to choose a passage from a reliable source. Therefore, some of the reading sections of the TOEIC and EIKEN served as alternatives for the study. Finally, speaking test material from the second grade EIKEN (Obunsha, 2001) was utilized to create the test. Before conducting the experiment, the same speaking test material was used as a dictation test for the learners who were in the same year and affiliated with a National College. With the dictation test, incorrect spelling data were collected and the words that a large percentage of students misspelled were chosen as the target words for the present study. With this procedure, twelve words (i.e., *before, buying, choice, compared, convenient, crowded, delivered, products, rather, recently, still,* and *wider*) were chosen from the speaking test material. Table 4.1 summarized the data of target words.

In should also be added that the vocabulary difficulty was explained with the JACET 8000. This is corpus-based lists showing word frequencies. There are eight levels in the list. The words in level 1 are the most frequently used words and the words in level 8 is infrequent words.

Table 4.1

Target Words in Study 2

Target Word	JACET 8000	Syllable	Phonetic Symbol
before	1	2	/bifɔˈːr/
buying	1	2	/baiˈiŋ/
choice	1	2	/tʃɔˈis/
compared	1	2	/kəmpeˈər
convenient	3	3	/kənviˈːniənt/
crowded	1	2	/kraˈudid/
delivered	2	3	/diliˈvər/
product(s)	1	2	/praˈdəkt/
rather	1	2	/ræˈðər/
recently	1	3	/riˈːsntli/
still	1	1	/stiˈl/
wider	1	2	/waiˈdɚ/

Note. Phonetic symbols were taken from online dictionary ALC (http://www.alc.co.jp/). The phonetic symbol converter (http://www.manabo.net/).

In Takanami (2012), one reading passage from the fourth grade EIKEN (Obunsha, 2004) was employed; however, reading passages from the second grade EIKEN were too long and complicated for the purpose of this study. For this reason, the present study utilized speaking test material. Followings are the detailed explanations for each material used in the study. Also, the characteristics of spelling tests are summarized in Table 4.2.

Table 4.2

Characteristics of the Test Format Employed in the Present Study (Based on Nation, 1990; 2001)

Test formats	Aspects of vocabulary knowledge	Types of Knowledge	Test types
		Receptive (R) or Productive (P)	Recall or Recognition
Story form	F: spoken → written U: grammatical functions	R → P R + P	Recall
Timed dictation	F: spoken → written U: grammatical functions	R →P R + P	Recall
List form	F: spoken → written	R → P	Recall
Multiple-choice	F: written	R	Recognition
L2 to L1 translation task	M: form (written) and meaning	R	Recall
Matching task	M: form (written) and meaning	R	Recognition

Note. In column 2, definitions of the aspects of vocabulary knowledge came from Nation's (1990; 2001) distinction. The abbreviations include F for "form," M for "meaning," and U for "use." In the column 3, types of knowledge also came from Nation's distinction of receptive knowledge and productive knowledge. Receptive knowledge relates to listening and reading, and productive knowledge relates to speaking and writing.

Appendices 4A to 4F are the examples of the test formats.

a. Story form: Listen to the story and fill in the blanks

The story form, one form of a recall test focusing on receptive and productive knowledge, is a test that requires test-takers to listen carefully to the story and fill in the blanks in a short story (i.e., spot dictation). The story was derived from the speaking test section of second grade EIKEN (Obunsha, 2001). Twelve target words were chosen from the passage (see Appendix 4A).

b. Timed dictation: Dictate the sentences you hear

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Timed dictation test is a recall test that focuses on both receptive and productive knowledge and requires test-takers to dictate the sentences they hear. Twelve sentences comprising one target word each were prepared for the test. In order to avoid artificiality, sentences for timed dictation were chosen from online dictionary of ALC (http://www.alc.co.jp/) and Google (http://www.google.co.jp/). Some sentences involving difficult expressions were modified. The researcher read-aloud the sentences twice and the test-takers were required to write the entire sentence (see Appendix 4B).

c. List form: Write the spelling of the words

The list form was a recall test that focuses on both receptive and productive knowledge and requires test-takers to write down the spelling of each target word. The researcher pronounced target words two times, and subsequently, test-takers tried to write down the spelling of each target word. This test is the most traditional form of the spelling test (see Appendix 4C).

d. Multiple-choice: Choose the correct spelling

The multiple-choice test was a recognition test measuring receptive knowledge. Four incorrect spellings (i.e., distractors) and one correct spelling were prepared for each target word. In order to prepare distractors for the study, incorrect spelling data were collected from learners affiliated with National College who were in the same year as were this study's participants. Test-takers had to choose one correctly spelled word and circle the answer (see Appendix 4D).

e. L2 to L1 translation task: Write the meaning of the target words

L2 to L1 translation task can be categorized as a recall test, focusing on receptive knowledge. This was not included in the previous studies, which measured only L1 learners' spelling ability. Previous studies did not need to ask test-takers to translate the meaning. However, for the purpose of the present study, it was necessary to assess test-takers' ability to translate English words (L2) into Japanese words (L1) to understand whether they know the meaning of the target words (see Appendix 4E).

f. Matching task: Match the word meaning with spelling

This test was a recognition test that focused on receptive knowledge. The researcher added the test to understand participants' already acquired knowledge of the meaning of the target words. Compared to L2 to L1 translation task, this test was very easy to answer. In fact, the result of Takanami's (2012) study on high school students' spelling ability showed ceiling effect for the matching task, which provided a reason for adding this test in the experimental design. For L2 or EFL students, understanding words' pronunciation does not appear to be directly related to their meaning in their first language; thus, asking participants to choose the appropriate meaning of the words was considered very important to truly understand what they know and what they do not know about the words' meaning (see Appendix 4F).

4.2.4 Design

All participants completed all tests because the present study employed a within-subject design. The purpose of diagnostic tests is to find learners'

weaknesses through the tests. The spelling tests in this study each measure different abilities related to spelling knowledge; thus, all six tests were a series of diagnostic test and the test-takers who participated the study must complete answering all the tests. The following sections provide more detailed information about the materials used in this study.

4.2.5 Procedure

The test in this study comprised two sessions. The first session included the Mochizuki Vocabulary Size Test (Mochizuki, 1998), which tested test-takers' estimated vocabulary size. The second session consisted of six spelling tests designed to measure learners' spelling knowledge. The participants completed each session on a different day. Test-takers needed to answer all tests included in the second session continuously, replicating the procedures from previous studies. Figure 4.1 describes the procedure for the second session of the study. It took approximately 30 minutes to complete the second session (i.e., Figure 4.1).

Figure 4.1. Experimental procedures of Study 2.

4.2.6 Scoring

Each correct spelling received "1" point and incorrect spelling received "0" point. Table 3 shows the scoring of each spelling test. For L2 to L1 translation task, the translation of synonym received a score of "1," because the translation task required test-takers to identify only the meaning of a word in their L1 (Japanese).

Table 4.3

Scoring of Spelling Tests

Test format	Correct	Incorrect
Story form	1	0
Timed dictation	1	0
List form	1	0
L2 to L1 translation task	1	0
Multiple-choice	1	0
Matching task	1	0

4.2.7 Analysis

In order to answer research questions, four quantitative analyses and one qualitative analysis were conducted. With respect to the quantitative analysis, (a) a repeated-measures analysis of variance (ANOVA) was used to understand the difficulty level of each spelling test, (b) a Pearson's product-moment correlation coefficient was used to examine the relations among vocabulary knowledge and the spelling test, (c) Spearman's rank-correlation coefficient was used to survey consistency of test-takers' performance on the tests, and (d) factor analysis was utilized to examine the underlying structure of the constructs used in the present study. Furthermore, qualitative analysis was done with (e) implicational scaling (Hatch & Lazaraton, 1991) to take a close look at the relations between difficulty of the spelling tests and the acquisition order of the English spellings among Japanese university students.

Implicational scaling uses four steps to calculate the value of scalability. In the first step, *coefficient of reproducibility* (henceforth C_{rep}) needs to be calculated to predict participant's performance from the matrix (= figure prepared for implicational scaling). To fulfill the criterion of validity, this value should be greater than .90 (i.e., value > .90). In the second step, *minimum marginal reproducibility* (henceforth MM_{rep}) needs to be calculated to examine predictability in the matrix without errors terms. This value should be smaller than the value of the coefficient of reproducibility (i.e., value < [the value of the C_{rep}]). In the third step, the margin of the coefficient of reproducibility and the minimum marginal reproducibility is calculated to see the *percent improvement in reproducibility* (henceforth % improvement). In the final step, *coefficient of scalability* (henceforth C_{scal}) is determined using the three values, C_{rep}, MM_{rep},

and percent improvement, calculated in the previous three steps. This provides an indication of whether the items in the matrix are truly scalable and unidimensional, and this value (C_{scal}) must be greater than .60 (i.e., value > .60).

4.3 Results and Discussion

4.3.1 Results of Quantitative Analysis

4.3.1.1 Difficulty Among Spelling Test Scores

Table 5.3 shows the descriptive statistics, reliability and Item Discrimination for the six spelling tests (i.e., story form, timed dictation, list form, L1-L2 translation task, multiple-choice, and matching task). Concerning Cronbach's alpha, the multiple-choice test had a slightly lower value (.69) compared to other spelling tests (ranging from .80 to .82). This was because the multiple-choice test required test-takers to choose the correct answer (spelling), and it might be possible that sometimes test-takers simply select an answer without thinking properly.

A repeated-measures analysis of variance (ANOVA) was utilized to examine the difficulty of the six spelling tests (i.e., story form, timed dictation, list form, L2 to L1 translation task, multiple-choice, and matching task). The result showed a significant main effect of test formats, $F(3.48, 289.09) = 196.74$, $p < .001$, indicating significant differences among tests. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption. After this, multiple comparison tests showed no significant difference between story form and timed dictation ($p = .077$) and between L2 to L1 translation task and multiple-choice ($p = .120$). However, all other comparisons among tests showed

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significant differences (p =.000). Table 4.5 is ANOVA table for the differences among six spelling tests.

Table 4.4

Descriptive Statistics, Reliability, Item Discrimination for the Six Spelling Tests (N =84)

Test Format	k	M	SD	Min	Max	Cronbach's alpha	DIS
Story form	12	5.49	2.93	0	12	.81	.78
Timed dictation	12	5.90	3.04	0	12	.81	.79
List form	12	6.50	2.89	0	12	.80	.77
L2 to L1translation task	12	8.01	3.26	2	12	.86	.85
Multiple-choice	12	8.63	2.38	4	12	.69	.68
Matching task	12	10.51	2.22	4	12	.82	.83

Note. k = number of items. *Min* = minimum value. *Max* = maximal value. *DIS* (i.e., Item discrimination) was calculated using point bi-serial correlations.

Table 4.5

One-way repeated-measures ANOVA for the Differences Among Six Spelling Tests in Study 2

Source	SS	df	MS	F	p	η_p^2
Test	1616.397	3.61	447.410	208.281	.000	.703
Error	682.936	317.92				
Total	2299.333	321.53				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

The results obtained by ANOVA were consistent with the previous study (Takanami, 2012), except for L2 to L1 translation task (which was added to the current study). Contrary to the expectation, the scores on translation and matching tasks were statistically different primarily because different task types

measured different aspects of learners' spelling knowledge. For instance, the recall test was used to assess translation while the recognition test measured word recognition. Therefore, difficulty of the six spelling tests can be described as follows (RQ1-1):

story form ≒ timed dictation < list form < L2 to L1 translation task ≒ multiple-choice < matching task   (difficult → easy).

4.3.1.2 Pearson's Correlations Among Vocabulary Size and Spelling Tests

To understand the relationships among estimated vocabulary size (Mochizuki Test) and each spelling test, Pearson's correlation was utilized. The results are summarized in Table 4.6, suggesting that all correlations ranging from .65 to .93 were statistically significant (all $ps < .01$).

Table 4.6

Pearson's Correlation Among Vocabulary Size and Spelling Tests

Variable	Mo_T	SF	TD	LF	TT	MC	MT
1	—						
2	.760**	—					
3	.810**	.902**	—				
4	.743**	.900**	.927**	—			
5	.831**	.838**	.870**	.814**	—		
6	.767**	.870**	.853**	.884**	.769**	—	
7	.680**	.710**	.705**	.645**	.665**	.665**	—

Note. **p <.01, two-tailed. Mo_T = Mochizuki Vocabulary Size Test (Mochizuki, 1998). SF = story form. TD = timed dictation. LF = list form. TT = L2 to L1 translation task. MC = multiple-choice. MT = matching task.

As noted above, matching and translation tasks were added to understand test-takers' knowledge of the meaning of the target words. Although significant correlations could not be expected based on the findings from the previous studies (e.g., Takanami, 2012), the results obtained from Pearson's correlation were moderately high to high (RQ2-1). Presumably, the difficulty level of vocabulary affected correlations in Takanami's past study. In fact, previous study showed a ceiling effect in matching task while this study did not.

Notably, correlations between timed dictation and list form were high (r = .92) because they both required test-takers to spell out the words they heard. In addition, the significant correlations among the four tests (i.e., story form, timed dictation, list form, and multiple-choice) were consistent with the results from the previous studies (e.g., Allred, 1984; Freyberg, 1970; Westwood, 1999; Takanami, 2012).

The correlations among all tests, including the Mochizuki Test, were significant (all ps <.01) in the present study. Generally, it seems meaningless to evaluate the depth of vocabulary knowledge with the participants whose vocabulary size was under 5000 words (e.g., Meara, 1996). However, the study found that depth of vocabulary knowledge also correlates with estimated vocabulary size among Japanese university students learning English.

4.3.1.3 Spearman's Rank-order Correlations Among Vocabulary Size and Spelling Tests

After using Pearson's correlation coefficient, Spearman's rank-order correlation coefficients were utilized to investigate the consistency of test-takers' performance on the vocabulary size test and the spelling tests. All the

correlations were statistically significant (all ps $<.01$), ranging from .65 to .92, as summarized in Table 4.7.

Table 4.7

Spearman's Rank Correlation Among Vocabulary Size and Spelling Tests

Variables	Mo_T	SF	TD	LF	TT	MC	MT
1	—						
2	.800**	—					
3	.841**	.913**	—				
4	.772**	.906**	.923**	—			
5	.872**	.852**	.886**	.826**	—		
6	.779**	.882**	.857**	.889**	.764**	—	
7	.719**	.726**	.736**	.649**	.788**	.764**	—

Note. **p $<.01$, two-tailed. Mo_T = Mochizuki Vocabulary Size Test (Mochizuki, 1998). SF = story form. TD = timed dictation. LF = list form. TT = L2 to L1 translation task. MC = multiple-choice. MT = matching task.

The results from the analysis were consistent with spelling test performance. On the other hand, the results were not consistent with the previous study (e.g., Takanami, 2012b). The consistency with the test performance indicated that "the learner who answered correctly on one test could answer other tests correctly and vice versa," as was hypothesized in Northby (1936). However, we could not see how the target word affects spelling performance. Therefore, this study used quantitative analysis to examine the effects of each word on spelling performance.

4.3.1.4 Factor Analysis of Six Spelling Tests

Exploratory factor analysis (EFA) was conducted. Contrary to the result from Takanami (2012), only one factor labeled "spelling tests" was found in the

factor analysis, which means that all items measure a single underlined construct. In Takanami (2012), matching task was found to be another factor, perhaps due to the already mentioned ceiling effect. Table 4.8 shows the results of the analysis.

Table 4.8

Factor Analysis for the Six Spelling Tests

Test Format	Factor 1	Communality
Story form	.96	.90
Timed dictation	.95	.92
List form	.94	.88
L2 to L1 translation task	.91	.82
Multiple-choice	.90	.81
Matching task	.76	.58
factor contribution	4.90	4.90
Cumulative contribution ratio	81.56	

4.3.2 Results of Qualitative Analysis (Implicational Scaling)

Table 4.9 shows the results of the implicational scaling. As noted above, implicational scaling was used to understand the acquisition order of English spelling among Japanese university students. To use implicational scaling, the value of C_{scal} (i.e., coefficient of scalability) must be greater than .60 (Hatch & Lazaraton, 1991) to verify that the data is scalable. The result showed that all words in the present study are highly scalable (ranging from .89 to .96), which means the use of implicational scaling was appropriate in the present study (RQ3). In other words, difficulty level of spelling tests could describe the acquisition order of English spelling among EFL university students. Matrices for implicational scaling are summarized in Appendix 4G (1-12).

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Table 4.9

Results of Implicational Scaling: Scalability

Target Word	Formula			
	C_{rep}	MM_{rep}	% improvement (C_{rep} - MM_{rep})	C_{scal}
before	0.974	0.468	0.506	0.951
buying	0.968	0.412	0.557	0.946
choice	0.938	0.383	0.556	0.900
compared	0.937	0.355	0.581	0.902
convenient	0.940	0.370	0.570	0.906
crowded	0.942	0.341	0.601	0.913
delivered	0.933	0.386	0.547	0.890
products	0.951	0.337	0.614	0.927
rather	0.941	0.226	0.715	0.924
recently	0.956	0.318	0.638	0.936
still	0.949	0.433	0.517	0.911
wider	0.935	0.375	0.560	0.895
AVERAGE	0.947	0.367	0.580	0.917

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}

Table 4.10 lists the percentage of accuracy of the 12 target words in this study. We can see that four words (i.e., *compared*, *convenient*, *crowded* and *delivered*), did not reach 50 % accuracy for two possible reasons. One possible reason is the past tense/participle form. It is said that acquiring this form is more difficult than acquiring the root form. Another possible reason may involve similarity of the word *convenient* with Japanese-English word (*katakana*). In other words, the word *convenient* was too familiar to participants. Therefore, writing katakana word using alphabets was especially difficult for the learners.

Table 4.10

Accuracy Rates of Target Words among Six Spelling Tests

Target words	SF	TD	LF	TT	MC	MT	Average
before	91.67	90.48	92.86	94.05	92.86	100.00	93.65
buying	65.48	66.67	79.76	89.29	92.86	100.00	82.34
choice	61.90	61.90	66.67	100.00	69.05	100.00	76.59
compared	14.29	29.76	22.62	33.33	57.14	69.05	37.70
convenient	22.62	26.19	26.19	72.62	39.29	85.71	45.44
crowded	25.00	25.00	36.90	47.62	58.33	79.76	45.44
delivered	20.24	23.81	25.00	70.24	57.14	85.71	47.02
products	22.62	22.62	33.33	55.95	88.10	88.10	51.79
rather	42.86	48.81	53.57	46.43	64.29	72.62	54.76
recently	38.10	40.48	44.05	57.14	61.90	85.71	54.56
still	85.71	84.52	90.48	72.62	94.05	91.67	86.51
wider	58.33	70.24	78.57	61.90	88.10	92.86	61.17
AVERAGE	45.73	49.21	54.17	66.77	71.92	87.76	62.59

Note. SF = story form. TD = timed dictation. LF = list form. TT = L2 to L1 translation task. MC = multiple-choice. MT = matching task.

Overall, the accuracy gradually declined from matching task to story form. However, the accuracy of spelling *before* and *still* did not decline dramatically across the tests, which shows that the present study's participants have already acquired these two words with various aspects of spelling knowledge.

4.4 Summary of the Findings: Chapter 4 (Study 2)

Chapter 4 (Study 2) tried to investigate the differences among the spelling tests formats and to verify the acquisition order to English spellings among Japanese EFL university students. The followings were the main findings and the answers to the research questions in the present study.

4.4.1 Answers to RQ2-1

RQ2-1: What are the characteristics of the spelling tests used in this study?

Difficulty of the six spelling tests can be described as follows:

story form ≒ timed dictation < **list form** < **L2 to L1 translation task** ≒ **multiple-choice** < **matching task**

(difficult → easy).

Most learners scored high on matching task (recognition test / receptive knowledge) and L2 to L1 translation task (recall test / receptive knowledge), suggesting that they already acquired the meaning of the target words and could correctly select the form of the words' spelling.

Most learners scored high on multiple-choice test (recognition test / productive knowledge), indicating that they know the correct form of the words' spelling, which means they can select the correct spelling among several distractors.

Many learners scored high on L2 to L1 translation task (recall test / receptive testing (L2 to L1), indicating that Japanese university students know the meaning of the words in Japanese, although they have difficulty writing them.

Only half of the students (54.17%) could answer correctly with the items on the list form test, showing that spelling English words is not so easy for Japanese university students (recall test / productive knowledge).

The scores on the story form and the timed dictation dropped drastically compared to other tests, indicating that these two tests were too difficult (highly loading) for this study's participants (recall test / productive knowledge).

4.4.2 Answers to RQ2-2

RQ2-2: What relationships exist between estimated vocabulary size (breadth of vocabulary knowledge) and performance on spelling tests (depth of vocabulary knowledge)?

The correlations among all tests, including estimated vocabulary size test (Mochizuki Test, 1998) and the six spelling tests, were significant.

4.4.3 Answers to RQ2-3

RQ2-3: What are the characteristics of the scalabilities among twelve target words?

The result of the implicational scaling showed that the difficulty level of spelling tests could describe the acquisition order of English spelling among Japanese EFL university students.

The present study had three purposes: (a) to examine the spelling test performance among Japanese university students using various types of tests, (b) to investigate the relationships between vocabulary size and spelling tests, and (c) to verify the weaknesses of English spelling knowledge with *implicational scaling* (Hatch & Lazaraton, 1991) by comparing spelling test performance.

First, we found that the production tests (i.e., story form, timed dictation, list form and L2 to L1 translation task) were more difficult compared to recognition tests (i.e., multiple-choice and matching task), which is consistent with the previous studies. Factor analysis showed that all spelling tests used in the current study loaded on one factor, "spelling tests," which was inconsistent with the results from Takanami (2012). Further research is needed to examine the

task differences with various types of tests especially focusing on spelling knowledge. The test formats in Study 1 and this study (Study 2) included several aspects of language acquisition. It is better to focus on the spelling knowledge in the aspects of vocabulary knowledge.

Second, we also found that the correlations among Mochizuki Test (1998) and the six spelling tests were statistically significant and were moderately high to high, which means test-takers' vocabulary size and the spelling performance were related. Therefore, assessing learners' spelling performance is also important even though their vocabulary size does not sufficiently reflect the depth of vocabulary knowledge. We can assess their spelling knowledge precisely using various kinds of spelling tests. Third, it was appropriate to use the implicational scaling to analyze various kinds of spelling tests' scores in order to understand the acquisition order or English spellings.

The present study utilized implicational Scaling procedure in an exploratory way, in accordance with Takanami (2012). Further investigation is needed with other types of spelling tests to cover the detailed aspects of spelling knowledge dealing with receptive knowledge and productive knowledge. From the pedagogical point of view, it can be concluded that implicational scaling was useful and increased our understanding of the learners' acquisition order of English spelling.

Chapter 5   Examining Diagnostic Spelling Tests (Part 1): Study 3

5.1 Purpose of the Study

The purposes of this study (Study 3) are (a) to compare performances on recall and recognition tasks in English spelling tests, (b) to investigate the relationships between vocabulary size and spelling tests, (c) to verify the weaknesses of English spelling knowledge among Japanese EFL learners with *implicational scaling* (Hatch & Lazaraton, 1991) by comparing their spelling test performance, and (d) to categorize the learners with diagnostic spelling tests' performance.

Study 1 targeted high school students and study 2 focused on university students. Not only the participants, but also the test formats in study 1 and study 2 differ from those of study 3. The tests in study 1 and study 2 contained aspects that were more complicated, such as reading comprehension or grammatical knowledge, compared to the previous spelling tests. This study focused on university students' spelling ability and emphasized developing diagnostic tests for English spelling acquisition among Japanese EFL learners. Comparing the results of this study with study 1 and study 2 will give us fruitful implications for teaching English spelling to the Japanese learners.

In order to understand learners' precise knowledge of vocabulary aspects summarized in Nation (1990, 2001), we needed to prepare vocabulary tests for each aspect. Therefore, the author decided to create several types of vocabulary tests that measure different aspects of the words. Combining Nation's definition of vocabulary knowledge and the three language codes described above, 12 tests were developed for this research. The first half of the six tests comprised recall

tests and the other half consisted of recognition tests. Two sets of the tests were designed to measure the same aspects of vocabulary knowledge. The six aspects are as follows: (a) sound to letter, (b) sound to meaning, (c) letter to sound, (d) letter to meaning, (e) meaning to letter, and (f) meaning to sound.

As Nation (1990, 2001) summarized the aspects of knowing a word, this study tries to use Nation's concepts to verify the learners' vocabulary knowledge focusing on spelling ability with using various kinds of tests. Another type of vocabulary test that would focus on "form and meaning" should be created for diagnostic purposes. This study attempted to suggest a model of task difficulties related to Japanese EFL learners' spelling acquisition along with the aspects of vocabulary knowledge. Therefore, it was necessary to develop various types of tests assessing different aspects of learners' spelling knowledge and vocabulary knowledge.

Alderson, Clapham, and Wall (1995) described that we need to create a test syllabication if we want to create a diagnostic test. It is important to clear up the purpose of creating a test.
Read (2000) suggested that we need to consider three aspects related to the vocabulary tests: (a) discrete or embedded, (b) selective or comprehensive, and (c) context-independent or context-dependent (Read & Chapelle, 2001). Hence, in this study (Study 3), the researcher constructed discrete, selective, and context-independent tests. Figure 5.1 summarizes Read's three dimensions of vocabulary assessment.

Discrete		Embedded
A measure of vocabulary knowledge or use as independent construct	⟷	A measure of vocabulary which forms part of the assessment of some other, larger construct
Selective		**Comprehensive**
A measure in which specific vocabulary items are the focus of the assessment	⟷	a measure which takes account of the whole vocabulary content of the material (reading/listening tasks) or the test-taker's response (writing/speaking tasks)
Context-independent		**Context-dependent**
A vocabulary measure in which the test-taker can produce the expected response without referring to any context	⟷	A vocabulary measure which assesses the test-taker's ability to take account of contextual information in order to produce the expected response

Figure 5.1. Three dimensions of vocabulary assessment (Read, 2000; p.9).

The research questions are as follows:

RQ3-1: Do the types of six recall test formats affect spelling test performance?

RQ3-2: Do the types of six recognition test formats affect spelling test performance?

RQ3-3: Are estimated vocabulary size and spelling test performance related?

RQ3-4: What are the characteristics of the scalabilities among thirty-five target words?

RQ3-5: Will diagnostic spelling tests categorize the test-takers?

5.2 Methods

5.2.1 Participants

Overall, 73 university students participated in the study (ages 18 to 22). Some students majored in English while other students majored in economics or business economics. For this reason, their English proficiency levels varied. This study (study 3) focused on detailed knowledge of vocabulary aspects. Thus, instead of using proficiency test scores, such as TOEIC scores, this study decided

to assess students' vocabulary knowledge as a tool to understand learners' already acquired knowledge of vocabularies. The average score of Mochizuki Test was about 2800 (to be exact 2773). According to the results of the Mochizuki Test, test-takers were divided into three groups, upper ($n = 25$), middle ($n = 20$), and lower ($n = 26$).

5.2.2 Materials

5.2.2.1 Target Words

In Takanami (2012a, 2012b), target words were chosen from the EIKEN materials (reading section or speaking section from Obunsha, 2001, 2004). However, this study mainly adopted words from Webb's (2008) research based on COBUILD dictionary. The degree of overlap between L1 and L2 meanings was also important when selecting words in Webb's study. In order to avoid test-takers to write polysemous words in translation tasks, it was important to choose words carefully and consider the high degree of overlap in meanings (e.g., Webb, 2008).

Another word lists from Chujo, Nishigaki, Yoshimori, and Nishioka (2007), Chujo, Nishigaki, and Miyazaki (2009, March), and Chujo, Yoshimori, Hasegawa, Nishigaki, and Yamazaki (2007, March) were useful to choose the target words.

Overall, 35 target words were chosen for the study. During the experiment, five words appeared to be inappropriate when scoring the results through the series of tests in a consistent way. For instance, test-takers' some of the answers varied in the translation setting formats, and it was difficult to standardize definitions of the words because some answers included synonyms. Thus, for this reason, five words were excluded from the study. Eventually, 30 words were

finally analyzed in the latter section. The lists of target words are displayed in Table 5.1. In should also be added that the vocabulary difficulty was explained with the JACET 8000. This is corpus-based lists showing word frequencies. There are eight levels in the list. The words in level 1 are the most frequently used words and the words in level 8 is infrequent words.

Table 5.1

Target Words in Study 3

Target Word	JACET 8000	Syllable	Phonetic Symbol
address	1	2	/ədre's|æ'dres/
animal	1	3	/æ'nəml/
bird	1	1	/bə'ːrd/
bottle	2	2	/bɑ'tl/
climb	1	1	/kla'im/
farm	1	1	/fɑ'ːrm/
grass	2	1	/græ's/
hero	2	2	/hi'ːərou/
kitchen	1	2	/ki'tʃn/
knife	2	1	/na'if/
law	1	1	/lɔ'ː/
magazine	2	3	/mæ'gəzi`ːn/
medicine	2	3	/me'dəsn/
message	1	2	/me'sidʒ/
mirror	2	2	/mi'rər/
moon	2	1	/mu'ːn/
neighbor	2	2	/ne'ibər/
pilot	2	2	/pa'ilət/
quality	1	3	/kwɑ'ləti/
rain	1	1	/re'in/
right	1	1	/ra'it/
safe	1	1	/se'if/
science	1	2	/sa'iəns/
sign	1	1	/sa'in/
sleep	1	1	/sli'ːp/
snow	2	1	/sno'u/
soft	2	1	/sɔ'ːft/
ticket	2	2	/ti'kət/
tomorrow	1	3	/təmɔ'ːrou/
turn	1	1	/tə'ːrn/
video	1	3	/vi'dio`u/
warm	1	1	/wɔ'ːrm/
wash	1	1	/wɑ'ʃ/
wrong	1	1	/rɔ'ːŋ/
yellow	2	2	/je'lou/

Note. Phonetic symbols were taken from online dictionary ALC (http://www.alc.co.jp/). The phonetic symbol converter (http://www.manabo.net/).

5.2.2.2 Dependent Measures (Recall Tasks vs. Recognition Tasks

Based on Nation's (2001) explanation of "Aspects of word knowledge for testing" (p.347), formats for the present study were developed for diagnostic purposes. The aspects shown in Nation's explanation were based on vocabulary knowledge (Nation, 1990, 2001). Focusing on the aspects that relate to spelling knowledge, the current study chose three sub-divisions: (a) *spoken*, (b) *written* in the aspect of form, (c) *form and meaning* from the aspect of meaning. Two sub-categories relate to the types of vocabulary knowledge: receptive and productive.

Therefore, considering the aspects of vocabulary knowledge with types of vocabulary knowledge, six types of test formats were produced from the lists. The present study also focused on two task types, recall and recognition. Pairing the six types of test formats with the task type differences developed a total of 12 test formats. The test formats in this study focused on the aspects of vocabulary knowledge that relate to spelling knowledge. Some formats did not include spelling; thus, it seemed those tasks were unnecessary. However, it is important to assess from various points of view how well the learners acquire the aspects of vocabulary knowledge. If the test formats omit the aspects of meaning, assessing their understanding of the target words in their first language would be impossible. The test formats that asked word meaning in their first language (Japanese) provide worthwhile information for diagnostic purposes.

Following are explanations of each test format. The capital letters indicate the names of the test formats and the numbers show the sequence of the tests conducted during the testing sessions. The test formats in this study are summarized in Table 5.2. Figure 5.2 also shows the test formats in this study.

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Table 5.2

Test Formats developed in Study 3

	Aspects of Vocabulary Knowledge	Test format		Test type
Form	spoken (sound to spelling)	A	L2 sound to L2 spelling	recognition
	spoken (sound to spelling)	B	L2 sound to L2 spelling	recall
	written (spelling to sound)	C	L2 spelling to L2 sound	recognition
	written (spelling to sound)	D	L2 spelling to L2 sound	(oral) recall
	(spoken) form and meaning (sound to meaning)	E	L2 sound to L1 meaning	recognition
	(spoken) form and meaning (sound to meaning)	F	L2 sound to L1 meaning	recall
	(written) form and meaning (spelling to meaning)	G	L2 spelling to L1 meaning	recognition
	(written) form and meaning (spelling to meaning)	H	L2 spelling to L1 meaning	recall
Meaning	(spoken) form and meaning (meaning to sound)	I	L1 meaning to L2 sound	recognition
	(spoken) form and meaning (meaning to sound)	J	L1 meaning to L2 sound	(oral) recall
	(written) form and meaning (meaning to spelling)	K	(L1 meaning to) L2 spelling	recognition
	(written) form and meaning (meaning to spelling)	L	L1 meaning to L2 spelling	recall

Figure 5.1. Test formats in Study 3

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Finally, as mentioned above, twelve tests were specifically designed for diagnostic analysis of Japanese EFL learners' English spelling ability (see Appendices 5A to 5L). Half of the tests were recognition tasks, and the other half of the tests were recall tasks. Each test contained 35 target words for diagnostic purposes. The same 35 words were given randomly in each test to avoid practice effect.

On the recall tests, some tests (i.e., test D and J) needed to record test-takers' oral recall; thus, for those tests, computer program named *movie teleco* in the Computer Assisted Language Learning (CALL) classrooms or IC recorders were used. Followings are the contents of both recall and recognition tests. Appendices 5A to 5L are the examples of test formats.

Recall Tests

[B] Test 3 - *L2 sound to L2 spelling* (receptive to productive recall)

This test measured productive knowledge of orthography; its well-known format is widely used in language classrooms. Test-takers heard each target word pronounced twice then had 10 seconds to write the spelling (mistakes were marked as incorrect). This test targeted learners' knowledge of sound-letter correspondences (see Appendix 5C).

[D] Test 5 - *L2 spelling to L2 sound* (receptive to productive recall)

This test measured productive knowledge of English word pronunciation. Although it resembles the naming task, which has been used in the word recognition studies, this test did not focus on latency because the target words in this study were already acquired, nor did it include nonwords (pseudo words). Focusing on correct pronunciation is necessary for understanding productive

knowledge of oral reading English words. This test requires learners to read and recognize correct spelling. Hence, the test focuses on both receptive and productive dimensions. The amount of time required varied among test-takers: two or three minutes to complete this task (see Appendix 5E).

Test D required knowledge of letter-sound correspondence; test B required sound-letter correspondence—both related to phonological processing routes, which are important aspects of reading and writing in a second language (Cook, 2005).

[F] Test 4 - *L2 sound to L1 meaning* (receptive recall)

This test measured receptive knowledge of meaning. Test-takers heard each target word pronounced twice then had 10 seconds to write the meaning in Japanese. They did not need to write in kanji; however, major errors of Japanese words (e.g., kanji errors or mistakes in word translation) were considered as mistakes and did not get points. They were able to use *hiragana* to translate the words. If the translation of the words was acceptable (i.e., synonymous words or the words that were not exactly the same but acceptable), they received points (see Appendix 5D).

[H] Test 6 - *L2 spelling to L1 meaning* (receptive recall)

This test measured receptive knowledge of form and meaning. The spellings of the words were listed on the test sheet, and test-takers were to write each word's meaning in Japanese. Scoring procedures were the same as on Test 4: they did not need to use kanji (see Appendix 5F).

[J] Test 1 - *L1 meaning to L2 sound* (productive recall)

This test measured productive knowledge of English word pronunciation. It required test-takers to translate Japanese meaning into English words. Thirty-five target words were printed on a test sheet; test-takers were to translate the words orally. This session used *movie teleco* and IC recorders. Test-takers could skip any items that they could not answer: to avoid random skipping, they were to say each item then, if they thought that they could not correctly answer the item, they needed to say "pass" or "don't know." Although this seems to test pronunciation, its purpose is to check understanding of the English words according to the Japanese meanings. For this reason, this test did not require learners' to produce native-like pronunciation (see Appendix 5A).

Tests F and J contained translating ability that did not include spelling information; thus some might think that they are unrelated to spelling knowledge. However, these tests attempted to assess learners' knowledge of sound form and meaning. The tests also sought to examine how well learners understand English pronunciation and translation of Japanese. The data from this task will provide additional information of learners' vocabulary knowledge with various aspects.

[L] Test 2 - *L1 meaning to L2 spelling* (productive recall)

This test measured productive knowledge of orthography. It required test-takers to write the correct spelling according to the given Japanese meaning of the words. They needed to write perfectly the correct spelling, which means incorrect spelling got "0" point: only correctly spelled answers were counted as their Test 2 [L] scores (see Appendix 5B).

Tests H and L focused on knowledge of written form and meaning receptively and productively. Comparing how results of H and L differ will be interesting. Without test H, assessing learners' knowledge of how well they can translate the words' meanings into Japanese would be impossible: all six recall tests were important to assess Japanese EFL learners' spelling knowledge related to vocabulary knowledge.

Recognition Tests

[A] Test 9 - *L2 sound to L2 spelling* (productive recognition)

This test measured receptive knowledge of form and sound. Two similar options of English words were listed on the test sheet. The distractors were chosen from the word lists from Obunsha (2012a, 2012b, 2012c, 2012d, 2012e, 2012f). The lists were from EIKEN grades pre-one, pre-two, two, three, four, and five. Choosing the distractors focused on the resemblance of word form and pronunciation. Each word was read twice then test-takers had 10 seconds to circle the correct spelling from two options (see Appendix 5I).

[C] Test 11 - *L2 spelling to L2 sound* (productive recognition)

This test measured receptive knowledge of written form and sound. The target words were printed on the test sheet and two options were given orally. Test-takers were to choose the correct pronunciation from the two options. Distractors were the same as those in test A (see Appendix 5K).

Requiring knowledge of connecting spelling to sound or sound to spelling, the formats of tests A and C were partly derived from pronunciation textbooks (Headway, 1999a, 1999b) whose recognition type tests contained three options.

Although the tested items in the current study contained only two options, this seemed appropriate due to the number of items.

[E] Test 10 - *L2 sound to L1 meaning* (receptive recognition)

This test measured receptive knowledge of sound and meaning. In this matching task, each of the thirty-five words was read twice, and the test-takers were to choose the appropriate meaning from the 40 options printed on the test sheet: five options were distractors to avoid guessing (Appendix 5J).

[G] Test 12 - *L2 spelling to L1 meaning* (receptive recognition)

This test measured receptive knowledge of written form and meaning. The test was a type of matching task. English words were printed on the work sheet and the options for target words were displayed on the same test sheet. There were 40 options for 35 test items including distractors as in test E (see Appendix 5L).

[I] Test 8 - *L1 meaning to L2 sound* (productive recognition)

This test measured receptive recognition of English word pronunciation. Japanese meanings of the words were listed on the test sheet. Two options were given once orally; test-takers were to choose one correct pronunciation that is appropriate for the listed Japanese word (see Appendix 5H).

[K] Test 7 - *L2 spelling recognition* (receptive recognition)

This test measured receptive knowledge of orthography. Test-takers were to circle one correct spelling of each target word among three distractors. Pilot Study 2 was conducted before the main test: same-year learners from the other classes took the spelling test and the incorrect answers were collected to make distractors (see Appendix 5G).

Among all tests, only the correct answers were considered as "pass", and incorrect answers were considered as "fail." Spelling errors were strictly checked and phonologically plausible spellings were also considered as "fail."

Data for the sound form tests were derived from Obunsha's (2012a, 2012b, 2012c, 2012d, 2012e, 2012f) web services, which could download the sound files for EIKEN word list (http://tokuten.obunsha.co.jp/passtan/). To edit sound form tests, this study used computer software, "Sound-it! 6.0."

5.2.3 Scoring

Each correct spelling received "1" point and incorrect spelling received "0" point on recall tasks. Table 5.3 shows the scoring of each spelling test.

Table 5.3

Scoring of Tests in Study 3

Test format		Targeted knowledge	Correct	Incorrect
A	L2 sound to L2 spelling recognition	spelling	1	0
B	L2 sound to L2 spelling recall	spelling	1	0
C	L2 spelling to L2 sound recognition	sound	1	0
D	L2 spelling to L2 sound recall	sound	1	0
E	L2 sound to L1 meaning recognition	meaning	1	0
F	L2 sound to L1 meaning recall	meaning	1	0
G	L2 spelling to L1 meaning recognition	meaning	1	0
H	L2 spelling to L1 meaning recall	meaning	1	0
I	L1 meaning to L2 sound recognition	sound	1	0
J	L1 meaning to L2 sound recall	sound	1	0
K	(L1 meaning to) L2 spelling recognition	spelling	1	0
L	L1 meaning to L2 spelling recall	spelling	1	0

For L2 to L1 translation, the translation of synonym received a score of "1" because the translation task required test-takers to identify only the meaning of a word in their L1 (Japanese).

5.2.4 Design

Following the procedures from the previous studies, recall tests were given to the test-takers first, and after a week later, recognition tests were given to the same test-takers. In order to analyze diagnostically, the study took within-subject design, which means all participants underwent all the testing sessions.

5.2.5 Procedure

At the beginning of this research, Mochizuki Test was administered to the test-takers to assess test-takers' already acquired vocabulary knowledge. After this, twelve spelling tests were given to the test-takers. However, taking 12 tests in one day requires too much cognitive load, and using recognition task and recall task in one research design is not effective to assess accurate knowledge of the participants. Thus, at first, six recall type tests were conducted and a week later, the other six recognition type tests were conducted.

It should be noted that test-takers had to take recall tests first. If the examinee took the recognition test first, the items on the test might have provided some clue for the recall tasks. Thus, recall test should be given to the examinee before the recognition test. This study carefully adopted the procedure of previous studies in that the recall tests were given to the test-takers one week before the recognition tests.

In sum, the 12 tests in Study 3 comprise two types of tests, the recall type

tests and the recognition type tests. In the second session, six recall tests were conducted in one day. One week after the second session, six recognition tests were conducted in one day. Therefore, three testing sessions were prepared for this study. Simply put, vocabulary size test (Mochizuki Test) was utilized in session 1 to evaluate test-takers' vocabulary size, six recall tests were conducted in session 2, and six recognition tests were conducted in session 3.

Figure 5.2. Experimental procedures of Study 3

5.3 Results and Discussion

5.3.1 Analysis

The analytical procedures used in this experiment are as follows:

(1) Two-way mixed design analysis of variance (ANOVA),

(2) Pearson's correlation coefficient,

(3) Spearman's rank-order correlation,

(4) Exploratory Factor Analysis (EFA),

(5) Implicational scaling.

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In order to compare the difficulties of the tests used in this study, two-way mixed design ANOVA was used. Subsequently, Pearson's correlation was used to assess the relationships among the vocabulary size test, six recall tests, and six recognition tests. In addition, it was also important to know whether the test-takers' performances on recall and recognition tasks were consistent. Spearman's rank-order correlation was used to answer this question. The correlation analysis is one method of validity checking. Factor analysis is another way to check validity. Thus, Exploratory Factor Analysis (EFA) was used in this study.

Finally, implicational scaling was used to check the orderliness in the collected data. This analysis method was used to examine developmental order. Implicational scaling was also used in Study 1 and Study 2, and the results showed that this method successfully showed the orderliness of the collected data. It seemed that the significant results could be expected with this analytical procedure.

5.3.2 Results of Quantitative Analysis

5.3.2.1 Difficulties Among Spelling Test Scores

As already stated, recall tasks and recognition tasks seemed to have corresponding relationship. However, the analyses were conducted independently for recall tasks and recognition tasks because producing correct answers on the recall tasks and the recognition tasks requires different abilities. Thus, it is appropriate to analyze recall and recognition tests independently. Table 5.4 shows the descriptive statistics, reliability, and Item Discrimination for the 12 tests (i.e., six recall tasks and six recognition tasks). Some tests showed low

Cronbach's alpha due to the high scores among test-takers. However, in test E and G, item discrimination was high despite of high mean scores. Also reliabilities were high in test E and G. There are similar trends in test A, C, and I. However, reliabilities and item discrimination were low. This is probably due to the lower group scores. In test E and G, the lower group scored lower than the middle group for more than 0.86 (test E) or 0.78 (test G), compared with test A (middle-lower = 0.23), C (middle-lower = 0.37), and I (middle-lower = 0.71). However, there is no conclusive proof that this assumption is correct. Although it is not too much to say that test E and G partly succeeded in dividing the middle group and the lower group compared to test A, C, and I.

Two-way mixed design analysis of variance (ANOVA) was utilized to examine the differences in difficulties of the tests. Group [upper ($n = 25$), middle ($n = 20$), and lower ($n = 26$)] was the between-subjects factor. Test was the within-subjects factor. The results of two-way mixed ANOVA are explained in the following sections.

Table 5.4

Descriptive Statistics, Reliability, Item Discrimination for the 12 Tests (N = 71)

(Table continues)

Test	Group	N	*M*	*SD*	*Min*	*Max*	Cronbach's alpha	*DIS*
[A] (*k*=30)	Upper	25	29.80	0.645	27	30		
	Middle	20	29.50	0.688	28	30	.44	.06
	Lower	26	29.27	1.116	26	30		
	Total	71	29.52	0.876	26	30		
[B] (*k*=30)	Upper	25	23.52	3.618	12	29		
	Middle	20	19.25	4.102	12	27	.87	.39
	Lower	26	14.77	4.885	5	25		
	Total	71	19.11	5.615	5	29		

Table 5.4

Descriptive Statistics, Reliability, Item Discrimination for the 12 Tests (N = 71) (Table continued)

Test	Group	N	M	SD	Min	Max	Cronbach's alpha	DIS
[C] (k=30)	Upper	25	29.64	0.569	28	30	.54	.13
	Middle	20	29.25	1.02	27	30		
	Lower	26	28.88	1.608	22	30		
	Total	71	29.25	1.192	22	30		
[D] (k=30)	Upper	25	29.12	0.781	28	30	.65	.20
	Middle	20	28.95	1.050	26	30		
	Lower	26	27.04	2.630	17	30		
	Total	71	28.31	1.983	17	30		
[E] (k=30)	Upper	25	29.88	0.44	28	30	.86	.36
	Middle	20	29.05	2.685	18	30		
	Lower	26	28.19	2.786	20	30		
	Total	71	29.03	2.305	18	30		
[F] (k=30)	Upper	25	28.24	1.480	25	30	.81	.31
	Middle	20	26.80	2.285	23	30		
	Lower	26	23.27	3.639	11	27		
	Total	71	26.01	3.412	11	30		
[G] (k=30)	Upper	25	29.96	0.2	29	30	.81	.27
	Middle	20	29.40	1.142	26	30		
	Lower	26	28.62	2.578	20	30		
	Total	71	29.31	1.753	20	30		
[H] (k=30)	Upper	25	29.60	0.645	28	30	.76	.23
	Middle	20	28.25	2.074	23	30		
	Lower	26	25.58	2.671	17	30		
	Total	71	27.75	2.628	17	30		
[I] (k=30)	Upper	25	29.36	0.638	28	30	.41	.08
	Middle	20	28.75	1.41	25	30		
	Lower	26	28.04	1.509	25	30		
	Total	71	28.70	1.346	25	30		
[J] (k=30)	Upper	25	24.08	2.272	20	29	.75	.36
	Middle	20	22.05	2.743	15	26		
	Lower	26	18.12	3.327	13	25		
	Total	71	21.32	3.801	13	29		
[K] (k=30)	Upper	25	28.60	1.555	23	30	.79	.30
	Middle	20	26.75	2.245	23	29		
	Lower	26	25.04	4.19	15	29		
	Total	71	26.77	3.283	15	30		
[L] (k=30)	Upper	25	21.20	3.379	12	26	.84	.23
	Middle	20	16.60	4.185	11	23		
	Lower	26	12.42	4.012	3	22		
	Total	71	16.69	5.333	3	26		

5.3.2.1.1 Results of the Recall Tasks

The results of ANOVA showed significant interaction between group and test (F (5.35, 182.03) = 10.026, p <.001). Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption. The effect size was small (.03), which means there was low statistical power of the interaction between group and test. This is probably due to the small number of the participants in this study.

Tukey post hoc test was performed to compare the differences among each level in group factor. Bonferroni post hoc test was utilized to compare differences among each level in the test factor. Table 5.5 shows the result of two-way mixed ANOVA. Table 5.6 shows the result of simple main effects test for each factor.

Table 5.5

Two-way Mixed ANOVA for the Effects of the Group Difference and the Test Formats in Study 3 Recall Tasks

Source	SS	df	MS	F	p	η^2
			Between Subjects			
Group	2572.140	2	1286.070	40.442	.000	.17
Error	2162.400	68	31.800			
			Within Subjects			
Test	8227.246	2.677	3073.399	353.565	.000	.01
Test * Group	466.578	5.354	87.148	10.026	.000	.03
Error	1582.319	182.031	8.693			
Total	15010.683	260.062				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

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Table 5.6

Simple main effects Test in Group Factor and Test Factor in Study 3 Recall Tasks

Simple Effect	Level	df	F	p	η²
[Group]	Test [B]	2	26.979	.000	.44
	Error	68			
	Test [D]	2	10.863	.000	.24
	Error	68			
	Test [F]	2	23.384	.000	.41
	Error	68			
	Test [H]	2	26.856	.000	.44
	Error	68			
	Test [J]	2	29.287	.000	.46
	Error	68			
	Test [L]	2	33.087	.000	.49
	Error	68			
[Test]	[Group Upper]	2.315	85.019	.000	.78
	Error	55.551			
	[Group Middle]	2.396	104.103	.000	.85
	Error	45.531			
	[Group Lower]	2.709	172.167	.000	.87
	Error	67.720			

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

After the simple main effects test, pairwise comparisons were conducted with each level in the group factor and the test factor. Table 5.7 shows the results of pairwise comparisons among tests in each group.

The results of the pairwise comparisons showed significant differences in test difficulties at the level of lower group. Test-takers in the lower group's vocabulary size were under 2500-word level. In the lower group, the order of difficulties was significant: $L < B < J < F < H < D$ (difficult to easy). On the other hand, the results revealed no significant differences in test difficulties in the upper group, $L < B ≒ J < F ≒ D ≒ H$ ($F < H$) (difficult to easy), or in the middle group, $L < B ≒ J < F < H ≒ D$ (difficult to easy).

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Table 5.7

Comparisons Among Tests in Each Group: Upper, Middle, and Lower

Group	Sig. of F						Test difference
	Test	1	2	3	4	5	6	
Upper	1. [B]	—						L < B ≒ J < F ≒ D ≒ H (F < H) (difficult → easy)
	2. [D]	.000	—					
	3. [F]	.000	.178	—				
	4. [H]	.000	.643	.000	—			
	5. [J]	1.000	.000	.000	.000	—		
	6. [L]	.000	.000	.000	.000	.000	—	
	Test	1	2	3	4	5	6	
Middle	1. [B]	—						L < B ≒ J < F < H ≒ D (difficult → easy)
	2. [D]	.000	—					
	3. [F]	.000	.012	—				
	4. [H]	.000	1.000	.004	—			
	5. [J]	.050	.000	.000	.000	—		
	6. [L]	.000	.000	.000	.000	.000	—	
	Test	1	2	3	4	5	6	
Lower	1. [B]	—						L < B < J < F < H < D (difficult → easy)
	2. [D]	.000	—					
	3. [F]	.000	.000	—				
	4. [H]	.000	.003	.000	—			
	5. [J]	.025	.000	.000	.000	—		
	6. [L]	.000	.000	.000	.000	.000	—	

In the previous section, the test-takers in the upper group were over 3000 word-level. In other words, the learners over 3000 word-level were able to answer correctly all recall tests, which means they were not affected by the test formats. It can be said that the lower group's performances were affected by the test characteristics. In other words, lower group learners did not have sufficient knowledge of the target words compared to the upper group. The differences between test B and test L were noteworthy. Test B asked test-takers to write the correct spelling of the pronounced word. Test L asked examinee to write the

correct spelling of the meaning written in their first language (i.e., L1 = Japanese). The differences between test B and test L were significant for all groups, and the test L was consistently more difficult compared to the test B. The results showed that translating the words (L1) into English (L2) was more difficult than writing the correct spelling from the pronounced words.

On the other hand, simple main effects of group on the test factors showed that test performances of the lower group and the upper group on each test were significantly different. Differences between the upper group (i.e., more than 3000 word level) and the middle group (i.e., not less than 2500 and less than 3000 word level) in the recall tasks were smaller. Except for test B, test F, and test L, the differences between the middle group and the lower group (i.e., less than 2500 word level) were significant through all recall tasks.

Considering test differences, test B and test L are closely related. Both tests asked test-takers to write the correct spelling even though the given inputs were different but Test F asked learners to write the meaning of the pronounced word. Test F could significantly differentiate three groups. Tests D, test H, and test J could not differentiate between the upper group and the middle group. Test D asked examinees to pronounce the words from the spelling: read-aloud. Test H asked learners to write the correct meaning from the written spelling: translation. Test J asked them to pronounce the words from the L1 meaning: translation.

The results showed no difference between the upper group and the middle group in the ability to read aloud the written spelling (Test D). Hence, it appears that learners who have over 2500 word-level could pronounce the words correctly. Test H showed that these learners could correctly translate the words from the written spelling. In addition, test J showed that the same learners could

correctly translate and pronounce the words from L1 meaning. Regarding the point of correct pronunciation, test D and test J were related.

In sum, compared to the learners over 3000 word-level, the learners below 2500 word-level were weaker on all recall tests used in this study. Seeing the results, the tests that asked learners to write the correct spelling seemed to be difficult, regardless of group differences. Table 5.8 shows the results of pairwise comparisons of groups for each test.

Table 5.8

Comparisons Among Groups in Each Test: Test [B], [D], [F], [H], [J], and [L]

Test		Sig. of F			Group difference
	Group	1	2	3	
	1. Upper	—			
[B]	2. Middle	.004	—		Lower < Middle < Upper
	3. Lower	.000	.002	—	
	Group	1	2	3	
	1. Upper	—			
[D]	2. Middle	.944	—		Lower < Middle ≒ Upper
	3. Lower	.000	.001	—	
	Group	1	2	3	
	1. Upper	—			
[F]	2. Middle	.177	—		Lower < Middle < Upper
	3. Lower	.000	.000	—	
	Group	1	2	3	
	1. Upper	—			
[H]	2. Middle	.069	—		Lower < Middle ≒ Upper
	3. Lower	.000	.000	—	
	Group	1	2	3	
	1. Upper	—			
[J]	2. Middle	.050	—		Lower < Middle ≒ Upper
	3. Lower	.000	.000	—	
	Group	1	2	3	
	1. Upper	—			
[L]	2. Middle	.000	—		Lower < Middle < Upper
	3. Lower	.000	.001	—	

5.3.2.1.2 Results of the Recognition Tasks

The results of ANOVA showed significant interaction between group and test ($F(5.10, 173.532) = 3.262. p <.01$). Greenhouse-Geisser correction was used to correct violations of the sphericity assumption. The effect size was small (.04), which means there was low statistical power of the interaction between group and test. This is probably due to the small number of the participants in this study.

Tukey post hoc test was performed to examine the differences among each level in group factor. Bonferroni post hoc test was utilized to assess differences among each level in the test factor. Table 5.9 shows the result of two-way mixed ANOVA. Table 5.10 shows the result of simple main effects test for each factor.

Table 5.9

Two-way Mixed ANOVA for the Effects of the Group Difference and the Test Formats in Study 3 Recognition Tasks

Source		SS	df	MS	F	p	η^2
				Between Subjects			
Group		179.906	2	89.953	10.368	.000	.09
Error		589.954	68	8.676			
				Within Subjects			
Test		356.301	2.552	139.620	31.180	.000	.18
Test Group	*	74.555	5.104	14.607	3.262	.007	.04
Error		777.051	173.532	4.478			
Total		1977.767	251.188				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

Table 5.10

Simple main effects Test in Group Factor and Test Factor in Study 3

Recognition Tasks

Simple Effect	Level	df	F	p	η²
[Group]	[Test A]	2	2.444	.094	.07
	Error	68			
	[Test C]	2	2.683	.076	.07
	Error	68			
	[Test E]	2	3.679	.030	.10
	Error	68			
	[Test G]	2	4.122	.020	.11
	Error	68			
	[Test I]	2	7.263	.001	.18
	Error	68			
	[Test K]	2	9.275	.000	.22
	Error	68			
[Test]	[Group Upper]	2.064	10.014	.000	.29
	Error	49.524			
	[Group Middle]	2.612	9.860	.000	.34
	Error	49.636			
	[Group Lower]	2.238	15.206	.000	.38
	Error	55.946			

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

After the simple main effects test, pairwise comparisons were conducted with each level for each group factor and test factor. Table 5.11 shows the results of pairwise comparisons among tests in each group.

Table 5.11

Comparisons Among Tests in Each Group: Upper, Middle, and Lower

Group	Test	1	2	3	4	5	6	Test difference
Upper	1. [A]	—						
	2. [C]	1.000	—					
	3. [E]	1.000	.838	—				K ≒ I ≒ C ≒ A ≒ E ≒ G
	4. [G]	1.000	.125	1.000	—			(K < A, C, E, G) (I < G)
	5. [I]	.196	1.000	.063	.002	—		(difficult → easy)
	6. [K]	.042	.043	.009	.004	.546	—	
Middle	Test	1	2	3	4	5	6	
	1. [A]	—						
	2. [C]	1.000	—					
	3. [E]	1.000	1.000	—				K ≒ I ≒ E ≒ C ≒ G ≒ A
	4. [G]	1.000	1.000	1.000	—			(K < A, C, E, G)
	5. [I]	.533	.315	1.000	1.000	—		(difficult → easy)
	6. [K]	.000	.005	.025	.000	.073	—	
Lower	Test	1	2	3	4	5	6	
	1. [A]	—						
	2. [C]	1.000	—					
	3. [E]	.543	1.000	—				K < I ≒ E ≒ G ≒ C ≒ A
	4. [G]	1.000	1.000	1.000	—			(K < A, C, E, G, I) (I < A)
	5. [I]	.000	.217	1.000	1.000	—		(difficult → easy)
	6. [K]	.000	.002	.012	.000	.009	—	

The results of the pairwise comparisons showed no significant differences in the test difficulties for each group. The difference between test K and test I was significant (p=.009) only for the lower group. However, the scores of the test K (i.e., correct spelling recognition) were consistently the lowest among all the groups. This result showed that it is difficult for all learners to recognize correct spelling.

On the other hand, simple main effects of group on the test factors showed no significant group differences between the upper group and the middle group

for all recognition tests. Additionally, no significant differences emerged between the middle group and the lower group. Significant differences emerged between the upper group and the lower group on all the recognition tests, except for test A and test C. Table 5.12 shows the results of pairwise comparisons among tests in each group.

Table 5.12

Comparisons Among Groups in Each Test: Test [A], [C], [E], [G], [I], and [K]

Test		Sig. of F			Group difference
	Group	1	2	3	
[A]	1. Upper	—			Lower ≒ Middle ≒ Upper
	2. Middle	.478	—		(Lower < Upper)
	3. Lower	.077	.640	—	
	Group	1	2	3	
[C]	1. Upper	—			Lower ≒ Middle ≒ Upper
	2. Middle	.507	—		
	3. Lower	.060	.545	—	
	Group	1	2	3	
[E]	1. Upper	—			Lower ≒ Middle ≒ Upper
	2. Middle	.431	—		(Lower < Upper)
	3. Lower	.023	.401	—	
	Group	1	2	3	
[G]	1. Upper	—			Lower ≒ Middle ≒ Upper
	2. Middle	.511	—		(Lower < Upper)
	3. Lower	.015	.265	—	
	Group	1	2	3	
[I]	1. Upper	—			Lower ≒ Middle ≒ Upper
	2. Middle	.236	—		(Lower < Upper)
	3. Lower	.001	.138	—	
	Group	1	2	3	
[K]	1. Upper	—			Lower ≒ Middle ≒ Upper
	2. Middle	.100	—		(Lower < Upper)
	3. Lower	.000	.133	—	

In sum, differences among learners' vocabulary size had a low effect on each performance on the recognition tests. The upper group consistently outperformed the lower group. However, only in the test C, the scores were not significantly different among three groups. Estimated vocabulary size was over

3000 in the upper group and in the lower group, it was under 2500. Although the differences between the upper group and the middle group (i.e., middle group's vocabulary size = over 2500, under 3000) were not significant. In other words, there were no differences between the middle group and the upper group. It seemed that the differences between the upper group and the lower group were meaningful presumably due to the estimated vocabulary size.

5.3.2.2 Pearson's Correlations Among Vocabulary Size and Spelling Tests

To examine the relationships between estimated vocabulary size (Mochizuki Test) and each test (i.e., six recall tasks and six recognition tasks), Pearson's correlation was utilized. The analyses were conducted separately for the recall tests and the recognition tests.

5.3.2.2.1 Pearson's Correlations of Recall Tasks in Study 3

The results of Pearson's correlations between Mochizuki Test and the six recall tests are reported in Table 5.13.

Table 5.13

Pearson's Correlation Coefficient for the Recall Tasks in Study 3

Variable	1	2	3	4	5	6	7
1. [Mo_T]	—						
2. [B]	.761**	—					
3. [D]	.512**	.601**	—				
4. [F]	.686**	.736**	.732**	—			
5. [H]	.694**	.744**	.717**	.891**	—		
6. [J]	.725**	.673**	.394**	.666**	.715**	—	
7. [L]	.780**	.932**	.574**	.722**	.759**	.748**	—

Note. **p <.01, two-tailed. [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [B], [D], [F], [H], [J], and [L] are recall tests.

The correlations between Mochizuki Vocabulary Size Test and the six recall tests (i.e., test B, D, F, H, J, and L) were high, ranging from .51 to .78. Comparing the test formats, test B and D did not include the aspect of vocabulary meaning. Test B asked to produce correct spelling from the pronounced word, test D asked to read-aloud printed spellings of the words. Mochizuki Test was designed to measure estimated vocabulary size with multiple-choice format, asking learners to choose the correct meaning, which matches the printed spelling of the word. Thus, it can be expected that correlations between Mochizuki Test and tests B and D were weak because both test B and D did not include the meaning aspect of vocabulary knowledge. The correlation between Mochizuki Test and test D was moderately high (.51) as expected. However, contrary to the expectations, the correlation between Mochizuki Test and test B was moderately high (.76).

The results showed that the correlations among six recall tests were moderately high to high, ranging from .39 to .93. Tests B and L had extremely high correlation (.93) because they were similar in that they both asked learners to produce the correct spellings of the words, even though the given inputs were different.

Only the correlation between tests D and J was weak (.39). Both tests asked to pronounce the words; however, test J was much more difficult compared to test D to the extent of asking test-takers to translate the words orally.

5.3.2.2.2 Pearson's Correlations of Recognition Tasks in Study 3

The results of Pearson's correlations among Mochizuki Test and the six recognition tests are reported in Table 5.14. The correlations among Mochizuki

Vocabulary Size Test and the six recognition tests (i.e., test A, C, E, G, I, and K) were weak to moderate, ranging from .24 to .55. The correlations among six recognition tests were weak to high, ranging from .31 to .78. Seeing the results, tests E and G were strongly correlated (.78) for the recognition tests. Test E asked learners to choose the correct meaning from the pronounced word, test G asked to choose (or match) the correct meaning from the printed spelling of the words. It is clear that test E and G targeted the same output even though the given inputs were different.

Table 5.14

Pearson's Correlation Coefficient for the Recognition Tasks in Study 3

Variable	1	2	3	4	5	6	7
1. [Mo_T]	—						
2. [A]	.243*	—					
3. [C]	.310**	.214	—				
4. [E]	.401**	.389**	.398**	—			
5. [G]	.310**	.526**	.317**	.786**	—		
6. [I]	.438**	.496**	.537**	.551**	.560**	—	
7. [K]	.547**	.553**	.146	.401**	.598**	.350**	—

Note. **p* <.01, **p* <.05, two-tailed. [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [A], [C], [E], [G], [I], [K] are recognition tests.

5.3.2.3 Spearman's Rank-order Correlations Among Spelling Tests

Spearman's rank-order correlation coefficients were utilized to investigate the consistency of test-takers' performance on the spelling tests. The results of the recall tests and the recognition tests are reported separately in the following sections.

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5.3.2.3.1 Spearman's Correlations of Recall Tasks in Study 3

The results of Spearman's rank-order correlation test in the recall tests are reported in Table 5.15. The correlations among six recall tests were weak to high, ranging from .40 to .93. Seeing these results, test-takers' performances on different test formats were consistent. Furthermore, on the recall tests, most learners who scored highly on one test also scored highly on other tests. However, the correlations between test D and other test formats were not so high, ranging from .39 to .55. As far as we can predict from the results, test D was easier compared to other test formats.

Table 5.15

Spearman's Rank-Order Correlation Coefficient for the Recall Tasks in Study 3

Variable	1	2	3	4	5	6
1. [B]	—					
2. [D]	.559**	—				
3. [F]	.744**	.502**	—			
4. [H]	.780**	.489**	.860**	—		
5. [J]	.690**	.396**	.701**	.725**	—	
6. [L]	.930**	.521**	.723**	.773**	.767**	—

Note. **$p <.01$, two-tailed. Test [B], [D], [F], [H], [J], and [L] are recall tests.

5.3.2.3.2 Spearman's Correlations of Recognition Tasks in Study 3

The results of Spearman's rank-order correlations between the recognition tests were reported in Table 5.16. The results showed no correlations with some tests: test A and C (.21), test C and K (.18), and test I and K (.19). In total, there were weak to moderately high correlations among the recognition tests, ranging

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from .34 to .56. Compared to the recall tests, performances on the recognition tests were inconsistent among different test formats. Comparing the test K with other tests, test K seemed to be the most difficult tests for the test-takers.

Table 5.16

Spearman's Rank-Order Correlation Coefficient for the Recognition Tasks in Study 3

Variable	1	2	3	4	5	6
1. [A]	—					
2. [C]	.218	—				
3. [E]	.380**	.408**	—			
4. [G]	.537**	.297*	.567**	—		
5. [I]	.443**	.539**	.454**	.431**	—	
6. [K]	.413**	.182	.348**	.467**	.198	—

Note. **p <.01, *p <.05, two-tailed. Test [A], [C], [E], [G], [I], [K] are recognition tests.

5.3.2.4 Factor Analysis of Six Spelling tests

Exploratory factor analysis (EFA) was conducted with the recall tests and the recognition tests. The results of each test set are as follows.

5.3.2.4.1 Factor Analysis for Recall Tasks in Study 3

Table 5.17 showed the results of factor analysis for the recall tests. The value of KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy coefficient was high (.826) and Bartlett's test of sphericity showed a significance (.000), which verified that the use of factor analysis was appropriate for the recall tests in this study.

For the recall tasks, only one factor was found. Thus, six recall tests were found to be appropriate, measuring test-takers' knowledge of sound form, written

form, and form and meaning of target words in a comprehensive manner.

Table 5.17

Factor Analysis for Recall Tasks in Study 3

Test Format	Factor 1	Communality
Test B	**.945**	.892
Test D	**.658**	.433
Test F	**.816**	.665
Test H	**.838**	.702
Test J	**.762**	.581
Test L	**.954**	.909
factor contribution	4.183	4.182
Cumulative contribution ratio	69.712	

5.3.2.4.2 Factor Analysis for Recognition Tasks in Study 3

Table 5.18 shows the results of factor analysis in the recognition tests. The value of KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy coefficient was high (.759) and Bartlett's test of sphericity was significant (.000), which verified that the use of factor analysis was appropriate for the recall tests in this study.

Table 5.18

Factor Analysis for Recognition Tasks in Study 3

Test Format	Factor 1	Factor 2	Communality
Test G	**1.000**	-.000	1.000
Test E	**.786**	.134	.636
Test K	**.598**	.019	.358
Test A	**.526**	.244	.336
Test I	.580	**.824**	.993
Test C	.317	**.436**	.291
factor contribution	2.666	.947	3.614
Cumulative contribution ratio	44.441	60.232	

The analysis indicated two factors of the recognition tests. First factor consists of four tests, A, E, G, and K. Second factor consists of two tests, test C and I.

In the first factor, test A measured the knowledge of matching pronounced word with written spelling, test E measured the knowledge of matching pronounced word with the meaning, test G measured matching written spelling with the meaning, and test K measured correct spelling recognition. Tests A, G, and K related to the letter knowledge. Test E and G were related to the issue of choosing appropriate meaning of the target words even though the inputs were different. It seemed that naming the first factor "letter recognition" was appropriate.

In the second factor, test I measured the knowledge of matching L1 meaning to correct pronunciation options, and test C measured the knowledge of matching written spelling to correct pronunciation options. Therefore, both tests measured the ability to choose appropriate pronunciation even though the given inputs were different from each other. In other words, the second factor related to the sound knowledge of the words; thus, it seemed that it was appropriate to name the factor "sound recognition."

5.3.3 Results of Qualitative Analysis: Implicational Scaling

Implicational scaling was used to understand the acquisition order of each vocabulary knowledge aspect. First, matrices for implicational scaling were summarized with all 12 tests (i.e., six recall tests and six recognition tests). However, it was impossible to discuss the order of spelling knowledge due to the inappropriate scalability. From the beginning, the characteristics of the recall

tasks and the recognition tasks seemed to contrast.

The tests were designed to measure the depth of vocabulary knowledge especially focused on the spelling knowledge. Also the differences of task types must be focused to assess learners' knowledge of receptive skills and productive skills of vocabulary knowledge. Thus, to compare the results of the recall tasks and the recognition tasks and to examine the results in parallel will help us understand the task differences. In the previous sections, quantitative analyses were conducted with several methods. In contrast, this section deals with qualitative analysis called implicational scaling. Implicational scaling is sometimes called Guttmann scaling. This method will help us consider the acquisition in the language learning. As in the previous chapters, we provide explanations on how to use implicational scaling.

Prior to using implicational scaling, several values had to be calculated to verify the scaling's validity. In order to use implicational scaling, we should follow four steps to calculate the value of scalability. In the first step, to predict participant's performance from the matrix (figure), coefficient of reproducibility (henceforth C_{rep}) needs to be calculated. This value should be greater than .90 (i.e., value > .90) to fulfill the criterion of validity. In the second step, to assess predictability without errors in the matrix, minimum marginal reproducibility (henceforth MM_{rep}) had to be calculated. This should be less than the value of the coefficient of reproducibility (i.e., value < [the value of the C_{rep}]). In the third step, the margin of the coefficient of reproducibility and the minimum marginal reproducibility was calculated to see the percent improvement in reproducibility (henceforth % improvement). The coefficient of scalability (henceforth C_{scal}) was determined in the final step using the following three values: C_{rep}, MM_{rep}, and %

improvement. It assessed whether the items in the matrix are scalable and unidimensional. The value of C_{scal} must be greater than .60 (i.e., value > .60). The goal of the calculation is to compute coefficient of scalability (C_{scal}). To calculate this value, we need to make matrices for the targets. The matrices for the recall tasks in study 3 are summarized in the Appendices.

5.3.3.1 Implicational Scaling in Recall Tasks in Study 3

Table 5.19 shows the scalability of the recall tasks. Scalabilities were calculated with each word in study 3. The value of Cscal indicated whether assumed orders of difficulties are valid. The value must be greater than .60. Before starting the analyses, it was crucial to look closely at the value of coefficient of reproducibility (henceforth C_{rep}). This value should be greater than .90 (i.e., value > .90) to fulfill the criterion of validity, as already indicated in the previous sections.

The difficulty order, which was assumed in the recall tasks, is as follows. The sequences were determined from the scores of learners' test performances.

$$L < B < J < F < H \fallingdotseq D$$

$$(\text{difficult} \rightarrow \text{easy})$$

This ordering shows that test L was the most difficult (score poorly) and the test D was the easiest (score highly). The results of the analyses in the previous sections showed that differences between some tests were not significant. However, the purposes of using implicational scaling were to see the difficulty order of the six recall tasks and to examine the validity of utilizing this method in this study. Thus, task difficulties were determined from the raw scores. Seeing the results, 14 words (i.e., bird, quality, snow, moon, knife, sign, right,

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bottle, grass, kitchen, mirror, science, message, and wash) seemed to be valid among all the test-takers in this study. The assumed difficulty order (L = B = J = F = H = D: difficult to easy) seemed to be adequate for the 14 words. However, the remaining 16 words were categorized as invalid at the difficulty level. The words that appeared to be valid are shown in bold in the table.

Table 5.19

Scalability in Recall Tasks in Study 3

Target Word	Formula			
	C_{rep}	MM_{rep}	% improvement (C_{rep} - MM_{rep})	C_{scal}
address	**.977**	.977	.000	.000
animal	**.995**	.991	.005	.500
bird	**.972**	.873	.099	**.778**
bottle	**.915**	.765	.150	**.640**
climb	.878	.744	.134	.523
farm	**.934**	.923	.012	.152
grass	**.953**	.817	.136	**.744**
hero	**.934**	.934	.000	.000
kitchen	**.953**	.763	.190	**.802**
knife	**.939**	.643	.296	**.829**
law	.892	.817	.075	.410
magazine	**.920**	.810	.110	.580
message	**.972**	.923	.049	**.636**
mirror	**.977**	.941	.035	**.600**
moon	**.962**	.829	.134	**.781**
pilot	.793	.883	-.089	-.760
quality	**.911**	.739	.171	**.658**
rain	.892	.697	.195	.643
right	**.925**	.777	.148	**.663**
science	**.967**	.880	.087	**.725**
sign	**.967**	.885	.082	**.714**
sleep	**.930**	.866	.063	.474
snow	**.962**	.803	.160	**.810**
soft	.840	.789	.052	.244
ticket	**.967**	.977	-.009	-.400
tomorrow	.873	.728	.146	.534
video	.869	.751	.117	.472
warm	**.897**	.796	.101	.494
wash	**.986**	.920	.066	**.824**
yellow	**.958**	.972	-.014	-.500
AVERAGE	.930	.840	.090	.452

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}.

Table 5.20 shows the accuracy rate of the recall tasks in study 3, which can help us understand the overall test difficulties.

Table 5.20

Accuracy Rate of Recall Tasks in Study 3

Target word	L	B	J	F	H	D	Total
address	94.37	98.59	92.96	100.00	100.00	100.00	97.65
animal	97.18	98.59	98.59	100.00	100.00	100.00	99.06
bird	14.08	25.35	67.61	97.18	100.00	98.59	67.14
bottle	9.86	23.94	19.72	63.38	76.06	73.24	44.37
climb	39.44	42.25	54.93	95.77	95.77	81.69	68.31
farm	85.92	83.10	91.55	92.96	100.00	100.00	92.25
grass	43.66	47.89	98.59	90.14	95.77	97.18	78.87
hero	84.51	97.18	80.28	98.59	100.00	100.00	93.43
kitchen	25.35	33.80	49.30	87.32	84.51	94.37	62.44
knife	42.25	38.03	42.25	57.75	66.20	84.51	55.16
law	69.01	83.10	74.65	81.69	90.14	91.55	81.69
magazine	61.97	70.42	70.42	90.14	92.96	100.00	80.99
message	76.06	81.69	95.77	100.00	100.00	100.00	92.25
mirror	84.51	85.92	98.59	97.18	100.00	98.59	94.13
moon	52.11	53.52	97.18	100.00	100.00	94.37	82.86
pilot	14.08	76.06	16.90	90.14	95.77	98.59	65.26
quality	36.62	30.99	53.52	83.10	90.14	84.51	63.15
rain	29.58	56.34	49.30	64.79	76.06	100.00	62.68
right	43.66	47.89	87.32	87.32	95.77	87.32	74.88
science	66.20	63.38	98.59	100.00	100.00	100.00	88.03
sign	66.20	70.42	100.00	97.18	97.18	100.00	88.50
sleep	70.42	83.10	76.06	95.77	98.59	95.77	86.62
snow	40.85	50.70	73.24	100.00	98.59	100.00	77.23
soft	76.06	73.24	67.61	87.32	91.55	77.46	78.87
ticket	97.18	97.18	95.77	100.00	100.00	95.77	97.65
tomorrow	40.85	63.38	50.70	78.87	90.14	94.37	69.72
video	11.27	35.21	11.27	35.21	54.93	88.73	39.44
warm	25.35	18.31	28.17	33.80	87.32	95.77	48.12
wash	74.65	81.69	98.59	98.59	100.00	98.59	92.02
yellow	95.77	100.00	92.96	97.18	97.18	100.00	97.18
AVERAGE	55.63	63.71	71.08	86.71	92.49	94.37	77.33

The words that appeared to be valid are shown in bold in the Table. Considering the results regarding the accuracy rate in the recall tasks, the remaining 16 words that appeared to be invalid can be divided into two groups. First group was named "too easy" and second group "too difficult." The words, which seemed to be too easy for the learners, showed marked tendency to answer correctly among all the six recall tasks: "too easy". This means that the test formats did not affect learners' response to produce correct answers. The learners showed marked tendency to answer correctly on test H and D; however, the performances on the remaining tests (i.e., test L, B, J, and F) showed poor results. These results showed that the learners already have adequate ability to write (translate) the correct meaning of the words on test H. In addition to this; they could correctly pronounce the words from the written spellings. Nevertheless, they could not write the correct spellings from the L1 meaning on test L, and they could not dictate correctly on the test B.

5.3.3.2 Implicational Scaling in Recognition Tasks in Study 3

Table 5.21 showed the scalability of the recognition tasks in study 3. Scalabilities were calculated with each word in study 3.

The task difficulties were determined according to the scores of learners' test performances.

$$K < I \fallingdotseq E \fallingdotseq C \fallingdotseq G \fallingdotseq A$$

$$(K < E, I < C)$$

$$(\text{difficult} \rightarrow \text{easy})$$

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Table 5.21

Scalability in Recognition Tasks in Study 3

| Target Word | Formula | | | |
	C_{rep}	MM_{rep}	% improvement (C_{rep} - MM_{rep})	C_{scal}
address	**.995**	.998	-.002	-1.000
animal	**.981**	.988	-.007	-.600
bird	**.986**	.934	.052	**.786**
bottle	**.925**	.885	.040	.347
climb	**.991**	.965	.026	**.733**
farm	**.977**	.967	.009	.286
grass	**.981**	.930	.052	**.733**
hero	**.995**	.995	.000	.000
kitchen	**.972**	.932	.040	.586
knife	**.925**	.946	-.021	-.391
law	**.953**	.960	-.007	-.176
magazine	**.991**	.962	.028	**.750**
message	**1.000**	.967	.033	**1.000**
mirror	**.986**	.988	-.002	-.200
moon	**.930**	.960	-.031	-.765
pilot	**.991**	.993	-.002	-.333
quality	**.939**	.948	-.009	-.182
rain	**.958**	.937	.021	.333
right	.873	.871	.002	.018
science	**.981**	.979	.002	.111
sign	.981	.981	.000	.000
sleep	**.991**	.981	.009	.500
snow	**.981**	.953	.028	**.600**
soft	**.967**	.972	-.005	-.167
ticket	**.995**	.995	.000	.000
tomorrow	**.953**	.962	-.009	-.250
video	**.953**	.960	-.007	-.176
warm	.864	.876	-.012	-.094
wash	**.986**	.993	-.007	-1.000
yellow	**.977**	.986	-.009	-.667
AVERAGE	.966	.959	.007	.026

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}

Only six words (i.e., *bird, snow, climb, grass, magazine,* and *message*) on the recognition tasks were considered valid for all test-takers. Comparing the values of C_{scal} on the recall tasks, same four words were considered to be valid (i.e., *bird, snow, grass,* and *message*).

Table 5.22 shows the accuracy rate of the recognition tasks in study 3. This will help us understand the overall test difficulties. The words that appeared to be valid are shown in bold in the table. The results of accuracy rate of the remaining invalid 24 words showed that most learners answered correctly regardless of different test formats. Not surprisingly, there were only small differences among six recognition tasks, even though especially test K showed significant differences with other tests. In other words, except for test K, the recognition tasks were not so difficult for the test-takers. This shows the test-takers in this study already acquired the abilities to recognize the target words, regardless of different test formats in the recognition tasks. Compared to the results from the recall tasks, which were analyzed in the previous sections, the learners successfully understood the following six dimensions: the knowledge of recognizing (a) sound to letter, (b) sound to meaning, (c) letter to sound, (d) letter to meaning, (e) meaning to letter, and (f) meaning to sound.

Table 5.22

Accuracy Rate of Recognition Tasks in Study 3

Target word	K	I	E	C	G	A	Total
address	100.00	100.00	100.00	98.59	100.00	100.00	99.77
animal	98.59	98.59	98.59	100.00	100.00	97.18	98.83
bird	64.79	100.00	98.59	100.00	98.59	98.59	93.43
bottle	67.61	91.55	90.14	95.77	90.14	95.77	88.50
climb	83.10	100.00	98.59	100.00	97.18	100.00	96.48
farm	90.14	92.96	98.59	100.00	98.59	100.00	96.71
grass	63.38	98.59	98.59	98.59	100.00	98.59	92.96
hero	98.59	100.00	98.59	100.00	100.00	100.00	99.53
kitchen	69.01	100.00	98.59	94.37	97.18	100.00	93.19
knife	98.59	88.73	88.73	98.59	92.96	100.00	94.60
law	94.37	95.77	94.37	94.37	97.18	100.00	96.01
magazine	80.28	100.00	100.00	100.00	100.00	97.18	96.24
message	80.28	100.00	100.00	100.00	100.00	100.00	96.71
mirror	97.18	100.00	97.18	98.59	100.00	100.00	98.83
moon	98.59	83.10	100.00	94.37	100.00	100.00	96.01
pilot	98.59	100.00	98.59	100.00	98.59	100.00	99.30
quality	94.37	94.37	98.59	92.96	95.77	92.96	94.84
rain	92.96	88.73	88.73	100.00	91.55	100.00	93.66
right	80.28	63.38	100.00	78.87	100.00	100.00	87.09
science	92.96	98.59	100.00	97.18	98.59	100.00	97.89
sign	94.37	100.00	98.59	100.00	95.77	100.00	98.12
sleep	92.96	100.00	97.18	100.00	100.00	98.59	98.12
snow	77.46	100.00	98.59	100.00	100.00	95.77	95.31
soft	97.18	97.18	91.55	100.00	97.18	100.00	97.18
ticket	98.59	100.00	100.00	100.00	98.59	100.00	99.53
tomorrow	92.96	100.00	95.77	100.00	94.37	94.37	96.24
video	95.77	94.37	92.96	100.00	92.96	100.00	96.01
warm	85.92	87.32	84.51	88.73	95.77	83.10	87.56
wash	100.00	98.59	100.00	97.18	100.00	100.00	99.30
yellow	98.59	98.59	97.18	97.18	100.00	100.00	98.59
AVERAGE	89.25	95.68	96.76	97.51	97.70	98.40	95.88

5.4 Summary of the Findings: Chapter 5 (Study 3)

5.4.1 Answers to RQ3-1

RQ3-1: Do the types of six recall test formats affect spelling test performance?

The results of two-way mixed ANOVA showed significant interaction between group (3: upper, middle, and lower) and test (6: test B, D, F, H, J, and L). After conducting post hoc analysis for the group factor for each test, there were significant group differences between lower group and the upper group in all six recall tasks. However, the differences between the middle group and the upper group in several tests (i.e., test D, H, and J) were not significant. Another post hoc analysis was conducted for the test factor for each group. Amazingly, the results of the test differences varied in each group. The upper group and the middle group differed little across test formats. In the lower group; however, the differences among tests were significant. That is to say, different test formats did affect lower group learners' test performances. The estimated vocabulary size in the lower group was less than 2500 word-level. At this word level, it seemed that learners' vocabulary knowledge of form and meaning was not yet completely acquired. Further analysis is needed to verify these results.

5.4.2 Answers to RQ3-2

RQ3-2: Do the types of six recognition test formats affect spelling test performance?

The results of two-way mixed ANOVA showed significant interaction among groups (3: upper, middle, and lower) and tests (6: test A, C, E, G, I, and K). After conducting post hoc analysis for the group factor for each test, there were no significant differences between the lower group and the middle group or

the middle group and the upper group. Only the differences between the lower group and the upper group were significant. Another post hoc analysis was conducted for the test factor in each group. The results showed little differences among the recognition tasks. However, the results of the test K (i.e., spelling recognition) should be noted. The scores on the test K were consistently the lowest among all groups. It seemed that recognizing correct spellings from several options were high-load tasks for all learners, regardless of the different levels of vocabulary size.

5.4.3 Answers to RQ3-3

RQ3-3: Are estimated vocabulary size and spelling test performance related?

First, Pearson's correlation coefficients were calculated with the Vocabulary Size Test and the six recall tasks. The results showed significant correlations among Vocabulary Size Test and all recall tasks. The correlations among recall tasks were also significant. In particular, tests comprising related aspects correlated highly, as was expected.

Second, Pearson's correlation coefficients were calculated with the Vocabulary Size Test and the six recognition tasks. It seemed that strong correlation might be found between Vocabulary Size Test and the G test (i.e., L2 spelling to L1 meaning) because of the similarities of two tests. However, contrary to our expectations, the correlations between two tests were not so high. The results showed significant correlations between Vocabulary Size Test and all the recognition tasks. However, the correlations were weak to moderately high.

The correlations among six recognition tasks were moderately high to high. However, the correlation between test A (i.e., L2 sound to L2 spelling) and test C

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(i.e., L2 spelling to L2 sound) was not significant. Added to this, test E (i.e., L2 sound to L1 meaning) and test K (i.e., L2 spelling recognition) were not significantly correlated.

Considering these results, it can be concluded that correlations among vocabulary size and the recall tasks were higher compared to those among the recognition tasks.

5.4.4 Consistencies of the Performances on Tests

First, Spearman's rank-order correlation coefficients were calculated among the six recall tasks in order to examine the consistency in learners' performances. The results showed significant correlations among the tests. Therefore, the results showed that the learners who scored highly on one test could score highly on the other test formats, too. Only the correlations between test D (i.e., L2 spelling to L2 sound) and other tests were weak to moderately high. Pronouncing the words from the written spellings was not so difficult for the test-takers in this study.

Second, Spearman's rank-order correlation coefficients were also calculated among the six recognition tasks to examine the consistency of test performances. The results showed significant correlations among the six tests. The correlations between test A (i.e., L2 sound to L2 spelling) and test C (i.e., L2 spelling to L2 sound) and between test I (i.e., L1 meaning to L2 sound) and test K (i.e., L2 spelling recognition) were not significant.

5.4.5 Answers to RQ3-4

RQ3-4: What are the characteristics of the scalabilities among thirty-five target

words?

Implicational scaling was used as a statistical method to examine task difficulty order. In the recall tasks, 14 words were scalable with the following difficulty order: L < B < J < F < H < D (difficult to easy). That is to say, the abilities measured on six recall tasks showed a valid difficulty order in some words with the results of implicational scaling. The target words were already studies in their school days; however, not all the learners could acquire various aspect of each word.

In the recognition tasks, six words were scalable with the following difficulty order: K < I < E < C < G < A (difficult to easy). Comparing the scores on the recognition tasks with those on the recall tasks, most learners could answer all recognition tasks correctly because of ceiling effect found in their scores. Only on test K (i.e., spelling recognition), some learners showed the lack in their spelling knowledge.

In sum, in the case of recognition tasks, testing materials should be further developed. However, the formats of the recall tasks showed appropriate results especially in the lower level test-takers.

5.4.6 Answers to RQ3-5

<u>*RQ3-5: Will diagnostic spelling tests categorize the test-takers?*</u>

Seventy-one learners were categorized according to their test performances especially on recall tests. The diagnostic spelling tests developed for this research succeeded in categorizing the learners into three groups according to their vocabulary knowledge: Good-decoder, good-speller, good-comprehender (D+ S+ C+), Good-decoder, poor-speller, good-comprehender (D+ S- C+), and

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Poor-decoder, poor-speller, poor-comprehender (D- S- C-). Thirty-one learners categorized as D+ S+ C+, and thirty-nine learners categorized as D+ S- C+. Only one participant categorized as D- S- C-.

It seems that Poor Decoders are rare if the target words have been introduced in the past. However, overall, almost half of the participants (*N*=31) were Poor-spellers; they need special treatment to acquire English spellings. There were no Good-spellers, Poor-comprehenders in the present study. It should be noted that there exists lack of sound-letter correspondence knowledge among Japanese EFL learners, and the learners have tendencies to remember the words' meaning first and they tend to ignore understanding sound-letter correspondences.

Comparing the results with multiple-choice testing (a recognition test), it can be said that learners who could not answer correctly on multiple-choice tests failed to write the correct spellings.

Chapter 6   Examining Diagnostic Spelling Tests (Part 2): Study 4

6.1 Purpose of the Study

The purpose of this study (Study 4) was (a) to compare the findings from Study 3 and (b) to elicit task difficulties among several spelling test formats among Japanese EFL learners for diagnostic purposes.

The results in Study 3 showed that the recall tasks partly succeeded in showing the difficulty order among six spelling tests. However, the results from the recognition tasks failed to indicate the task difficulties. It seemed that some parts of the recognition tasks tests were too easy for the test-takers. That said, it should be noted that it is not appropriate to delete recognition tasks from the testing sessions because there is still a possibility of showing task difficulties among recognition tests. Thus, for these reasons, study 4 intended to develop another version of 12 tests (i.e., six recall tasks and six recognition tasks) with different target words. This is to examine whether the words' characteristics might affect the results of the test-takers' performances. Therefore, appropriate selection of the target words is also important issue for this study. The selection of the target words is described in the following sections.

The research questions are as follows:

RQ4-1: Do task difficulties of recall test formats differ between Study 3 and Study 4?

RQ4-2: Do task difficulties of recognition test formats differ between Study 3 and Study 4?

RQ4-3: Are estimated vocabulary size and spelling test performance related compared to Study 3?

RQ4-4: What are the characteristics of the scalabilities among thirty-two target words focusing on silent letters?

RQ4-5: Are there any learners who can be categorized as poor-decoders, good-spellers, poor-comprehenders (D- S+ C-)?

6.2 Methods

6.2.1 Participants

Overall, 57 university students participated in the study (ages 18 to 20). Students who could not complete all sessions in this study were excluded. At last, 44 students (27 male, 17 female) were included in this study. Some students majored in English; however, other students majored in economics or business economics. For this reason, their English proficiency levels varied. This study (Study 4) was a follow-up study to Study 3 in Chapter 5; thus, the study also focused on the aspects of vocabulary knowledge.

Instead of using proficiency test scores, such as TOEIC scores, this study also decided to assess students' ability of breadth of vocabulary knowledge as a tool to understand learners' already acquired knowledge of vocabularies. The average score of Mochizuki Test among the participants was about 2500 (i.e., 2507). According to the results of this Mochizuki Test, test-takers were divided into two groups, such as upper ($n = 21$) and lower ($n = 23$).

6.2.2 Materials

In Study 3, the author picked up the target words from Webb's (2008) previous study. The words on the Webb's list came from COBUILD dictionary. Contrary to Study 3, this study focused on using the certainty of already acquired

words for the test-takers. From this point of view, the words from English

textbooks in the junior high and the high schools were considered appropriate.

The word lists from Chujo, Nishigaki, Yoshimori, and Nishioka (2007) were

based on English textbooks. Thus, target words were chosen from the lists. Next

section explains the detailed information about word choices in this study.

6.2.2.1 Target Words

Target words were chosen from the list suggested by Chujo et al (2007).

The list was created from Japanese high school textbooks. There are 34 types of

textbooks in English I and 35 types of textbooks in English II. In addition to this,

there are 25 types of reading textbooks. Chujo et al (2007) created the list from

those textbooks considering two perspectives, such as frequency and range. The

term frequency in their study refers to the frequency with which words appeared

in the textbooks. The term range in their study means the total types of English I,

II, and reading textbooks. The words in the textbooks were considered as already

acquired by the participants. This is the reason for which this study used this list.

According to their study, total number of range 35 words was 169. Range 35

means that the word appeared in all 35 types of the textbooks. Finally, the author

decided to choose the words that appeared in 30 books. The total number of

words included in range was 449. Target words for this study were selected from

these 449 words, focusing on "silent letters." It is said that 60% of English words

have the characteristics of silent letters. There are complicated divisions of silent

letters. There are three types of silent letters: inert letters, auxiliary letters, and

empty letters. Narita (2009) introduced these categories in his book based on the

past studies; therefore, this study follows the previous divisions of silent letters.

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First, inert letters are the letters, which appear in morphemes and allomorphs of the same words. However, in some cases, the letters are pronounced only in allomorphs (e.g., bomb-bombard, sign-signature). Second, auxiliary letters are letters, which are not pronounced in some words; however, the letters have functions to pronounce (e.g., "e" in hate, "u" in guess). Third, empty letters are those that do not have any functions in the words (e.g., "b" in debt, doubt, "h" in honest, honor).

Considering these characteristics of silent letters, 32 words were finally chosen from 449 words which were in range 30. It was also important to consider the word level, such as JACET 8000. The result of the Mochizuki Test showed that the students' average word level was around 2,500. Thus, it seemed that choosing words from level 1 and level 2 in JACET 8000 word-level was appropriate for the test-takers in this study. Table 6.1 shows the target words in Study 4.

Table 6.1

Target Words in Study 4

Target Word	JACET 8000	Syllable	Phonetic Symbol
across	1	2	/əkrɔ':s/
actually	1	4	/æ'ktʃuəli/
alone	1	2	/əlóun/
answer	1	2	/æ'nsər/
believe	1	2	/bilí:v/
between	1	2	/bitwí:n/
break	1	1	/bréik/
build	1	1	/bíld/
carry	1	2	/kæ'ri/
cause	1	1	/kɔ':z/
choose	1	1	/ʧú:z/
clean	1	1	/klí:n/
close	1	1	/klóuz/
continue	1	3	/kəntínju:/
deep	1	1	/dí:p/
difficult	1	3	/dífikʌ`lt/
express	1	2	/iksprés/
famous	1	2	/féiməs/
finally	1	3	/fáinəli/
full	1	1	/fúl/
happen	1	2	/hæ'pən/
heart	1	1	/hɑ':rt/
hope	1	1	/hóup/
inside	1	2	/ìnsáid/
introduce	1	3	/ìntrəd(j)ú:s/
letter	1	2	/létər/
look	1	1	/lúk/
poor	1	1	/púər/
reach	1	1	/rí:ʧ/
receive	1	2	/risí:v/
same	1	1	/séim/
surprise	1	2	/sərpráiz/
wash	1	1	/wɑ'ʃ/
wrong	1	1	/rɔ':ŋ/
yellow	2	2	/je'lou/

Note. Phonetic symbols were taken from online dictionary ALC
(http://www.alc.co.jp/). The phonetic symbol converter
(http://www.manabo.net/).

6.2.2.2 Dependent Measures (Recall Tasks vs. Recognition Tasks)

Overall, 12 tests were developed for this study. This study utilized the same test formats as presented in the previous chapter (Study 4). Twelve tests were specifically designed for diagnostic analysis of Japanese EFL learners' English spelling ability. Half of the tests were recognition tasks, and the other half of the test were recall tasks. Each test contained 32 target words and for diagnostic purposes, the same words were utilized but given randomly in each test. Some recall tests were designed to record test-takers' oral recall; thus, for those tests, computer program named *movie teleco* in the Computer Assisted Language Learning (CALL) classrooms or IC recorders were used. Followings are the contents of both recall and recognition tests. Appendices 6A to 6L are the examples of test formats.

Recall Tests

[B] Test 3 - *L2 sound to L2 spelling* (receptive to productive recall)

This test measured productive knowledge of orthography; its well-known format is widely used in language classrooms. Test-takers heard each target word pronounced twice then had 10 seconds to write the spelling (mistakes were marked as incorrect). This test targeted learners' knowledge of sound-letter correspondences (see Appendix 6C).

[D] Test 5 - *L2 spelling to L2 sound* (receptive to productive recall)

This test measured productive knowledge of English word pronunciation. Although it resembles the naming task, which has been used in the word recognition studies, this test did not focus on latency because the target words in this study were already acquired, nor did it include nonwords (pseudo words).

Focusing on correct pronunciation is necessary for understanding productive knowledge of oral reading English words. This test requires learners to read and recognize correct spelling. Hence, the test focuses on both receptive and productive dimensions. The amount of time required varied among test-takers: two or three minutes to complete this task (see Appendix 6E).

Test D required knowledge of letter-sound correspondence; test B required sound-letter correspondence—both related to phonological processing routes, which are important aspects of reading and writing in a second language (Cook, 2005).

[F] Test 4 - *L2 sound to L1 meaning* (receptive recall)

This test measured receptive knowledge of meaning. Test-takers heard each target word pronounced twice then had 10 seconds to write the meaning in Japanese. They did not need to write in kanji; however, major errors of Japanese words (e.g., kanji errors or mistakes in word translation) were considered as mistakes and did not get points. They were able to use *hiragana* to translate the words. If the translation of the words was acceptable (i.e., synonymous words or the words that were not exactly the same but acceptable), they received points (see Appendix 6D).

[H] Test 6 - *L2 spelling to L1 meaning* (receptive recall)

This test measured receptive knowledge of form and meaning. The spellings of the words were listed on the test sheet, and test-takers were to write each word's meaning in Japanese. Scoring procedures were the same as on Test 4: they did not need to use kanji (see Appendix 6F).

[J] Test 1 - *L1 meaning to L2 sound* (productive recall)

This test measured productive knowledge of English word pronunciation. It required test-takers to translate Japanese meaning into English words. Thirty-five target words were printed on a test sheet; test-takers were to translate the words orally. This session used *movie teleco* and IC recorders. Test-takers could skip any items that they could not answer: to avoid random skipping, they were to say each item then, if they thought that they could not correctly answer the item, they needed to say "pass" or "don't know." Although this seems to test pronunciation, its purpose is to check understanding of the English words according to the Japanese meanings. For this reason, this test did not require learners' to produce native-like pronunciation (see Appendix 6A).

Tests F and J contained translating ability that did not include spelling information; thus some might think that they are unrelated to spelling knowledge. However, these tests attempted to assess learners' knowledge of sound form and meaning. The tests also sought to examine how well learners understand English pronunciation and translation of Japanese. The data from this task will provide additional information of learners' vocabulary knowledge with various aspects.

[L] Test 2 - *L1 meaning to L2 spelling* (productive recall)

This test measured productive knowledge of orthography. It required test-takers to write the correct spelling according to the given Japanese meaning of the words. They needed to write perfectly the correct spelling, which means incorrect spelling got "0" point: only correctly spelled answers were counted as their Test 2 [L] scores (see Appendix 6B).

Tests H and L focused on knowledge of written form and meaning receptively and productively. Comparing how results of H and L differ will be interesting. Without test H, assessing learners' knowledge of how well they can translate the words' meanings into Japanese would be impossible: all six recall tests were important to assess Japanese EFL learners' spelling knowledge related to vocabulary knowledge.

Recognition Tests

[A] Test 9 - *L2 sound to L2 spelling* (productive recognition)

This test measured receptive knowledge of form and sound. Two similar options of English words were listed on the test sheet. The distractors were chosen from the word lists from Obunsha (2012a, 2012b, 2012c, 2012d, 2012e, 2012f). The lists were from EIKEN grades pre-one, pre-two, two, three, four, and five. Choosing the distractors focused on the resemblance of word form and pronunciation. Each word was read twice then test-takers had 10 seconds to circle the correct spelling from two options (see Appendix 6I).

[C] Test 11 - *L2 spelling to L2 sound* (productive recognition)

This test measured receptive knowledge of written form and sound. The target words were printed on the test sheet and two options were given orally. Test-takers were to choose the correct pronunciation from the two options. Distractors were the same as those in test A (see Appendix 6K).

Requiring knowledge of connecting spelling to sound or sound to spelling, the formats of tests A and C were partly derived from pronunciation textbooks

(Headway, 1999a, 1999b) whose recognition type tests contained three options. Although the tested items in the current study contained only two options, this seemed appropriate due to the number of items.

[E] Test 10 - *L2 sound to L1 meaning* (receptive recognition)

This test measured receptive knowledge of sound and meaning. In this matching task, each of the thirty-five words was read twice, and the test-takers were to choose the appropriate meaning from the 40 options printed on the test sheet: five options were distractors to avoid guessing (Appendix 6J).

[G] Test 12 - *L2 spelling to L1 meaning* (receptive recognition)

This test measured receptive knowledge of written form and meaning. The test was a type of matching task. English words were printed on the work sheet and the options for target words were displayed on the same test sheet. There were 40 options for 35 test items including distractors as in test E (see Appendix 6L).

[I] Test 8 - *L1 meaning to L2 sound* (productive recognition)

This test measured receptive recognition of English word pronunciation. Japanese meanings of the words were listed on the test sheet. Two options were given once orally; test-takers were to choose one correct pronunciation that is appropriate for the listed Japanese word (see Appendix 6H).

[K] Test 7 - *L2 spelling recognition* (receptive recognition)

This test measured receptive knowledge of orthography. Test-takers were to circle one correct spelling of each target word among three distractors. Pilot Study 4 was conducted before the main test: same-year learners from the other classes took the spelling test and the incorrect answers were collected to

make distractors (see Appendix 6G).

Among all tests, only the correct answers were considered as "pass", and incorrect answers were considered as "fail." Spelling errors were strictly checked and phonologically plausible spellings were also considered as "fail."

Sound data for the sound form tests were derived from Zen-Ei-Ren's (2000a; 2000b; 2001) books with CDs. Computer software called "Sound-it! 6.0" was utilized to edit sound form tests.

6.2.3 Scoring

Each correct spelling received "1" point and incorrect spelling received "0" point on recall tasks. Table 6.2 shows the scoring of each spelling test.

Table 6.2

Scoring of Tests in Study 4

	Test format	Targeted knowledge	Correct	Incorrect
A	L2 sound to L2 spelling recognition	spelling	1	0
B	L2 sound to L2 spelling recall	spelling	1	0
C	L2 spelling to L2 sound recognition	sound	1	0
D	L2 spelling to L2 sound recall	sound	1	0
E	L2 sound to L1 meaning recognition	meaning	1	0
F	L2 sound to L1 meaning recall	meaning	1	0
G	L2 spelling to L1 meaning recognition	meaning	1	0
H	L2 spelling to L1 meaning recall	meaning	1	0
I	L1 meaning to L2 sound recognition	sound	1	0
J	L1 meaning to L2 sound recall	sound	1	0
K	(L1 meaning to) L2 spelling recognition	spelling	1	0
L	L1 meaning to L2 spelling recall	spelling	1	0

For L2 to L1 translation task, the translation of synonym received a score of "1" because the translation task required test-takers to identify only the meaning of a word in their L1 (Japanese).

6.2.4 Design

Following the procedures from the previous studies, recall tests were given to the test-takers first, and a week later, recognition tests were given to the same test-takers. In order to analyze diagnostically, the study adopted within-subject design, which means all the participants completed all testing sessions.

6.2.5 Procedure

The procedure of the experiment was the same as that of study 3. At the beginning of this research, Mochizuki Test was conducted to assess test-takers' already acquired vocabulary knowledge. Subsequently, twelve spelling tests were given to the test-takers. However, taking 12 tests in one day requires too much cognitive load. Furthermore, using recognition task and recall task in one research design is not effective in assessing accurate knowledge of the participants. Thus, at first, six recall type tests were administered and a week later, the other six recognition type tests were administered.

It should be noted that test-takers had to take recall tests first. This is because if the examinee took the recognition test first, the items on the test could have provided some clue about the recall tasks. Thus, the recognition test should be administered to the examinee before the recall test. This study carefully adopted the procedure of previous studies, giving the recall tests to the test-takers one week before the recognition tests.

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In sum, the 12 tests in Study 4 are the recall type tests and the recognition type tests. In the second session, six recall tests were conducted in one day. After a week from the second session, six recognition tests were conducted in one day. Therefore, three testing sessions were prepared for this study. Simply put, vocabulary size test (Mochizuki Test) was utilized in session 1 to evaluate test-takers' vocabulary size, six recall tests were conducted in the session 2, and in the session 3, six recognition tests were conducted.

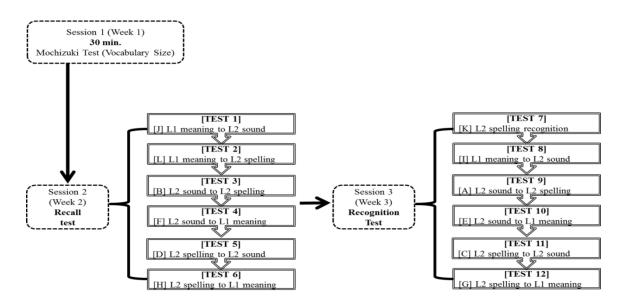*Figure 6.1.* Experimental procedures of Study 4

6.3 Results and Discussion

6.3.1 Analysis

The analytical procedures used in this experiment are as follows:

(1) Two-way mixed design analysis of variance (ANOVA),

(2) Pearson's correlation coefficient,

(3) Spearman's rank-order correlation,

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(4) Exploratory Factor Analysis (EFA),

(5) Implicational scaling.

In order to compare the difficulties of the tests conducted in this study, two-way mixed design ANOVA was used. In the next step, Pearson's correlation coefficient was used to show the relationships among vocabulary size test, the six recall tests, and the six recognition tests. In addition, it was also important to know whether the test-takers' performances on recall and recognition tasks were consistent. Spearman's rank-order correlation was used to answer this question. Correlation is one method to check for validity, another way is factor analysis. Thus, Exploratory Factor Analysis (EFA) was used for the data in this study.

Finally, implicational scaling was used to check the orderliness in the collected data. This analysis method was used to examine the developmental order.

6.3.2 Results of Quantitative Analysis

6.3.2.1 Difficulties Among Spelling Test Scores

This study included recall tasks and recognition tasks. The analyses were conducted independently with recall tasks and recognition tasks. Table 6.3 shows the descriptive statistics, reliability, and Item Discrimination for the 12 tests (i.e., six recall tasks and six recognition tasks). Only in test A, Cronbach's alpha was considerably-low. This is probably due to the high mean scores. Compared to the other tests, the mean scores in test A were too high, both in the lower group and in the upper group.

Two-way mixed design analysis of variance (ANOVA) was utilized to

examine the difficulties among the tests. Group [upper ($N = 21$) and lower ($N = 23$)] was the between-subjects factor. Test was the within-subjects factor. The results of two-way mixed ANOVA are explained in the following sections.

Table 6.3

Descriptive Statistics, Reliability, Item Discrimination for the 12 Tests (N = 44) (Table continues)

Test	Group	N	*M*	*SD*	*Min*	*Max*	Cronbach's alpha	*DIS*
[A] (*k*=30)	Upper	21	29.48	0.873	27	30		
	Lower	23	29.13	0.815	27	30	.10	.03
	Total	44	29.30	0.851	27	30		
[B] (*k*=30)	Upper	21	21.24	5.214	11	28		
	Lower	23	15.43	5.968	2	26	.88	.43
	Total	44	21.24	5.214	2	28		
[C] (*k*=30)	Upper	21	27.24	2.827	20	30		
	Lower	23	26.96	1.846	23	30	.66	.22
	Total	44	27.09	2.341	20	30		
[D] (*k*=30)	Upper	21	29.00	1.183	26	30		
	Lower	23	27.65	2.551	21	30	.69	.21
	Total	44	28.30	2.108	21	30		
[E] (*k*=30)	Upper	21	27.14	3.021	20	30		
	Lower	23	22.96	5.156	12	30	.86	.39
	Total	44	24.95	4.725	12	30		
[F] (*k*=30)	Upper	21	25.52	3.203	18	30		
	Lower	23	20.13	5.337	11	28	.86	.39
	Total	44	22.70	5.174	11	30		
[G] (*k*=30)	Upper	21	28.67	1.742	24	30		
	Lower	23	24.30	4.665	12	30	.87	.41
	Total	44	26.39	4.172	12	30		
[H] (*k*=30)	Upper	21	27.67	2.415	23	30		
	Lower	23	22.96	4.617	12	28	.87	.40
	Total	44	25.20	4.391	12	30		

Table 6.3

Descriptive Statistics, Reliability, Item Discrimination for the 12 Tests (N =

44) (Table continues)

Test	Group	N	*M*	*SD*	*Min*	*Max*	Cronbach's alpha	*DIS*
[I] (*k*=30)	Upper	21	27.24	1.411	24	30		
	Lower	23	26.48	2.086	22	29	.30	.04
	Total	44	26.84	1.817	22	30		
[J] (*k*=30)	Upper	21	16.52	4.946	9	25		
	Lower	23	9.70	4.733	4	19	.78	.29
	Total	44	12.95	5.894	4	25		
[K] (*k*=30)	Upper	21	27.19	1.965	23	30		
	Lower	23	25.17	3.312	18	29	.66	.21
	Total	44	26.14	2.906	18	30		
[L] (*k*=30)	Upper	21	17.67	3.825	7	26		
	Lower	23	11.74	4.223	2	17	.85	.37
	Total	44	14.57	4.990	2	26		

Note. k = number of items. Min = minimum value. Max = maximal value. DIS (i.e., Item Discrimination) was calculated using point bi-serial correlations. Test [A], [C], [E], [G], [I], and [K] are the recognition tests. Test [B], [D]. [F], [H], [J], and [L] are the recall tests.

6.3.2.1.1 Results of the Recall Tasks

The results of ANOVA showed significant interaction between group and test (F (3.75, 157.47) = 6.001, p <.001). Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption. The effect size was again small (.03), which means there was low statistical power of the interaction between group and test. This is probably due to the small number of the participants in this study.

After this, *t*-test was performed to compare the differences across different levels of group factor. Bonferroni post hoc test was utilized to compare the differences among each level in the test factor. Table 6.4 shows the result of

two-way mixed ANOVA. Table 6.5 shows the result of simple main effects test in each factor.

Table 6.4

Two-way Mixed ANOVA for the Effects of the Group Difference and the Test Formats in Study 4 Recall Tasks

Source	SS	df	MS	F	p	η^2
			Between Subjects			
Group	1647.727	1	1647.727	21.847	.000	.23
Error	3167.738	42	75.422			
			Within Subjects			
Test	821.892	3.749	2139.633	238.001	.000	.11
Test * Group	202.255	3.749	53.946	6.001	.000	.03
Error	1415.620	157.466	8.990			
Total	7255.232	207.964				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

Table 6.5

Simple main effects in Group Factor and Test Factor in Study 3 Recall Tasks

Simple Effect	Level	df	t	p	r
	[Test B]	42	3.42	.001	.47
	[Test D]	42	2.212	.030	.32
	[Test F]	42	4.015	.000	.53
[Group]	[Test H]	42	4.179	.000	.54
	[Test J]	42	4.863	.000	.60
	[Test L]	42	4.678	.000	.59

Simple Effect	Level	df	F	p	η^2
	[Group Upper]	2.878	87.688	.000	.81
	Error	57.569			
[Test]	[Group Lower]	5	158.514	.000	.88
	Error	110			

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

After the simple main effects test, pairwise comparisons were conducted with each level of the group factor and the test factor. Table 6.6 shows the results of pairwise comparisons among tests in each group.

Table 6.6

Comparisons Among Tests in Each Group: Upper and Lower

Group		Sig. of *F*						Test difference
	Test	1	2	3	4	5	6	
Upper	1. Test [B]	—						L ≒ J < B < F < H ≒ D
	2. Test [D]	.000	—					(L < B)
	3. Test [F]	.001	.000	—				
	4. Test [H]	.000	.152	.000	—			(difficult → easy)
	5. Test [J]	.034	.000	.000	.000	—		
	6. Test [L]	.000	.000	.000	.000	1.000	—	
	Test	1	2	3	4	5	6	
Lower	1. Test [B]	—						L < J < B < F < H < D
	2. Test [D]	.000	—					
	3. Test [F]	.000	.000	—				
	4. Test [H]	.000	.000	.002	—			(difficult → easy)
	5. Test [J]	.000	.000	.000	.000	—		
	6. Test [L]	.000	.000	.000	.000	.009	—	

The results of the pairwise comparisons showed significant differences in test difficulties for the lower group. Test-takers in the lower group's vocabulary size were under 2500. In the lower group, the order of difficulties was significant: L < J < B < F < H < D (difficult to easy). On the other hand, not all differences among tests were significant in the upper group: L ≒ J < B < F < H ≒ D (L < B) (difficult to easy). The vocabulary size of the upper group learners' was over 2500. In other words, the results were found to be less hierarchical for learners over 2500 word level.

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It can be said that the test difficulties influenced the lower groups' performance on the tests, which is consistent results of study 3. In other words, lower group learners had fewer knowledge of the target words compared to the upper group.

The characteristics of test L were also noteworthy. The scores on test L were consistently the lowest in the upper and lower groups. Test L asked participants to write correct English spelling of the word written in their first language (i.e., L1 = Japanese). It seemed that translating the words into English and writing the correct spellings were the most difficult tasks for Japanese EFL learners.

On the other hand, simple main effects of group on the test factors showed significant differences between the lower group and the upper group in performance on each test. Upper group outperformed the lower group on all six recall tasks.

Table 6.7

Comparisons Between Groups in Each Test: Test [B], [D], [F], [H], [J], and [L]

Test	Sig. of t	Group difference (Upper_Lower)
Test [B]	0.001	
Test [D]	0.030	
Test [F]	0.000	Lower < Upper
Test [H]	0.000	
Test [J]	0.000	
Test [L]	0.000	

6.3.2.1.2 Results of the Recognition Tasks

The results of ANOVA showed significant interaction between group and test (F (3.75, 157.47) = 6.001, p <.01). Greenhouse-Geisser correction was used to correct the violation of the sphericity assumption. The effect size was small (.07), which means there was low statistical power of the interaction between group and test. This is probably due to the small number of the participants in this study. To compare the differences among each group, t-test was performed. Bonferroni post hoc test was utilized to compare the differences among each level of the test types. Table 6.8 shows the result of two-way mixed ANOVA.

Table 6.8

Two-way Mixed ANOVA for the Effects of the Group difference and the Test Formats in Study 4 Recognition Tasks

Source	SS	df	MS	F	p	η^2
Between Subjects						
Group	261.368	1	261.368	11.680	.001	.09
Error	939.825	42	22.377			
Within Subjects						
Test	434.584	2.862	151.851	16.808	.000	.15
Test * Group	193.069	2.862	67.461	7.467	.000	.07
Error	1085.943	120.200	9.034			
Total	2914.789	168.924				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

Table 6.9 shows the result of simple main effects test on each factor. After the simple main effects test, pairwise comparisons were conducted with each level of the group factor and the test factor. Table 6.10 shows the results of pairwise comparisons among tests in each group.

Table 6.9

Simple main effects Test in Group Factor and Test Factor in Study 4 Recognition Tasks

Simple Effect	Level	df	t	p	r
	[Test A]	42	1.359	.181	.21
	[Test C]	42	0.395	.695	.06
	[Test E]	36.049	3.319	.002	.48
[Group]	[Test G]	28.498	4.177	.000	.62
	[Test I]	42	1.401	.168	.21
	[Test K]	42	2.426	.020	.35

Simple Effect	Level	df	F	p	η^2
	[Group Upper]	3.101	7.079	.000	.26
	Error	62.019			
[Test]	[Group Lower]	2.338	15.118	.000	.41
	Error	51.446			

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

Table 6.10

Comparisons Among Tests in Each Group: Upper and Lower

Group		Sig. of F						Test difference
	Test	1	2	3	4	5	6	
	1. Test [A]	—						
	2. Test [C]	.021	—					E ≒ K ≒ I ≒ C ≒ G ≒ A
Upper	3. Test [E]	.037	1.000	—				(E < A, K < A, I < G, A)
	4. Test [G]	.900	.050	.058	—			(difficult → easy)
	5. Test [I]	.000	1.000	1.000	.032	—		
	6. Test [K]	.002	1.000	1.000	.134	1.000	—	
	Test	1	2	3	4	5	6	
	1. Test [A]	—						
	2. Test [C]	.000	—					E ≒ G ≒ K ≒ I ≒ C < A
Lower	3. Test [E]	.000	.007	—				(E < I, C)
	4. Test [G]	.000	.104	.702	—			(difficult → easy)
	5. Test [I]	.000	1.000	.043	.493	—		
	6. Test [K]	.000	.341	1.000	1.000	.632	—	

The result of the pairwise comparisons showed that significant differences between the upper and lower groups were found only for test E and some other tasks. Test E asked learners to choose the appropriate meaning of the pronounced words. They needed to choose Japanese meaning of the words. Due to the time restriction, it seemed that it was difficult for the test-takers to choose the meanings within a limited time. Overall, the recognition tasks were not so difficult compared to the recall tasks.

On the other hand, simple main effects of group on the test factors showed that differences between the upper group and the lower group were significant for the half of the tests (i.e., test E, G, and K) while for the other half of the tests (i.e., test A, C, and I), the differences were not significant. Table 6.11 shows the results of pairwise comparisons among tests in each group. Considering these results, it seemed that tests E, G, and test K were appropriate for distinguishing the upper group from the lower group. Test E asked learners to recognize the pronounced words and to match their meaning in Japanese. Test G measured learners' knowledge of matching the correct meanings for the written English spellings. Test K measured the knowledge of correct written form of spellings of the target words. Test E and test G were similar in that they both asked learners to match the sound form or the written form to the L1 meaning (Japanese). Additionally, test K and test G were similar in that they asked learners to recognize English spellings.

As seen above, the tasks in this study were related with each other in a certain degree. This shows that utilizing several types of spelling tests gives us interesting results, which could not be obtained when using simple vocabulary tests.

Table 6.11

Comparisons Among Groups in Each Test: Test [A], [C], [E], [G], {I}, and [K]

Test	Sig. of *t*	Group (Upper_Lower)
Test [A]	.181	Lower ≒ Upper
Test [C]	.695	
Test [E]	.002	Lower < Upper
Test [G]	.000	
Test [I]	.168	Lower ≒ Upper
Test [K]	.020	Lower < Upper

6.3.2.2 Pearson's Correlations Among Vocabulary Size and Spelling Tests

To examine the relationships among estimated vocabulary size (Mochizuki Test) and each test (i.e., six recall tasks and six recognition tasks), Pearson's correlation was utilized. The analyses were conducted separately with the recall tasks and the recognition tasks.

6.3.2.2.1 Pearson's Correlations of Recall Tasks in Study 4

The results of Pearson's correlation coefficient among Mochizuki Test and the six recall tests are reported in Table 6.12.

Table 6.12

Pearson's Correlation Coefficient for the Recall Tasks in Study 4

Variable	1	2	3	4	5	6	7
1. [Mo_T]	—						
2. [B]	.647**	—					
3. [D]	.435**	.698**	—				
4. [F]	.628**	.833**	.639**	—			
5. [H]	.639**	.809**	.629**	.891**	—		
6. [J]	.712**	.704**	.474**	.720**	.701**	—	
7. [L]	.684**	.858**	.579**	.789**	.791**	848**	—

Note. **p <.01, two-tailed. [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [B], [D], [F], [H], [J], and [L] are recall tests.

The correlations among Mochizuki Vocabulary Size Test and the six recall tasks (i.e., test B, D, F, H, J, and L) were moderately high to high, ranging from .43 to .71. Comparing the test formats, the correlations between Mochizuki Test and test D were low (.43). Test D asked learners to pronounce the target words from the written English spellings, and it did not include asking the meanings of the target words.

In addition, another weak correlation was found between test D and test J (.47). Test D asked learners to pronounce the target words from the written spellings, test J asked learners to pronounce and translate the target words from the written L1 meanings of the words. However, the results showed that the correlation coefficients were lower compared to other tests. The scores on test J were much lower compared to scores on test D. From the results reported in previous chapter (study 3), the scores on test J were also lower compared to scores on test D. Moreover, the correlation between test J and test D was not so high.

6.3.2.2.1 Pearson's Correlations of Recognition Tasks in Study 4

The results of Pearson's correlation coefficient among Mochizuki Test and the six recognition tasks are reported in Table 6.13. The correlations among Mochizuki Test and the six recognition tasks (i.e., test A, C, E, G, I, and K) varied, ranging from .13 to .69. The correlations between Mochizuki Test and tests A (.19), C (.18), and I (.13) were non-significant. Tests A, C, and I had some similar characteristics, which required learners to recognize the spoken form of the target words. Tests A and C did not ask them to understand the meaning of the target words. Thus, it was plausible that tests A and C had no correlations with vocabulary size test. On the other hand, Test I attempted to measure the knowledge of matching L1 meaning to L2 sound, and there were no significant correlations between vocabulary size test and test I. This result showed that matching L1 meaning to L2 spelling (i.e., Mochizuki Test) and matching L1 meaning to L2 sound were different.

The correlation between test E (i.e., L2 sound to L1 meaning) and test G (L2 spelling to L1 meaning) (.83) was noteworthy. The required output was the same in order to match the given input (i.e., sound or spelling) to L1 meaning, which means that both tests measured receptive vocabulary knowledge.

Although correlations among similar tasks were high, the results were not that simple. For instance, test A (i.e., L2 sound to L2 spelling) and test C (i.e., L2 spelling to L2 sound) seemed to share similar aspects. Surprisingly, the correlation between test A and test C was not significant (.18). Although further development of recognition tasks is needed, it is important to interpret the data in a careful manner.

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Table 6.13

Pearson's Correlation Coefficient for the Recognition Tasks in Study 4

Variable	1	2	3	4	5	6	7
1. [Mo_T]	—						
2. [A]	.192	—					
3. [C]	.188	.150	—				
4. [E]	.544**	.339*	.457**	—			
5. [G]	.645**	.334*	.384**	.831**	—		
6. [I]	.138	.242	.332*	.351*	.334*	—	
7. [K]	.557**	.209	.210	.473**	.699**	.506**	—

Note. **$p <$ .01, *$p <$ .05, two-tailed. [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [A], [C], [E], [G], [I], [K] are recognition tests.

6.3.2.3 Spearman's Rank-order Correlations Among Spelling Tests

Spearman's rank-order correlation coefficients were utilized to investigate the consistency of test-takers' performance on the spelling tests. The results from the recall tests and the recognition tests are reported independently in the following sections.

6.3.2.3.1 Spearman's Correlations of Recall Tasks in Study 4

The results of Spearman's rank-order correlation coefficients in the recall tasks are reported in Table 6.14. The correlations among six recall tasks were moderately high to high, ranging from .65 to .89. Seeing these results, test-takers' performances were consistent across different test formats. Furthermore, on the recall tasks, most learners who scored high on one test also scored high on the other tests. However, the correlations among test D and other test formats were not high compared to other correlations, ranging from .56 to .66. This result was consistent with the results from the previous chapter (study 3). As far as we can predict from the results, test D was easier compared to other test formats that

most learners could answer correctly.

Table 6.14

Spearman's Rank-Order Correlation Coefficient for the Recall Tasks in

Study 4

Variable	1	2	3	4	5	6
1. [B]	—					
2. [D]	.659**	—				
3. [F]	.851**	.668**	—			
4. [H]	.814**	.569**	.894**	—		
5. [J]	.741**	.588**	.759**	.775**	—	
6. [L]	.878**	.600**	.819**	.835**	.869**	—

Note. **$p <.01$, two-tailed. [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [B], [D], [F], [H], [J], and [L] are recall tests.

6.3.2.3.2 Spearman's Correlations of Recognition Tasks in Study 4

The Spearman's rank-order correlations for the recognition tasks are reported in Table 6.15. The results showed weak to moderately high correlations among the recognition tasks, ranging from .30 to .79. However, no correlations were found between test A and test C (.14), test A and test I (.15), test A and test K (.18). Compared to the other tasks, the mean score on test A was quite high.

Table 6.15

Spearman's Rank-Order Correlation Coefficient for the Recognition Tasks in Study 4

Variable	1	2	3	4	5	6
1. [A]	—					
2. [C]	.147	—				
3. [E]	.329*	.569**	—			
4. [G]	.405**	.568**	.799**	—		
5. [I]	.151	.315*	.304*	.325*	—	
6. [K]	.180	.391**	.404**	.607**	.356*	—

Note. **$p <.01$, *$p <.05$ two-tailed. Test [A], [C], [E], [G], [I], [K] are recognition tests.

6.3.2.4   Factor Analysis of Six Spelling tests

Exploratory factor analysis (EFA) was conducted with the recall tests and the recognition tests. The results of each test set are as follows.

6.3.2.4.1 Factor Analysis for Recall Tasks in Study 4

Table 6.16 shows the results of factor analysis for the recall tasks. The value of KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy coefficient was high (.856) and Bartlett's test of sphericity showed a significance (.000), indicating that the use of factor analysis was appropriate for the recall tests in this study.

For the recall tasks, only one factor was found. Thus, the six recall tasks tests were found to be appropriate for measuring test-takers' knowledge of sound form, written form, and form and meaning of target words in a comprehensive manner.

Table 6.16

Factor Analysis for Recall Tasks in Study 4

Test Format	Factor 1	Communality
Test B	.915	.837
Test D	.690	.477
Test F	.919	.845
Test H	.908	.825
Test J	.806	.650
Test L	.903	.815
factor contribution	4.450	4.449
Cumulative contribution ratio	74.163	

6.3.2.4.2 Factor Analysis for Recognition Tasks in Study 4

Table 6.17 shows the results of factor analysis of the recognition tasks. The value of KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy coefficient was moderately high (.625) and Bartlett's test of sphericity showed a significance (.000), verifying that it is appropriate to use factor analysis for the recognition tasks in this study.

Table 6.17

Factor Analysis for Recognition Tasks in Study 4

Test Format	Factor 1	Communality
Test A	.339	.115
Test C	.393	.154
Test E	.837	.700
Test G	.993	.985
Test I	.346	.120
Test K	.701	.491
factor contribution	2.566	2.565
Cumulative contribution ratio	42.759	

For the recognition tasks, only one factor was found. However, test A, C, and I did not contribute much. The reliabilities of these tests were low in Study 3 and this study (Study 4). Thus, test E, G and K seemed to be the appropriate tasks for measuring test-takers' knowledge. The result was different from the previous chapter (study 3) because in study 3, two factors were found for the recognition tasks. However, as mentioned above, further studies are needed to verify the results in recognition tasks.

6.3.3 Results of Qualitative Analysis: Implicational Scaling

Implicational scaling was used to understand the acquisition order of each vocabulary knowledge aspect. At first, matrices for implicational scaling were summarized with all 12 tests (i.e., six recall tests and six recognition tests). However, it was impossible to discuss the order of spelling knowledge due to the inappropriate scalability. From the beginning, the characteristics of the recall tasks and the recognition tasks appeared contrasting. In addition, in the recognition tasks there were no significant differences between some of the tasks.

The tests were designed to measure the correspondents' knowledge of each aspect of the target words. Previous sections described quantitative analyses conducted using several methods. By contrast, this section describes qualitative analysis, specifically implicational scaling. Implicational scaling is sometimes called Guttmann scaling. This method will help us consider language acquisition in the language learning.

The goal of the calculation is to compute coefficient of scalability (C_{scal}). In order to calculate this value, we need to make matrices for the targets. The matrices for the recall tasks in study 4 are summarized in the Appendices.

6.3.3.1 Implicational Scaling in Recall Tasks in Study 4

Table 6.18 shows the scalability of the recall tasks. Scalabilities were calculated with each word in study 4. The value of C_{scal} indicates whether assumed orders of difficulties are valid. The value must be greater than .60 for the order of difficulties to be valid. Before starting the analyses, it is crucial to look at the value of coefficient or reproducibility (henceforth C_{rep}). This value

should be greater than .90 (i.e., value > .90) to fulfill the criterion of validity, as indicated in the previous sections.

The difficulty order, which was assumed in the recall tasks, is as follows. The sequences were determined from the scores of learners' test performances.

$$L < J < B < F < H < D$$

(difficult → easy)

This ordering shows that test L was the most difficult (score poorly) and the test D was the easiest (score highly). The implicational scaling was used to see the difficulty order of the six recall tasks and to examine the validity of utilizing this method in this study. Thus, task difficulties are determined from the raw scores. Seeing the results, 14 words (i.e., *across, difficult, hope, introduce, same, cause, between, break, clean, deep, look, reach, carry,* and *happen*) seemed to be valid to show the difficulty order of the tasks which were used in the study. The assumed difficulty order seemed to be adequate for 14 words. However, the remaining 16 words were categorized to be invalid at the difficulty level based on the results of implicational scaling. The words, which appeared to be valid, are shown in bold in Table 6.18.

Table 6.18

Scalability in Recall Tasks in Study 4

| Target Word | Formula | | | |
	C_{rep}	MM_{rep}	% improvement (C_{rep} - MM_{rep})	C_{scal}
across	**.947**	.758	.189	**.781**
actually	.894	.723	.170	.616
alone	.879	.723	.155	.562
believe	.886	.807	.080	.412
between	**.932**	.773	.159	**.700**
break	**.902**	.735	.167	**.629**
build	.894	.739	.155	.594
carry	**.924**	.716	.208	**.733**
cause	**.947**	.708	.239	**.818**
choose	**.902**	.765	.136	.581
clean	**.947**	.780	.167	**.759**
close	**.902**	.886	.015	.133
deep	**.939**	.845	.095	**.610**
difficult	**.955**	.856	.098	**.684**
express	.848	.761	.087	.365
famous	.886	.780	.106	.483
finally	.894	.742	.152	.588
full	.841	.697	.144	.475
happen	**.902**	.735	.167	**.629**
heart	.811	.837	-.027	-.163
hope	**.924**	.739	.186	**.710**
inside	**.917**	.811	.106	.560
introduce	**.932**	.708	.223	**.766**
letter	.894	.909	-.015	-.167
look	**.955**	.848	.106	**.700**
poor	.879	.708	.170	.584
reach	**.939**	.807	.133	**.686**
receive	**.924**	.830	.095	.556
same	**.939**	.708	.231	**.792**
surprise	.871	.795	.076	.370
AVERAGE	**.907**	.774	.132	.552

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}

Table 6.19 shows the accuracy rate of the recall tasks in study 4. This will help us understand the overall test difficulties.

Table 6.19

Accuracy Rate in Recall Tasks in Study 4

Target word	L	J	B	F	H	D	Total
across	54.55	56.82	77.27	81.82	84.09	100.00	75.76
actually	15.91	27.27	40.91	56.82	63.64	97.73	50.38
alone	40.91	29.55	54.55	61.36	88.64	100.00	62.50
believe	34.09	70.45	40.91	93.18	97.73	97.73	72.35
between	61.36	54.55	86.36	81.82	84.09	95.45	77.27
break	43.18	45.45	63.64	77.27	95.45	93.18	69.70
build	34.09	47.73	47.73	84.09	97.73	90.91	67.05
carry	36.36	43.18	50.00	75.00	86.36	97.73	64.77
cause	15.91	13.64	29.55	36.36	40.91	61.36	32.95
choose	20.45	20.45	56.82	77.27	84.09	81.82	56.82
clean	54.55	59.09	70.45	88.64	97.73	97.73	78.03
close	77.27	84.09	86.36	97.73	100.00	86.36	88.64
deep	70.45	63.64	88.64	88.64	95.45	100.00	84.47
difficult	70.45	70.45	88.64	90.91	95.45	97.73	85.61
express	2.27	2.27	68.18	31.82	34.09	95.45	39.02
famous	54.55	79.55	61.36	86.36	90.91	95.45	78.03
finally	31.82	54.55	36.36	77.27	84.09	97.73	63.64
full	47.73	38.64	25.00	43.18	79.55	93.18	54.55
happen	52.27	45.45	72.73	79.55	84.09	97.73	71.97
heart	36.36	84.09	38.64	93.18	100.00	100.00	75.38
hope	45.45	54.55	61.36	79.55	93.18	100.00	72.35
inside	56.82	47.73	95.45	88.64	95.45	97.73	80.30
introduce	34.09	27.27	59.09	65.91	63.64	97.73	57.95
letter	86.36	88.64	79.55	90.91	100.00	100.00	90.91
look	45.45	40.91	100.00	100.00	100.00	95.45	80.30
poor	54.55	54.55	61.36	75.00	88.64	90.91	70.83
reach	9.09	9.09	34.09	25.00	38.64	100.00	35.98
receive	9.09	25.00	11.36	75.00	79.55	88.64	48.11
same	61.36	56.82	70.45	70.45	79.55	86.36	70.83
surprise	38.64	61.36	63.64	97.73	97.73	95.45	75.76
AVERAGE	43.18	48.56	60.68	75.68	84.02	94.32	67.74

The words, which appeared to be valid, are shown in bold in the Table. Considering the results of accuracy rate in the recall tasks, the remaining 16 words that appeared to be invalid can be divided into two groups. The first group

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was labeled "drastically changed" and second group was labeled "flatness." The accuracy rate of some words grouped in the first category changed drastically through tasks. For instance, the scores on test L were poor. The scores on other tests showed almost 100% accuracies.

Second group labeled flatness showed that the scores on different types of tests were not so different. The scores of the flatness group showed that test formats did not affect learners' test performances.

6.3.3.2 Implicational Scaling in Recognition Tasks in Study 4

Table 6.20 showed the scalability of the recognition tasks in study 3. Scalabilities were calculated with each word in study 4.

The difficulty order, which was assumed in the recognition tasks, is as follows. The sequences were determined based on the scores of learners' test performances.

E < K < G < I < C < A

(difficult → easy)

Table 6.20

Scalability in Recognition Tasks in Study 4

Target Word	Formula		% improvement (C_{rep} - MM_{rep})	C_{scal}
	C_{rep}	MM_{rep}		
across	**.939**	.932	.008	.111
actually	**.902**	.909	-.008	-.083
alone	.697	.837	-.140	-.860
believe	.886	.905	-.019	-.200
between	**.939**	.920	.019	.238
break	.818	.890	-.072	-.655
build	.841	.890	-.049	-.448
carry	**.932**	.955	-.023	-.500
cause	.803	.705	.098	.333
choose	.879	.864	.015	.111
clean	.818	.883	-.064	-.548
close	**.939**	.966	-.027	-.778
deep	**.985**	.981	.004	.200
difficult	**.924**	.947	-.023	-.429
express	.826	.818	.008	.042
famous	**.939**	.939	.000	.000
finally	.864	.917	-.053	-.636
full	.879	.852	.027	.179
happen	.879	.890	-.011	-.103
heart	.689	.871	-.182	-1.412
hope	**.932**	.924	.008	.100
inside	**.939**	.951	-.011	-.231
introduce	**.902**	.860	.042	.297
letter	.788	.867	-.080	-.600
look	**.977**	.985	-.008	-.500
poor	**.955**	.924	.030	.400
reach	.742	.746	-.004	-.015
receive	.848	.871	-.023	-.176
same	**.932**	.924	.008	.100
surprise	**.917**	.958	-.042	-1.000
AVERAGE	.880	.896	-.017	-.123

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement $(C_{rep} - MM_{rep})/1-MM_{rep}$

The result showed no scalable values among the target words. The total accuracy rate on the recognition tasks was quite high (89.28%). Table 6.21 showed the accuracy rate of the recognition tasks. The accuracy rate of most of

the words was quire high. Thus, difficulty orders could not be found for the recognition tasks in this study.

Table 6.21

Accuracy Rate in Recall Tasks in Study 4

Target word	E	K	G	I	C	A	Total
across	86.36	77.27	95.45	100.00	100.00	100.00	93.18
actually	75.00	95.45	79.55	100.00	95.45	100.00	90.91
alone	93.18	97.73	95.45	56.82	59.09	100.00	83.71
believe	84.09	70.45	93.18	95.45	100.00	100.00	90.53
between	75.00	93.18	86.36	100.00	97.73	100.00	92.05
break	88.64	100.00	95.45	68.18	86.36	95.45	89.02
build	88.64	88.64	93.18	72.73	90.91	100.00	89.02
carry	93.18	93.18	88.64	100.00	97.73	100.00	95.45
cause	45.45	70.45	50.00	68.18	86.36	93.18	68.94
choose	81.82	84.09	84.09	72.73	95.45	100.00	86.36
clean	93.18	88.64	97.73	86.36	65.91	97.73	88.26
close	100.00	88.64	95.45	97.73	100.00	97.73	96.59
deep	97.73	95.45	97.73	100.00	97.73	100.00	98.11
difficult	93.18	97.73	90.91	93.18	93.18	100.00	94.70
express	38.64	90.91	50.00	93.18	95.45	100.00	78.03
famous	86.36	84.09	95.45	100.00	97.73	100.00	93.94
finally	97.73	61.36	95.45	100.00	100.00	95.45	91.67
full	56.82	97.73	86.36	81.82	95.45	93.18	85.23
happen	77.27	93.18	70.45	100.00	93.18	100.00	89.02
heart	90.91	97.73	100.00	72.73	36.36	97.73	82.58
hope	75.00	97.73	90.91	100.00	100.00	90.91	92.42
inside	93.18	88.64	100.00	97.73	90.91	100.00	95.08
introduce	72.73	68.18	79.55	97.73	97.73	100.00	85.98
letter	95.45	86.36	100.00	75.00	81.82	81.82	86.74
look	97.73	95.45	100.00	100.00	100.00	97.73	98.48
poor	75.00	93.18	95.45	97.73	97.73	95.45	92.42
reach	72.73	84.09	70.45	65.91	61.36	93.18	74.62
receive	86.36	56.82	84.09	95.45	100.00	100.00	87.12
same	84.09	95.45	81.82	95.45	97.73	100.00	92.42
surprise	100.00	81.82	95.45	100.00	97.73	100.00	95.83
AVERAGE	83.18	87.12	87.95	89.47	90.30	97.65	89.28

In total, the recognition tasks were not so difficult for the learners in study 4. Compared to the results in study 3, it seemed that test A was consistently the easiest among other tasks. However, it can be said that most learners could successfully respond to the following dimensions of the knowledge to recognize vocabulary: (a) sound to letter, (b) sound to meaning, (c) letter to sound, (d) letter to meaning, (e) meaning to letter, and (f) meaning to sound.

6.4 Summary of the Findings: Chapter 6 (Study 4)

6.4.1 Answers to RQ4-1

RQ4-1: Do task difficulties of recall test formats differ between Study 3 and Study 4?

The results of two-way mixed ANOVA showed significant group (2: upper and lower) by test (6: test B, D, F, H, J, and L) interaction. After conducting post hoc analysis for the group factor on each test, significant group differences between the lower group and upper group emerged on all six recall tasks. That is to say, on the recall tasks, upper group always outperformed the lower group.

Another post hoc analysis was conducted for the test factor for each group. Although the significant differences among tasks were different in each group, the ordering of their raw scores was the same in the upper group and the lower group. In the lower group, the differences between test L and test B, test J and test B, test B and test F, test F and test H were significant. However, in the lower group, there were significant differences among all tests, indicating that the test formats did affect lower group learners' test performances. The estimated vocabulary size in the lower group was less than 2500. At this level, it seemed that learners' vocabulary knowledge of form and meaning was not completely

acquired. Compared to the results from the previous chapter (study 3), the results for the lower group were almost equivalent. Further analysis is needed to verify these results.

6.4.2 Answers to RQ4-2

RQ4-2: Do task difficulties of recognition test formats differ between Study 3 and Study 4?

The results of two-way mixed ANOVA showed significant interaction between group (2: upper and lower) and tests (6: test A, C, E, G, I, and K). Post-hoc analysis for the group factor of each test indicated significant differences among tests E, G, and K.

Another post hoc analysis was conducted for the test factor in each group. The results showed little differences among the recognition tasks. Simply put, the differences in test formats had a weak effect on the learners in this study. On the other hand, most learners could respond to the recognition tasks correctly even though they could not answer the recall tasks correctly.

6.4.3 Answers to RQ4-3

RQ4-3: Are estimated vocabulary size and spelling test performance related compared to Study 3?

First, Pearson's correlation coefficients were calculated among the Vocabulary Size Test and the six recall tasks. The results showed significant correlations among Vocabulary Size Test and all recall tasks. The correlations among the recall tasks were also significant. In particular, tests that measured related aspects correlated highly, as was expected.

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Second, Pearson's correlations among the Vocabulary Size Test and the six recognition tasks were calculated. Although similar tasks correlated with each other, the results were not that simple to interpret. For instance, test A (i.e., L2 sound to L2 spelling) and test C (i.e., L2 spelling to L2 sound) seemed to measure similar aspects. Surprisingly, the correlation between test A and test C was not significant. Thus, it is important to interpret the data carefully.

6.4.4 Consistencies of the Performances on Tests

First, Spearman's rank-order correlation coefficients were calculated among the six recall tasks in order to examine the consistency in the learners' performances. The results showed significant correlations among the tests. Therefore, the results showed that learners who scored highly on one test could score highly on the other test formats. Only test D (i.e., L2 spelling to L2 sound) had weak to moderate correlations with other tests. Pronouncing the words from the written spellings was not so difficult for the test-takers in this study, which was consistent with the previous chapter (study 3).

Second, Spearman's rank-order correlations were calculated among the six recognition tasks for the same reason, that is, to examine the consistency of test performances. The results showed significant interactions among some tests. However, the correlations between test A and test C, test A and test I, and test A and test K were not significant. The scores on test A were surprisingly high; thus, the scores might affect the data.

6.4.5 Answers to RQ4-4

RQ4-4: What are the characteristics of the scalabilities among thirty-two target

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words focusing on silent letters?

Implicational scaling (Hatch & Lazaraton, 1991) was used to examine the task difficulties. On the recall tasks, 14 words were scalable with the following difficulty order: L < J < B < F < H < D (difficult to easy). That is to say, the difficulties of six recall tasks explained learners' acquisition order. The target words in this study were previously introduced in their school; however, not all the learners could acquire various aspect of each word.

However, for the recognition tasks, scalabilities were not so high among all target words. It seemed that most learners could answer all recognition tasks correctly due to the ceiling effect in their scores. That is to say, the recognition tasks were easy for the learners in this study. Moreover, the learners could answer the recognition tasks correctly even though they could not answer the recall tasks correctly. It seemed that there were considerable gaps between recall tasks and the recognition tasks. The results from study 3 and study 4 were similar, especially regarding the recall tasks. Further experiment should be conducted to verify the results and to develop the testing formats for the recognition tasks.

6.4.6 Answers to RQ4-5

<u>*RQ4-5: Will diagnostic spelling tests categorize the test-takers?*</u>

Forty-four learners were categorized with three skills—(a) decode, (b) spell, and (c) comprehend, according to their test performances especially on recall tests. The diagnostic spelling tests developed for this research succeeded in categorizing the learners into groups according to their vocabulary knowledge: Good-decoder, good-speller, good-comprehender (D+ S+ C+), Good-decoder, poor-speller, good-comprehender (D+ S- C+), Good-decoder, good-speller,

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poor-comprehender (D+ S+ C-), and Poor-decoder, poor-speller, poor-comprehender (D- S- C-)

Eighteen learners categorized as D+ S+ C+, and twenty-two learners categorized as D+ S- C+. Four learners categorized as D+ S- C-. There were no D+ S- C- learners.

Comparing the results from Study 3 (previous chapter), same tendencies was found. Poor Decoders are rare if the target words have been introduced in the past. However, overall, almost half of the participants (*N*=18) were Poor-spellers; they need special treatment to acquire English spellings. There was also no Good-speller, Poor-comprehender in the present study. The results indicated that the lack of sound-letter correspondence knowledge among Japanese EFL learners emerged.

Comparing the results with multiple-choice testing (a recognition test), it can be said that learners who could not answer correctly on multiple-choice tests failed to write the correct spellings. This result was also similar to the previous chapter (Study 3).

Appendices 6A to 6L are the examples of test formats. Appendix 6M (1-30) and Appendix 6N (1-30) are the matrices for implicational scaling.

Chapter 7   Examining Diagnostic Spelling Tests (Part 3): Study 5

7.1 Purpose of the Study

The purpose of this study (Study 5) was (a) to compare the test performances reported in previous experiments (Study 3 and Study 4) and (b) to verify the task difficulties among the spelling test formats utilizing implicational scaling (Hatch & Lazaraton, 1991). The results of Study 3 and Study 4 showed that the recall tasks partly succeeded in showing the task difficulties. However, the results from the recognition tasks were not very successful in showing the task difficulties. Based on the previous results, it seemed that some parts of the tests assessing recognition tasks were too easy for the test-takers. Therefore, this study tried to upgrade and modify the recognition tasks.

The target words in the previous chapters were chosen carefully; however, in order to generalize the results, it would be much more appropriate to include various kinds of target words, which include different types of phonological aspects. At first, the target words from Study 3 and Study 4 were categorized with phonetic symbols. After this procedure, some phonetic symbols, which were not included in the previous experiments, were determined from the lists.

At the beginning of this study, the author intended to develop another version of 12 tests (i.e., six recall tasks and six recognition tasks) with different target words. However, due to the low Cronbach's alpha or low Item Discrimination of the testing items, it was necessary to reexamine the appropriate test formats. The recall tasks in the previous chapters (Study 3 and Study 4) showed the consistent result; thus, this study decided to use the same test formats for the recall tasks. However, the test formats of the recognition tasks changed

based on the results of study 3 and 4. The tests that showed low Cronbach's alpha or low Item Discrimination were deleted from the recognition tasks. However, other types of test, which integrated the aspects of the excluded tests, were added to the recognition tasks. Finally, a total of ten test formats were used in this study (i.e., six recall tasks and four recognition tasks)

The research questions are as follows:

RQ5-1: Do task difficulties of recall test formats differ among Study 3, Study 4, and Study 5?

RQ5-2: Do task difficulties of recognition test formats differ among Study 3, Study 4, and Study 5?

RQ5-3: Are estimated vocabulary size and spelling test performance related among Study 3, Study 4 and Study 5?

RQ5-4: What are the characteristics of the scalabilities among thirty-three target words from high school textbooks?

RQ5-5: Are good-spellers (S+) always good-decoders, good-comprehenders (D+ C+)?

7.2 Methods

7.2.1 Participants

Overall, 34 university students participated in the study (ages 18 to 28). Some students majored in English while other students majored in economics or business economics. Therefore, their English proficiency levels varied. This study also analyzed different aspects of vocabulary knowledge with various kinds of spelling tests. Thus, instead of using proficiency test scores, such as

TOEIC scores, this study utilized Mochizuki Vocabulary Size Test. This test was specifically designed to measure learners' estimated vocabulary size (lemmas), that is, the breadth of vocabulary knowledge. The average score on Mochizuki Test was about 2300 (to be exact 2303). It is said that average vocabulary size is about 3000 word-level for the university students. From this standpoint, the participants in this study were categorized into the group with the below average vocabulary size. Admitting that the level of their vocabulary size is not so high, the participants were classified according to the results from the Mochizuki Test. A total of 34 test-takers were divided into two groups, upper ($n = 13$) and lower ($n = 21$). The upper group's vocabulary size was over 2500 word-level. On the other hand, the lower group's vocabulary size was under 2500 word-level.

7.2.2 Materials

7.2.2.1 Target Words

The words from English junior high textbooks and the high schools were considered appropriate. The word lists from Chujo, Nishigaki, Yoshimori, and Nishioka (2007) were based on English textbooks. Thus, target words were chosen from the lists. In this study (Study 5), the target words should be selected in a strict manner. Comparing the target words from Study 3 and 4, the target words in this study must include the items which had not tested. A series of studies (i.e., Study 3, Study 4, and Study 5) examined learners' spelling knowledge of vocabulary knowledge with resemble tasks. This was to investigate the reliabilities of the test formats and to cover almost all the characteristics of the English words. In order to fulfill this purpose, the characteristics of the words were examined with dictionaries (e.g., Takebayashi & Saito, 2012; Wells,

2008). The lists of the target words are displayed in Table 7.1.

Table 7.1

Target Words in Study 5

Target Word	JACET 8000	Syllable	Phonetic Symbol
already	1	3	/ɔːlreˈdi|ɔːreˈdi/
another	1	3	/ənʌˈðɚ/
ask	1	1	/æˈsk/
back	1	1	/bæˈk/
boat	1	1	/boʊˈt/
bring	1	1	/brɪˈŋ/
brother	1	2	/brʌˈðɚ/
casual	3	3	/kæˈʒəwəl|kæˈʒwəl/
culture	1	2	/kʌˈlʧɚ/
dream	1	1	/driːˈm/
drink	1	1	/drɪˈŋk/
during	1	2	/dɚːˈiŋ|dʊˈriŋ/
enjoy	1	2	/əndʒɔiˈ|endʒɔiˈ/
fire	1	1	/faiˈɚ/
flower	1	2	/flaʊˈɚ/
foot	1	1	/fʊˈt/
forget	1	2	/fɔːrgeˈt|fɚgeˈt/
hour	1	1	/aʊˈɚ|aʊˈr/
however	1	3	/haʊˌeˈvɚ/
love	1	1	/lʌˈv/
manual	3	3	/mæˈnjuːəl/
measure	1	2	/meˈʒɚ/
mouth	1	1	/maʊˈθ/
point	1	1	/pɔiˈnt/
popular	1	3	/paˈpjəlɚ/
put	1	1	/pʊˈt/
sure	1	1	/ʃʊˈr/
thing	1	1	/θɪˈŋ/
thought	1	1	/θɔːˈt/
tire	5	1	/taiˈɚ/
travel	1	2	/træˈvəl/
true	1	1	/truːˈ/
with	1	1	/wəð|wɪˈð/

Note. Phonetic symbols were taken from online dictionary ALC
(http://www.alc.co.jp/). The phonetic symbol converter (http://www.manabo.net/).

Finally, 33 words were chosen from the lists from the previous study (e.g.,

Chujo et al., 2007) to verify whether the words' characteristics affect the results

of the test-takers' performances.

7.2.2.2 Dependent Measures (Recall Tasks vs. Recognition Tasks)

The reliabilities and the Item Discrimination in the recall tasks showed acceptable values in the previous experiment. However, concerning the recognition tasks, some tests should be developed differently due to the low Cronbach's alpha or weak Item Discrimination. Thus, ten tests were developed for this study, which was based on the results from the previous experiment (Study 3 and Study 4). Three tests, which showed inappropriate Cronbach's alpha, were excluded from the study (i.e., test A, C, and I). The purpose of conducting different types of spelling tests was to diagnose test-takers' understanding of various kinds of vocabulary knowledge.

Test A was designed to check learners' ability to recognize L2 sound from L2 spelling. Test C assessed learners' ability to recognize L2 spelling from L2 sound. However, it seemed that test A and test C were closely related, even though the Pearson's correlation coefficients were not so high in Study 3 and study 4. For this reason, tests A and C were changed into "optional task" for the purpose of this experiment (Study 5). This "optional task (henceforth test OP)" required learners to number the target words according to the exact orders of pronounced word. The target words were printed in alphabetical order and the test-takers had to find the word first and to write the correct numbers based on the orders of the pronounced words.

Test I was also deleted from the recognition tasks because of its low Cronbach's alpha. Test I asked learners to recognize L1 meaning from L2 sound. There were two options for each target word; however, looking at the results of the test I, the mean scores were almost the same for the upper and lower groups. That is, test I was too easy, in that it could not successfully distinguish the upper

group from the lower group. Considering the test similar to test I, it seemed that test E was measuring the opposite aspect of test I; that is, the recognition of L2 sound from L1 meaning (i.e., test E). Test E required learners to listen to the pronounced target word and choose the appropriate translations among the various options. It can be said that test E was a higher-loaded task compared to test I because of its characteristics. Obviously, tests E and I measure different directions of the aspects of vocabulary knowledge. Besides, test E also includes the characteristics of test I because it required learners to listen to the word and choose the meaning among the options simultaneously. Hence, the author decided to delete test I from the recognition tasks, resulting in ten tests in total. The test formats in this study are summarized in Table 7.2.

Table 7.2

Detailed Test Items in Study 5

	Aspects of Vocabulary Knowledge		Test format	Test type
Form	spoken, written (sound to spelling) (spelling to sound)	O	L2 sound to L2 spelling, L2 spelling to L2 sound	recognition
	spoken (sound to spelling)	B	L2 sound to L2 spelling	recall
	written (spelling to sound)	D	L2 spelling to L2 sound	(oral) recall
	(spoken) form and meaning (sound to meaning)	E	L2 sound to L1 meaning	recognition
	(spoken) form and meaning (sound to meaning)	F	L2 sound to L1 meaning	recall
	(written) form and meaning (spelling to meaning)	G	L2 spelling to L1 meaning	recognition
	(written) form and meaning (spelling to meaning)	H	L2 spelling to L1 meaning	recall
Meaning	(spoken) form and meaning (meaning to sound)	J	L1 meaning to L2 sound	(oral) recall
	(written) form and meaning (meaning to spelling)	K	(L1 meaning to) L2 spelling	recognition
	(written) form and meaning (meaning to spelling)	L	L1 meaning to L2 spelling	recall

On the recall tasks, some tests (i.e., test D and test J) needed to record test-takers' oral recall; thus, for those tests, we used computer program named *movie teleco* in the Computer Assisted Language Learning (CALL) classrooms or IC recorders. Following section analyzes the contents of both recall and recognition tasks. Followings are the contents of both recall and recognition tests. Appendices 7A to 7L are the examples of test formats.

Recall Tests

[B] Test 3 - *L2 sound to L2 spelling* (receptive to productive recall)

This test measured productive knowledge of orthography; its well-known format is widely used in language classrooms. Test-takers heard each target word pronounced twice then had 10 seconds to write the spelling (mistakes were marked as incorrect). This test targeted learners' knowledge of sound-letter correspondences (see Appendix 7C).

[D] Test 5 - *L2 spelling to L2 sound* (receptive to productive recall)

This test measured productive knowledge of English word pronunciation. Although it resembles the naming task, which has been used in the word recognition studies, this test did not focus on latency because the target words in this study were already acquired, nor did it include nonwords (pseudo words). Focusing on correct pronunciation is necessary for understanding productive knowledge of oral reading English words. This test requires learners to read and recognize correct spelling. Hence, the test focuses on both receptive and productive dimensions. The amount of time required varied among test-takers: two or three minutes to complete this task (see Appendix 7E).

Test D required knowledge of letter-sound correspondence; test B required sound-letter correspondence—both related to phonological processing routes, which are important aspects of reading and writing in a second language (Cook, 2005).

[F] Test 4 - *L2 sound to L1 meaning* (receptive recall)

This test measured receptive knowledge of meaning. Test-takers heard each target word pronounced twice then had 10 seconds to write the meaning in Japanese. They did not need to write in kanji; however, major errors of Japanese words (e.g., kanji errors or mistakes in word translation) were considered as mistakes and did not get points (Appendix 7D).

[H] Test 6 - *L2 spelling to L1 meaning* (receptive recall)

This test measured receptive knowledge of form and meaning. The spellings of the words were listed on the test sheet, and test-takers were to write each word's meaning in Japanese. Scoring procedures were the same as on Test 4: they did not need to use kanji (see Appendix 7F).

[J] Test 1 - *L1 meaning to L2 sound* (productive recall)

This test measured productive knowledge of English word pronunciation. It required test-takers to translate Japanese meaning into English words. Thirty-five target words were printed on a test sheet; test-takers were to translate the words orally. This session used *movie teleco* and IC recorders. Test-takers could skip any items that they could not answer: to avoid random skipping, they were to say each item then, if they thought that they could not correctly answer the item, they needed to say "pass" or "don't know." Although this seems to test pronunciation, its purpose is to check understanding of the English words

according to the Japanese meanings. For this reason, this test did not require learners' to produce native-like pronunciation (see Appendix 7A).

Tests F and J contained translating ability that did not include spelling information; thus some might think that they are unrelated to spelling knowledge. However, these tests attempted to assess learners' knowledge of sound form and meaning. The tests also sought to examine how well learners understand English pronunciation and translation of Japanese. The data from this task will provide additional information of learners' vocabulary knowledge with various aspects.

[L] Test 2 - *L1 meaning to L2 spelling* (productive recall)

This test measured productive knowledge of orthography. It required test-takers to write the correct spelling according to the given Japanese meaning of the words. They needed to write perfectly the correct spelling, which means incorrect spelling got "0" point: only correctly spelled answers were counted as their Test 2 [L] scores (see Appendix 7B).

Tests H and L focused on knowledge of written form and meaning receptively and productively. Comparing how results of H and L differ will be interesting. Without test H, assessing learners' knowledge of how well they can translate the words' meanings into Japanese would be impossible: all six recall tests were important to assess Japanese EFL learners' spelling knowledge related to vocabulary knowledge.

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Recognition Tests

[E] Test 8: L2 sound to L1 meaning (receptive recognition)

This test measured the receptive knowledge of sound and meaning. This was a matching task. Thirty-five words were read twice and the test-takers had to choose the appropriate meaning from the 40 options (i.e., 33 correct answers, 7 distractors) printed on the test sheet. In order to avoid guessing, distractors were included in the options (see Appendix 7H).

[G] Test 9: L2 spelling to L1 meaning (receptive recognition)

This test measured the receptive knowledge of written form and meaning. The test was a matching task. English words were printed on the work sheet and the options for target words were displayed on the same test sheet. The test-takers had to choose the appropriate meaning from the 40 options (i.e., 33 correct answers, 7 distractors) printed on the test sheet. In order to avoid guessing, distractors were added in the options.

[K] Test 7: L2 spelling recognition (receptive recognition)

This test measured the receptive knowledge of orthography. The test-takers had to circle one correct spelling of the target words among three distractors. Test K was a multiple-choice test. In order to prepare distractors, Pilot Study was conducted before the main test. Learners from different classes took the spelling test and the incorrect answers were gathered to make distractors. Each test item had four options, and the test-takers needed to choose one correct spelling from the options (see Appendix 7G).

[O] Test 10: L2 sound to L2 spelling (receptive to productive recognition)

This test measured receptive to productive knowledge of sound form and written form. The test was a matching task. Instead of using the excluded test formats, test O was added for this experiment. The test-takers had to recognize the pronounced target words and then choose the appropriate spellings of the word; moreover, they had to number the words spellings in order with the sequences simultaneously (see Appendix 7J).

Sound data for the sound form tests were derived from Zen-Ei-Ren's (2000a; 2000b; 2001) books with CDs. Computer software called "Sound-it! 6.0" was utilized to edit sound form tests.

7.2.3 Scoring

Each correct spelling received "1" point and incorrect spelling received "0" point on the recall tasks. In the recognition tasks, only correct answers could get "1" point. Table 7.3 shows the scoring of each spelling test. For L2 to L1 translation task, the translation of synonym received a score of "1" because the translation task required test-takers to identify only the meaning of a word in their L1 (Japanese).

Table 7.3

Scoring of Tests in Study 5

	Test format	Targeted knowledge	Correct	Incorrect
O	L2 sound to L2 spelling recognition L2 spelling to L2 sound recognition	spelling sound	1	0
B	L2 sound to L2 spelling recall	spelling	1	0
D	L2 spelling to L2 sound recall	sound	1	0
E	L2 sound to L1 meaning recognition	meaning	1	0
F	L2 sound to L1 meaning recall	meaning	1	0
G	L2 spelling to L1 meaning recognition	meaning	1	0
H	L2 spelling to L1 meaning recall	meaning	1	0
J	L1 meaning to L2 sound recall	sound	1	0
K	(L1 meaning to) L2 spelling recognition	spelling	1	0
L	L1 meaning to L2 spelling recall	spelling	1	0

7.2.4 Design

At first, all participants took the Mochizuki Vocabulary Size Test. After the first testing session, recall and recognition tasks were given to the test-takers. Following the procedures from the previous studies, recall tasks were given to the test-takers first and a week later, recognition tasks were given to the same test-takers. In order to analyze diagnostically, the study adopted within-subject design, which means that all participants completed all testing sessions.

7.2.5 Procedure

At the beginning of study 5, Mochizuki Test was administered to the test-takers to assess their already acquired vocabulary knowledge, especially their breadth of vocabulary knowledge. The basic procedure of the experiment

was the same as those in study 3 and study 4. Subsequently, ten tests were given to the test-takers (i.e., six recall tasks and four recognition tasks). It was quite unnatural to take ten tests in one day; thus, six recall tasks were given to the test-takers first and subsequently, four recognition tasks were given to the same test-takers a week later. If there were two types of tasks, such as recall and recognition tasks, recall tasks should be conducted before the recognition tasks in order to eliminate the negative effects of the recognition tasks.

In sum, the first session included Mochizuki Test (i.e., estimated vocabulary size test), the second session included six recall tasks, and the third session included four recognition tasks. Therefore, study 5 as well as studies 3 and 4 comprised three testing sessions.

7.3 Results and Discussion

7.3.1 Analysis

The analytical procedures used in this this experiment are as follows:

(1) Two-way mixed design analysis of variance (ANOVA),

(2) Pearson's correlation,

(3) Spearman's rank-order correlation,

(4) Exploratory Factor Analysis (EFA),

(5) Implicational scaling.

To compare the difficulties of the tests utilized in this study, two-way mixed design ANOVA was used. In the next step, Pearson's correlation was used to show the relationships among the vocabulary size test, six recall tests, and four recognition tests. In addition, it was also important to examine whether the test-takers' performances on recall and recognition tasks were consistent.

Spearman's rank-order correlation was used to answer this question. Correlation and factor analysis are two ways to check for validity. Thus, Exploratory Factor Analysis (EFA) was used for the data in this study.

Finally, implicational scaling was used to check the orderliness in the collected data. This analysis method was used to examine the developmental order of vocabulary knowledge among Japanese EFL learners. Implicational scaling was already used in study 1 through study 4, and the results showed that this method could explain the orderliness of the collected data. It seemed that the significant results could be expected with this analytical procedure.

7.3.2 Results of Qualitative Analysis

7.3.2.1 Difficulties Among Spelling Test Scores

As already started, recall tasks and recognition tasks seemed to have corresponding relations. Nevertheless, the analyses were conducted independently with recall tasks and recognition tasks because the ability to produce correct answer on the recall tasks and the recognition tasks was not equivalent. Thus, it is appropriate to analyze recall and recognition tests independently. Table 7.4 shows the descriptive statistics, reliability, and Item Discrimination for the ten tests (i.e., six recall tasks and four recognition tasks). Two-way mixed analysis of variance (ANOVA) was utilized to examine the difficulties among the tests. Group [upper ($n = 13$), middle ($n = 21$)] was the between-subject factor. Test was the within-subject factor. The results of two-way mixed ANOVA are explained in the following sections.

Table 7.4

Descriptive Statistics, Reliability, Item Discrimination for the ten tests (N = 34)

Test	Group	N	*M*	*SD*	*Min*	*Max*	Cronbach's alpha	*DIS*
[B] (*k*=33)	Upper	13	26.23	4.622	17	31		
	Lower	21	20.95	5.399	7	28	.87	.38
	Total	34	22.97	5.675	7	31		
[D] (*k*=33)	Upper	13	31.85	1.214	30	33		
	Lower	21	31.05	1.658	27	33	.49	.07
	Total	34	31.35	1.535	27	33		
[E] (*k*=33)	Upper	13	29.46	2.757	24	33		
	Lower	21	23.76	4.949	14	31	.86	.37
	Total	34	25.94	5.051	14	33		
[F] (*k*=33)	Upper	13	27.77	3.059	23	32		
	Lower	21	23.71	4.991	15	31	.85	.34
	Total	34	25.26	4.744	15	32		
[G] (*k*=33)	Upper	13	31.31	3.172	22	33		
	Lower	21	27.48	4.854	13	33	.88	.41
	Total	34	28.94	4.638	13	33		
[H] (*k*=33)	Upper	13	31.15	2.672	24	33		
	Lower	21	26.95	4.165	17	33	.86	.32
	Total	34	28.56	4.172	17	33		
[J] (*k*=33)	Upper	13	22.15	4.451	16	30		
	Lower	21	18.10	5.137	17	31	.81	.30
	Total	34	19.65	5.216	16	31		
[K] (*k*=33)	Upper	13	30.62	2.256	26	33		
	Lower	21	29.48	3.203	17	32	.73	.32
	Total	34	29.91	2.896	17	33		
[L] (*k*=33)	Upper	13	22.46	6.565	11	32		
	Lower	21	16.19	5.250	5	23	.87	.42
	Total	34	18.59	6.477	5	32		
[OP] (*k*=33)	Upper	13	31.46	2.757	23	33		
	Lower	21	31.00	1.673	28	33	.73	.22
	Total	34	31.18	2.124	23	33		

7.3.2.1.1 Results of the Recall Tasks

The results of ANOVA showed significant interaction between group and test (F (3.62, 115.87) = 4,125, p <.05). Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption. The effect size was again small (.02), which means there was low statistical power of the interaction between group and test. This is probably due to the small number of the participants in this study. Study 3 and Study also showed the small effect size. However, t-test was performed to compare the differences across different levels of group factor. Bonferroni post hoc test was utilized to compare the differences among each level of the test factor. Table 7.5 shows the result of two-way mixed ANOVA. Table 7.6 shows the results of simple main effects of each factor.

Table 7.5

Two-way Mixed ANOVA for the Effects of the Group Difference and the Test Formats in Study 5 Recall Tasks

Source	SS	df	MS	F	p	η^2
Between Subjects						
Group	814.000	1	814.000	9.544	.004	.09
Error	2729.338	32	85.292			
Within Subjects						
Test	3738.583	3.621	1032.459	112.867	.000	.43
Test * Group	136.622	3.621	37.730	4.125	.005	.02
Error	1059.775	115.874	9.146			
Total	8478.318	156.116				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

After the simple main effects test, pairwise comparisons were conducted with each level of the group factor and the test factor. Table 7.7 shows the results of pairwise comparisons of tests by each group.

Table 7.6

Simple main effects in Group Factor and Test Factor in Study 5 Recall Tasks

Simple Effect	Level	df	t	p	r
[Group]	[Test B]	32	2.921	.006	.46
	[Test D]	32	1.502	.143	.26
	[Test F]	32	2.937	.006	.46
	[Test H]	32	3.583	.001	.54
	[Test J]	32	2.351	.025	.38
	[Test L]	32	3.075	.004	.48

Simple Effect	Level	df	F	p	η^2
[Test]	[Group Upper]	2.083	33.638	.000	.74
	Error	24.990			
	[Group Lower]	5	98.693	.000	.83
	Error	100			

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

Table 7.7

Comparisons among Tests in Each Group: Upper and Lower

Group		Sig. of F						Test difference
	Test	1	2	3	4	5	6	
Upper	1. Test [B]	—						J ≒ L < B ≒ F < H ≒ D (difficult --> easy)
	2. Test [D]	.005	—					
	3. Test [F]	.970	.001	—				
	4. Test [H]	.008	1.000	.000	—			
	5. Test [J]	.010	.000	.000	.000	—		
	6. Test [L]	.026	.002	.011	.000	1.000	—	
	Test	1	2	3	4	5	6	
Lower	1. Test [B]	—						L ≒ J < B ≒ F < H < D (difficult --> easy)
	2. Test [D]	.000	—					
	3. Test [F]	.091	.000	—				
	4. Test [H]	.000	.000	.001	—			
	5. Test [J]	.040	.000	.000	.000	—		
	6. Test [L]	.000	.000	.000	.000	.298	—	

The results of the pairwise comparisons showed significant differences in test difficulties of some tests in the upper group and the lower group. The group was divided based on the results of the Mochizuki Test (i.e., vocabulary size test). The test explains putative vocabulary size of the learners. It comprises eight sets of tests that measure level 1 to level 8 vocabularies. Level 1 means learners presumably know 1000 lemmas. Thus, the value of vocabulary size explains the size of acquired lemmas. Based on vocabulary size test, the lower group's estimated vocabulary size was under 2500, and the upper group's vocabulary size was over 2500 lemmas. In the lower group, the order of task difficulties was significant in some test formats: L ≒ J < B ≒ F < H < D (difficult to easy). The differences between tests L and J and between tests B and F were not significant; however, the differences between tests J and B, between tests F and H, and between tests H and D were significant.

On the other hand, little differences were observed between tests in the upper group: J ≒ L < B ≒ F < H ≒ D (difficult to easy). The differences between tests J and L, tests B and F, and tests H and D were not significant; however, the differences between tests L and B and tests F and H were significant. It seemed that the results found to be less hierarchical to explain the task difficulties among the learners over 2500 word level because the learners in the upper group tend to answer correctly among all the tasks.

The lower groups' test performances were partly affected by the test characteristics, which is consistent with the results of the previous experiments. In other words, the learners in the lower group could not answer the six recall tasks in a consistent way. The term "test characteristics" here related to the aspects of vocabulary knowledge because the tests in this study were prepared

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based on Nation's (2001) "Aspects of word knowledge for testing (p.347)" with an aim to examine the depth of vocabulary knowledge.

In other words, lower group learners did not have a constant knowledge of the target words compared to the upper group. Seeing the results from the perspectives of diagnostic assessment, the learners in the lower group needed some additional treatment to acquire the aspects of vocabulary knowledge because the results showed their vocabulary knowledge on the recall tasks was incomplete even though they have learned all the target words before entering the university.

The differences between tests J and L were not significant in the upper group and the lower group. In study 3 and 4, the test-takers scored the lowest on test L. Test L asked examinee to write correct spelling from the meaning, which was written in their first language (i.e., L1 = Japanese). It seemed that translating the words into English and writing the correct spellings were the most difficult task for the test-takers in study 3 and 4. However, in this study (study 5), the differences between tests L and J were not significant, which means test J (i.e., L1 meaning to L2 sound) was similar to test L in terms of difficulty. Tests L, J, and B consisted of easy tasks, as they were constantly showed high scores on the tests. Tests F, H, and D contained difficult tasks, as they were constantly categorized into the third line from the top. Regardless of the differences in scores, these two classifications were consistent across studies 3, 4, and the present experiment (Study 5).

On the other hand, simple main effects of group on the test factors were significant, indicating that the lower and upper groups differed in performance on each test. Except for test D, the upper group always outperformed the lower

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group on all six recall tasks. Table 7.8 shows the results of the analysis. The result of test D was within a predictable range because the reliability of test D was the lowest of all (Cronbach's alpha = .49).

Table 7.8

Comparisons among Groups in Each Test: Test [B], [D], [F], [H], [J], and [L]

Test	Sig. of t	Group (Upper_Lower)
Test [B]	.006	Lower < Upper
Test [D]	.143	Lower $\fallingdotseq$ Upper
Test [F]	.006	
Test [H]	.001	Lower < Upper
Test [J]	.025	
Test [L]	.004	

7.3.2.1.2 Results of the Recognition Tasks

The results of ANOVA showed significant interaction between group and test, $F_{(2.38, 76.28)} = 5.374$, $p < .05$. Greenhouse-Geisser correction was used to correct the violations of the sphericity assumption. To compare the differences among groups, t-test was performed. Bonferroni post hoc test was utilized to compare the differences among each level of the test factor. Table 7.9 shows the result of two-way mixed ANOVA. Table 7.10 shows the results of simple main effects test on each factor.

Table 7.9

Two-way Mixed ANOVA for the Effects of the Group Difference and the Test

Formats in Study 5 Recognition Tasks

Source	SS	df	MS	F	p	η^2
			Between Subjects			
Group	248.748	1	248.748	10.749	.003	.11
Error	740.495	32	23.140			
			Within Subjects			
Test	369.923	2.384	155.180	13.991	.000	.16
Test * Group	142.100	2.384	59.612	5.374	.004	.06
Error	846.099	76.280	11.092			
Total	2347.365	114.048				

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

Table 7.10

Simple main effects in Group Factor and Test Factor in Study 5 Recognition Tasks

Simple Effect	Level	df	t	p	r
	[Test E]	31.772	4.307	.000	.61
[Group]	[Test G]	32	2.524	.017	.41
	[Test K]	32	1.119	.271	.20
	[Test O]	32	0.610	.546	.11

Simple Effect	Level	df	F	p	η^2
	[Group Upper]	3	1.948	.139	.14
[Test]	Error	36			
	[Group Lower]	2.128	19.090	.000	.49
	Error	42.557			

Note. Greenhouse-Geisser correction was used to correct for violations of the sphericity assumption.

After the simple main effects test, pairwise comparisons were conducted with each level of the group factor and the test factor. Table 7.11 shows the results of pairwise comparisons among tests in each group.

Table 7.11

Comparisons among Tests in Each Group: Upper and Lower

Group		Sig. of F				Test difference
	Test	1	2	3	4	
Upper	1. Test [E]	—				
	2. Test [G]	.793	—			E ≒ K ≒ G ≒ OP
	3. Test [K]	.687	1.000	—		(difficult --> easy)
	4. Test [O]	.192	1.000	1.000	—	
	Test	1	2	3	4	
Lower	1. Test [E]	—				
	2. Test [G]	.020	—			E < G ≒ K ≒ OP
	3. Test [K]	.001	.062	—		(difficult --> easy)
	4. Test [O]	.000	.025	.298		

The results of the pairwise comparisons showed that the differences among tests were not significant in the upper group. Furthermore, only small differences were observed in the lower group. Test-takers in the upper group obtained almost perfect scores on different test formats.

However, looking at the raw scores, the results consistently indicated that test E was the most difficult and test O was the easiest in both groups. In the upper group, differences between different pairs of tests were insignificant. In the lower group, significant differences emerged between test E and test O and between test G and test O. Test E asked learners to match the pronounced words with L1 meanings. They needed to listen to the pronounced words carefully and then find appropriate translations from the list, which included some distractors. It seemed that listening to the target words and choosing appropriate meaning simultaneously were challenging tasks for the learners in the lower group. Comparing the results from the previous experiments, the results of test K in

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study 5 were different. In the previous experiments, test K was consistently the most difficult recognition task. However, the results from this study showed that test E was the most difficult, which was different from the previous experiments.

On the other hand, simple main effects of group on the test factors showed that differences between the upper group and the lower group were significant for test E and test G. However, differences between groups in tests K and OP were not significant. Table 7.12 shows the results of pairwise comparisons among tests in each group.

Table 7.12

Comparisons among Groups for Each Test: Test [E], [G], [K], and [O]

Test	Sig. of t	Group (Upper_Lower)
Test [E]	.000	Lower < Upper
Test [G]	.017	
Test [K]	.271	Lower $\fallingdotseq$ Upper
Test [O]	.546	

7.3.2.2 Pearson's Correlations Among Vocabulary Size and Spelling Tests

To examine the relationships between estimated vocabulary size (Mochizuki Test) and each test (i.e., six recall tasks and four recognition tasks), Pearson's correlation was utilized. The analyses were conducted separately for the recall tasks and the recognition tasks.

7.3.2.2.1 Pearson's Correlations of Recall Tasks in Study 5

The results of Pearson's correlations between Mochizuki Test and the six recall tasks are reported in Table 7.13.

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Table 7.13

Pearson's Correlation Coefficient for the Recall Tasks in Study 5

Variable	1	2	3	4	5	6	7
1. [Mo_T]	—						
2. [B]	.514**	—					
3. [D]	.323	.714**	—				
4. [F]	.531**	.768**	.648**	—			
5. [H]	.613**	.790**	.650**	.837**	—		
6. [J]	.519**	.784**	.663**	.663**	.754**	—	
7. [L]	.589**	.886**	.652**	.652**	.851**	.837**	—

Note. **p <.01, two-tailed. [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [B], [D], [F], [H], [J], and [L] are recall tests.

The correlations between Mochizuki Vocabulary Size Test and the recall tasks (i.e., test B, F, H, J, and L) were moderately high, ranging from .51 to .61, with the exception of test D. The correlation between Mochizuki Test and the test D was weak and non-significant. These results suggest that except for test D, various test formats of recall tasks had moderately high correlations with Mochizuki Test, which is a recognition type test.

Test D measured learners' pronunciation of words printed on a list, and it did not include the aspects of the words' meaning. Before the experiment, the author thought that the scores on test D were not so high because it seemed that it was difficult for the learners to pronounce the words correctly from daily observations by the author. However, the results indicated that the test-takers' performances were quite high compared to other test formats of the recall tasks.

The results from the previous experiments (study 3 and study 4) were consistent with this study. The correlation coefficients in study 3 and study 4 were also consistent with current results. The results showed that learners' ability

to connect words' meanings to words' spellings is considerably different and unrelated to the ability to pronounce the printed words. Considering these results from another perspective, if we attempted to measure learners' ability to pronounce the words correctly, we would need to use specifically prepared tasks, such as test D. Thus, if we wanted to know whether the learners could pronounce the words correctly, we would need to use specifically designed tasks to measure learners' ability to read-aloud English words.

On the other hand, the correlations among six recall tasks were moderately high to high, ranging from .64 to .88. The tests that measured related aspects were moderately or highly correlated, as was expected [e.g., test B and D (.71), test F and J (.66), and test H and L (.75)]. It is notable to report the correlation coefficient between test B and L (.88) was high. Both tests required learners to write the correct spellings from the given inputs. However, the inputs used in these tests differed: test B was L2 sound (pronounced word), and test L was L1 meaning (Japanese word). Test B was the typical type of spelling test (i.e., dictate one word) focused on receptive to productive recall. On the other hand, test L was the typical type of L1 to L2 translation task that focused on productive recall. It can be concluded that the results of the tasks, which required the same outputs for the learners, were strongly related, reflecting productive recall. It is also notable that the correlation coefficient between test F and H (.83) was high. Both tests required learners to write the correct meaning of the target words from the given inputs. However, the input used in these tests differed: test F was L2 sound (pronounced word), and test H was L2 spelling (printed spelling). Test F was a translation task that focused on receptive recall. Test H was also a translation task that focused on receptive recall. Despite the differences of input

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(i.e., L2 sound or L2 spelling), test F and test H were strongly related because they required learners to write the translation of the target sounds or target spellings.

7.3.2.2.2 Pearson's Correlations of Recognition Tasks in Study 5

The results of Pearson's correlations among Mochizuki Test and the six recognition tasks are reported in Table 7.14.

Table 7.14

Pearson's Correlation Coefficient for the Recognition Tasks in Study 5

Variable	1	2	3	4	5
1. [Mo_T]	—				
2. [E]	.696**	—			
3. [G]	.371*	.517**	—		
4. [K]	.133	.223	.656**	—	
5. [O]	.040	.272	.127	.264	—

Note. **p <.01, *p <.05 two-tailed.   [Mo_T] = Mochizuki Vocabulary Size Test (Mochizuki, 1998). Test [E], [G], [K], and [O] are recognition tests.

The correlations among Mochizuki Vocabulary Size Test, test E, and G were weak to moderately high, ranging from .37 to .69. However, the correlations among Mochizuki Test, test K, and test O were not significant.

Test E measured learners' ability to match L2 sound (pronounced word) to L1 meaning (Japanese), and test G measured learners' ability to match L2 spelling (printed word) and L1 meaning (Japanese). Tests E and G are both receptive recognition tasks that require learners to choose the correct meaning of the target words from the sounds or the spellings. Mochizuki Test required

learners to match the L1 meaning (Japanese) to L2 spellings (printed words). Thus, this test can be categorized as productive recognition. Tests E and G assess different types of knowledge (i.e., receptive knowledge) than does Mochizuki Test (i.e., productive knowledge); nevertheless, strong relations were found between Mochizuki Test and both tests E and G.

Test K measured learners' ability to recognize correct forms of the written words. Learners had to choose correct spellings of the words from four options. Therefore, three distractors were included in the options. This test measures receptive and productive knowledge. Test-takers needed to recognize the printed options first and then select correct spellings of the words among distractors. On the other hand, test O measures learners' ability to connect sound form and written form of the target words, which assesses receptive to productive knowledge. They needed to recognize the pronounced target words first and then select the correct spellings of the word printed on the sheet alphabetically. During this test, test-takers needed to number the words according to the order of pronounced sounds.

The correlations among four recognition tasks were not so high. The correlation coefficients between tests E and G (.51) and between tests G and K (.65) were moderately high. Other correlations were weak and uncorrelated. Tests E and G were both measuring receptive knowledge. Tests E and G are strongly related because they both required learners to choose the appropriate L1 meaning (Japanese) from the given input.

Test G attempted to measure receptive knowledge and test K intended to measure receptive to productive knowledge. During the tests, learners needed to recognize the spellings of the words; thus, these two tests were related, as they

both asked learners to recognize the spellings of the words.

It is notable that test O did not correlate significantly with other tests. Test O was added to this experiment (study 5) instead of using excluded tasks. However, compared to the other tasks, this test measures the vocabulary knowledge independently from the previous test formats.

7.3.2.3 Spearman's Rank-order Correlations Among Spelling Test

Spearman's rank-order correlation coefficients were utilized to investigate the consistency of test-takers' performance on the spelling tests. The results of the recall tests and the recognition tests are reported separately in the following sections.

7.3.2.3.1 Spearman's Correlations of Recall Tasks in Study 5

The results of Spearman's rank-order correlation test for the recall tests are reported in Table 7.15. The correlations among six recall tests were moderately high to high, ranging from .62 to .89. Seeing these results, test-takers' performances on different test formats were consistent. Furthermore, most learners who scored highly on one test also scored highly on other recall tests. However, the correlations between test D and other test formats were only moderately high, ranging from .62 to .69. This result was consistent with the results reported in previous chapters (study 3 and study 4). Added to this, Cronbach's alpha for test D was consistently the lowest. From the result, it can be concluded that the characteristics of test D were quite different from other test formats. Test D asked learners to pronounce correctly the printed English words. At the beginning of doing these studies, the author thought that the scores on test

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D were not so high because during the English lessons they could not pronounce correctly. However, the scoring of test D was based on less-stringent criterion because it was difficult to expect perfectly correct pronunciation for the target words by the participants. For instance, perfect pronunciation of the target words and the borderline pronunciation for the target words were treated as correct answers. Thus, the test-takers' accented but audible pronunciation was evaluated as correct answer. It seemed that this scoring procedure for test D is not completely consistent with other tests because the responses on other tests varied less. On other tests, only correct answers received "1" point. Further research should improve this scoring method, as in the research on spelling knowledge, this test represents a new approach of assessing learners' pronunciation.

Table 7.15

Spearman's Rank-Order Correlation Coefficient for the Recall Tasks in Study 5

Variable	1	2	3	4	5	6
1. [B]	—					
2. [D]	.684**	—				
3. [F]	.829**	.623**	—			
4. [H]	.819**	.690**	.815**	—		
5. [J]	.797**	.687**	.827**	.779**	—	
6. [L]	.895**	.626**	.857**	.872**	.831**	—

Note. **$p <.01$, two-tailed. Test [B], [D], [F], [H], [J], and [L] are recall tests.

7.3.2.3.3 Spearman's Correlations of Recognition Tasks in Study 5

The Spearman's rank-order correlations for the recognition tasks are reported in Table 7.16. The results showed weak to moderately high correlations among the recognition tasks, ranging from .35 to .64. However, no correlations

were found between tests E and O and between tests G and O. These results suggest that test-takers' performances on different test formats, except test O, were consistent. Furthermore, most learners who scored highly on one test also scored highly on other tests measuring recognition. Test O checked learners' ability to connect pronounced words and written spellings. The row scores on this test were quite high compared to the other tasks. However, Cronbach's alpha was sufficient (.73) and the Item Discrimination was also sufficient (.22), indicating that test O functioned well among the participants in this study.

Table 7.16

Spearman's Rank-Order Correlation Coefficient for the Recognition Tasks in Study 5

Variable	1	2	3	4
1. [E]	—			
2. [G]	.648**	—		
3. [K]	.459**	.549**	—	
4. [O]	.261	.188	.354*	—

Note. **p <.01, *p <.05 two-tailed. Test [E], [G], [K], and [O] are recognition tests.

7.3.2.4 Factor Analysis of Tests

Exploratory factor analysis (EFA) was conducted with the recall tasks and the recognition tasks. The results of each test set are as follows.

7.3.2.4.1 Factor Analysis for Recall Tasks in Study 5

Table 7.17 shows the results of factor analysis for the recall tasks. The value of KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy coefficient was high (.899) and Bartlett's test of sphericity showed a significance (.000), indicating that the use of factor analysis was appropriate for the recall tasks in

this study.

For the recall tasks, only one factor was found. Thus, the six recall tasks were found to be appropriate for measuring test-takers' knowledge of sound form, written form, and form and meaning of target words in a comprehensive manner.

Table 7.17

Factor Analysis for Recall Tasks in Study 5

Test Format	Factor 1	Communality
Test B	.913	.833
Test D	.727	.529
Test F	.872	.761
Test H	.893	.797
Test J	.869	.756
Test L	.954	.909
factor contribution	4.585	4.585
Cumulative contribution ratio	76.411	

7.3.2.4.2 Factor Analysis for Recognition Tasks in Study 5

Table 7.18 shows the results of factor analysis of the recognition tasks. The value of KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy coefficient was low (.472) and Bartlett's test of sphericity showed significance (.016), verifying that it is appropriate to use factor analysis for the recognition tasks in this study.

Table 7.18

Factor Analysis for Recognition Tasks in Study 5

Test Format	Factor 1	Communality
Test E	.517	.268
Test G	.999	.999
Test K	.656	.431
Test O	.128	.016
factor contribution	1.714	1.714
Cumulative contribution ratio	42.847	

7.3.3 Results of Qualitative Analysis: Implicational Scaling

Implicational scaling was used to understand the acquisition order of each vocabulary knowledge aspect. At first, matrices for implicational scaling were summarized with all ten tests (i.e., six recall tests and four recognition tests). However, it was impossible to discuss the order of spelling knowledge due to the inappropriate scalability. From the beginning, the characteristics of the recall tasks and the recognition tasks appeared contrasting. In addition, in the recognition tasks there were no significant differences between some of the tasks.

The tests were designed to measure the correspondents' knowledge of each aspect of the target words. Previous sections described quantitative analyses conducted using several methods. By contrast, this section describes qualitative analysis, specifically implicational scaling. Implicational scaling is sometimes called Guttmann scaling. This method will help us consider language acquisition in the language learning.

The goal of the calculation is to compute coefficient of scalability (C_{scal}).

In order to calculate this value, we need to make matrices for the targets. The matrices for the recall tasks in study 5 are summarized in the Appendices.

7.3.3.1 Implicational Scaling in Recall Tasks in Study 5

Table 7.19 shows the scalability of the recall tasks. Scalabilities were calculated with each word in Study 5. The value of C_{scal} indicates whether assumed orders of difficulties are valid. The value must be greater than .60 for the order of difficulties to be valid. Before starting the analyses, it is crucial to look at the value of coefficient or reproducibility (henceforth C_{rep}). This value should be greater than .90 (i.e., value > .90) to fulfill the criterion of validity, as indicated in the previous sections.

The difficulty order, which was assumed in the recall tasks, is as follows. The sequences were determined from the scores of learners' test performances.

$$J < L < B < F < H < D$$

(difficult → easy)

This ordering shows that test J was the most difficult (score poorly) and the test D was the easiest (score highly). The implicational scaling was used to see the difficulty order of the six recall tasks and to examine the validity of utilizing this method in this study. Thus, task difficulties are determined from the raw scores. Seeing the results, ten words (i.e., *already, ask, back, boat, casual, during, measure, point, true,* and *with*) seemed to be valid to show the difficulty order of the tasks which were used in the study. The assumed difficulty order seemed to be adequate for ten words. However, the remaining 23 words were

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categorized to be invalid at the difficulty level based on the results of implicational scaling. The words, which appeared to be valid, are shown in bold in Table 7.19.

Table 7.19

Scalability in Recall Tasks in Study 4

Target Word	Formula			
	C_{rep}	MM_{rep}	% improvement (C_{rep} - MM_{rep})	C_{scal}
already	**.980**	.716	.265	**.931**
another	**.951**	.892	.059	.545
ask	**.961**	.819	.142	**.784**
back	**.951**	.843	.108	**.688**
boat	**.931**	.779	.152	**.689**
bring	**.902**	.775	.127	.565
brother	**.961**	.966	-.005	-.143
casual	**.951**	.799	.152	**.756**
culture	.873	.770	.103	.447
dream	**.971**	.951	.020	.400
drink	**.951**	.975	-.025	-1.000
during	**.931**	.662	.270	**.797**
enjoy	**.951**	.912	.039	.444
fire	**.912**	.931	-.020	-.286
flower	**.931**	.941	-.010	-.167
foot	.784	.814	-.029	-.158
forget	**.931**	.853	.078	.533
hour	.873	.696	.176	.581
however	.892	.740	.152	.585
love	**.941**	.971	-.029	-1.000
manual	.873	.770	.103	.447
measure	**.951**	.770	.181	**.787**
mouth	.853	.814	.039	.211
point	**.990**	.907	.083	**.895**
popular	**.912**	.863	.049	.357
put	**.951**	.907	.044	.474
sure	.853	.740	.113	.434
thing	.843	.740	.103	.396
thought	**.902**	.809	.093	.487
tire	.824	.711	.113	.390
travel	.892	.794	.098	.476
true	**.922**	.770	.152	**.660**
with	**.971**	.765	.206	**.875**
Total (33 words)	**.941**	.789	.152	**.721**
AVERAGE	**.946**	.847	.099	.412

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}

Table 7.20 shows the accuracy rate of the recall tasks in Study 5. This will help us understand the overall test difficulties. The words, which appeared to be valid, are shown in bold in the Table.

Table 7.20

Accuracy Rate in Recall Tasks in Study 5

Target word		J	L	B	F	D	H
1	**already**	41.18	50.00	67.65	76.47	100.00	76.47
2	another	79.41	76.47	88.24	94.12	100.00	97.06
3	**ask**	50.00	67.65	97.06	85.29	100.00	91.18
4	**back**	64.71	79.41	79.41	85.29	100.00	97.06
5	**boat**	52.94	44.12	67.65	91.18	100.00	100.00
6	bring	61.76	61.76	88.24	73.53	97.06	82.35
7	brother	100.00	88.24	91.18	100.00	100.00	100.00
8	**casual**	17.65	17.65	50.00	76.47	100.00	88.24
9	culture	64.71	44.12	44.12	91.18	100.00	94.12
10	dream	94.12	88.24	88.24	100.00	100.00	100.00
11	drink	100.00	88.24	97.06	100.00	100.00	100.00
12	**during**	23.53	20.59	35.29	44.12	67.65	52.94
13	enjoy	82.35	85.29	94.12	91.18	94.12	100.00
14	fire	94.12	85.29	85.29	97.06	97.06	100.00
15	flower	100.00	85.29	79.41	100.00	100.00	100.00
16	foot	44.12	35.29	14.71	8.82	100.00	91.18
17	forget	67.65	76.47	94.12	85.29	97.06	91.18
18	hour	55.88	67.65	61.76	67.65	73.53	91.18
19	however	38.24	38.24	82.35	67.65	97.06	73.53
20	love	100.00	100.00	85.29	97.06	100.00	100.00
21	manual	55.88	35.29	55.88	91.18	100.00	94.12
22	**measure**	20.59	8.82	11.76	55.88	88.24	58.82
23	mouth	91.18	67.65	55.88	82.35	94.12	97.06
24	**point**	61.76	82.35	100.00	100.00	100.00	100.00
25	popular	79.41	67.65	76.47	94.12	100.00	100.00
26	put	85.29	85.29	97.06	85.29	100.00	91.18
27	sure	23.53	20.59	79.41	38.24	97.06	50.00
28	thing	20.59	23.53	41.18	17.65	94.12	52.94
29	thought	11.76	5.88	2.94	5.88	52.94	41.18
30	tire	52.94	26.47	58.82	88.24	85.29	67.65
31	travel	32.35	41.18	73.53	76.47	100.00	100.00
32	**true**	44.12	35.29	76.47	82.35	100.00	82.35
33	**with**	52.94	58.82	76.47	76.47	100.00	94.12
AVERAGE		59.54	56.33	69.61	76.56	95.01	86.54

7.3.3.2 Implicational Scaling in Recognition Tasks in Study 5

Table 7.21 showed the scalability of the recognition tasks in Study 5. Scalabilities were calculated with each word in Study 5.

The difficulty order, which was assumed in the recognition tasks, is as follows. The sequences were determined based on the scores of learners' test performances.

E < G < K < O

(difficult → easy)

This ordering shows that test E was the most difficult (score poorly) and the test O was the easiest (score highly). The implicational scaling was used to see the difficulty order of the four recognition tasks and to examine the validity of utilizing this method in this study. Thus, task difficulties are determined from the raw scores. Seeing the results, only three words (i.e., *bring, sure,* and *thing*) seemed to be valid to show the difficulty order of the tasks which were used in the study. The assumed difficulty order seemed to be adequate for ten words. However, the remaining 30 words were categorized to be invalid at the difficulty level based on the results of implicational scaling. The words, which appeared to be valid, are shown in bold in Table 7.21.

Table 7.21

Scalability in Recognition Tasks in Study 5

Target Word	Formula				
	C_{rep}	MM_{rep}	% improvement (C_{rep} - MM_{rep})		C_{scal}
already	.882	.897		-.015	-.143
another	**.941**	.941		.000	.000
ask	**.971**	.949		.022	.429
back	**.971**	.956		.015	.333
boat	**.926**	.912		.015	.167
bring	**.941**	.765		.176	**.750**
brother	**.971**	.971		.000	.000
casual	**.985**	.978		.007	.333
culture	.853	.875		-.022	-.176
dream	**.956**	.963		-.007	-.200
drink	**.941**	.934		.007	.111
during	.897	.765		.132	.563
enjoy	**.985**	.971		.015	.500
fire	**.956**	.956		.000	.000
flower	**.971**	.985		-.015	-1.000
foot	.735	.757		-.022	-.091
forget	**.926**	.897		.029	.286
hour	**1.000**	.934		.066	1.000
however	**.912**	.860		.051	.368
love	**1.000**	.971		.029	1.000
manual	**.971**	.949		.022	.429
measure	.794	.765		.029	.125
mouth	**.956**	.926		.029	.400
point	**.912**	.941		-.029	-.500
popular	**.956**	.971		-.015	-.500
put	.853	.860		-.007	-.053
sure	**.926**	.772		.154	**.677**
thing	**.985**	.794		.191	**.929**
thought	.809	.765		.044	.188
tire	.882	.897		-.015	-.143
travel	**.912**	.912		.000	.000
true	.868	.846		.022	.143
with	**.941**	.904		.037	.385
Total (33 words)	**.985**	.956		.029	**.667**
AVERAGE	**.954**	.924		.030	.211

Note. C_{rep} = coefficient of reproducibility. MM_{rep} = minimum marginal reproducibility. % improvement = percent improvement in reproducibility. C_{scal} = coefficient of scalability, the formula for C_{scal} is % improvement (C_{rep} - MM_{rep})/1-MM_{rep}

Table 7.22 show the accuracy rate of four recognition tasks. The accuracy rate of three words which seemed to be valid was quite low in test E.

Table 7.22

Accuracy Rate in Recognition Tasks in Study 5

Target word		E	G	K	O
1	already	70.59	88.24	73.53	97.06
2	another	91.18	94.12	91.18	100.00
3	ask	91.18	88.24	100.00	100.00
4	back	88.24	94.12	100.00	100.00
5	boat	85.29	91.18	88.24	100.00
6	**bring**	58.82	79.41	76.47	91.18
7	brother	94.12	97.06	97.06	100.00
8	casual	97.06	94.12	100.00	100.00
9	culture	88.24	94.12	67.65	100.00
10	dream	94.12	97.06	97.06	97.06
11	drink	85.29	94.12	97.06	97.06
12	during	61.76	61.76	91.18	91.18
13	enjoy	91.18	100.00	100.00	97.06
14	fire	94.12	94.12	97.06	97.06
15	flower	100.00	97.06	97.06	100.00
16	foot	20.59	82.35	88.24	47.06
17	forget	82.35	85.29	91.18	100.00
18	hour	82.35	94.12	97.06	100.00
19	however	76.47	79.41	91.18	97.06
20	love	88.24	100.00	100.00	100.00
21	manual	88.24	97.06	97.06	97.06
22	measure	70.59	82.35	52.94	100.00
23	mouth	88.24	88.24	94.12	100.00
24	point	94.12	94.12	97.06	91.18
25	popular	100.00	97.06	91.18	100.00
26	put	76.47	97.06	94.12	76.47
27	**sure**	55.88	58.82	97.06	97.06
28	**thing**	35.29	44.12	97.06	100.00
29	thought	8.82	58.82	97.06	58.82
30	tire	91.18	91.18	76.47	100.00
31	travel	88.24	94.12	85.29	97.06
32	true	79.41	88.24	73.53	97.06
33	with	76.47	97.06	97.06	91.18
AVERAGE		78.61	87.70	90.64	94.47

In total, the recognition tasks were not so difficult for the learners in study 5. Compared to the results in study 3 and 4, it can be said that most learners could successfully respond to the following dimensions of the knowledge to recognize vocabulary: (a) sound to letter, (b) sound to meaning, (c) letter to sound, (d) letter to meaning, (e) meaning to letter, and (f) meaning to sound.

7.4 Summary of the Findings: Chapter 7 (Study 5)

7.4.1 Answers to RQ5-1

RQ5-1: Do task difficulties of recall test formats differ among Study 3, Study 4, and Study 5?

The results of two-way mixed ANOVA showed significant group (2: upper and lower) by test (6: test B, D, F, H, J, and L) interaction. After conducting post hoc analysis for the group factor on each test, significant group differences between the lower group and upper group emerged on the recall tasks except for test D. That is to say, except for the test D, upper group always outperformed the lower group.

Another post hoc analysis was conducted for the test factor for each group. Although the significant differences among tasks were different in each group, the ordering of their raw scores was the similar in the upper group and the lower group. In the upper group, the differences between test J and test B, test L and test F, test B and test H, test F and test H were significant. In the lower group, the differences between test L and test B, test J and test B, test B and test H, test F and test H, test H and test D were significant.

Compared to the results from the previous chapter (Study 3 and Study 4), the results of the difficulty order based on their raw scores were similar.

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7.4.2 Answers to RQ5-2

RQ5-2: Do task difficulties of recognition test formats differ among Study 3, Study 4, and Study 5?

The results of two-way mixed ANOVA showed significant interaction between group (2: upper and lower) and tests (4: test E, G, K, and O).

Another post hoc analysis was conducted for the test factor in each group. The results showed little differences among the recognition tasks. Simply put, the differences in test formats had a weak effect on the learners in this study. On the other hand, most learners could respond to the recognition tasks correctly even though they could not answer the recall tasks correctly.

7.4.3 Answers to RQ5-3

RQ5-3: Are estimated vocabulary size and spelling test performance related among Study 3, Study 4 and Study 5?

The analyses were conducted independently with the recall tasks and the recognition tasks.

First, Pearson's correlation coefficients were calculated among the Vocabulary Size Test and the six recall tasks. The results showed significant correlations among Vocabulary Size Test and the recall tasks except for test D. The correlations among the recall tasks were significant. In particular, tests that measured related aspects correlated highly, as was expected.

Second, Pearson's correlations among the Vocabulary Size Test and the six recognition tasks were calculated. There were no significant relationships between Mochizuki Test and test K, test O.

7.4.4 Consistencies of the Performances on Tests

In order to examine the consistency of the test-takers' performances, Spearman's rank-order correlation was used to interpret the data. First, Spearman's rank-order correlation coefficients were calculated among the six recall tasks in order to examine the consistency in the learners' performances. The results showed significant correlations among the tests. Therefore, the results showed that learners who scored highly on one test could score highly on the other test formats. Test D (i.e., L2 spelling to L2 sound) had weak to moderate correlations with other tests. Pronouncing the words from the written spellings was not so difficult for the test-takers in this study, which was consistent with the previous chapter (Study 3 and Study 4).

Second, Spearman's rank-order correlations were calculated among the four recognition tasks for the same reason, that is, to examine the consistency of test performances. The results showed significant interactions among some tests. However, the correlations between test E and test O, test G and test O were not significant. The scores on test O were surprisingly high; thus, the scores might affect the data.

7.4.5 Answers to RQ5-4

RQ5-4: What are the characteristics of the scalabilities among thirty-three target words from high school textbooks?

Implicational scaling was used as a statistical method to examine the task difficulties among several test formats. On the recall tasks, ten words were scalable with the following difficulty order: J < L < B < F < H < D (difficult → easy). The target words in this study were previously introduced in their school;

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however, not all the learners could acquire various aspect of each word.

However, for the recognition tasks, scalabilities were not significant among all target words. It seemed that most learners could answer all recognition tasks correctly due to the ceiling effect in their scores. That is to say, the recognition tasks were easy for the learners in this study. Moreover, the learners could answer the recognition tasks correctly even though they could not answer the recall tasks correctly. It seemed that there were considerable gaps between recall tasks and the recognition tasks. The results from study 3 and study 4 were similar, and the results from this stud (study 5) were also similar.

7.4.6 Answers to RQ5-5

RQ5-5: Will diagnostic spelling tests categorize the test-takers?

Thirty-four learners were categorized according to their test performances especially on recall tests. The diagnostic spelling tests developed for this research succeeded in categorizing the learners into groups according to their vocabulary knowledge: Good-decoder, good-speller, good-comprehender (D+ S+ C+), Good-decoder, poor-speller, good-comprehender (D+ S- C+), Good-decoder, good-speller, poor-comprehender (D+ S+ C-), and Poor-decoder, poor-speller, poor-comprehender (D- S- C-)

Twenty-one learners categorized as D+ S+ C+, and ten learners categorized as D+ S- C+. Three learners categorized as D+ S- C-. There were no D- S- C- learners.

Comparing the results from Study 3 and Study 4 (previous chapters), same tendencies was found. If the target words have been introduced in the past, there are low possibilities of existing Poor-decoders. In total, 13 learners were

Poor-spellers. There was also no Good-speller, Poor-comprehender in thorough the experiments (Study 3, 4, and 5). The results indicated that the lack of sound-letter correspondence knowledge among Japanese EFL learners emerged.

Comparing the results with multiple-choice testing (a recognition test), it can be said that learners who could not answer correctly on multiple-choice tests failed to write the correct spellings. This result was also similar to the previous chapters (Study 3 and Study 4).

Appendices 7A to 7J are the examples of test formats. Appendix 7K (1-34) and Appendix 7L (1-34) are the matrices for implicational scaling.

Chapter 8   Conclusion

The present study aimed to evaluate Japanese EFL learners' spelling knowledge with various types of diagnostic tests. Tests from previous research were used in the beginning of this project. Subsequently, the researcher developed several types of tests. Therefore, in total, five experiments were conducted in order to precisely investigate test-takers' spelling knowledge in the aspects of vocabulary knowledge. After the testing sessions, the method called implicational scaling (Hatch & Lazaraton, 1991) was used to diagnose learners' detailed knowledge of each word. Finally, the examinees in the present study were categorized according to their performances. Eight patterns of knowledge emerged, reflecting degrees of incompleteness of vocabulary knowledge especially for the three symbolic codes of the words: sound, letter, and meaning.

This final chapter first summarizes the answers of the research questions then discusses the implications, limitations, and suggestions. The last section offers some recommendations for further research.

8.1 Answers to the Research Questions

The present study asks several research questions: Study 1 had three research questions (i.e., RQ1-1, RQ1-2, and RQ1-3); Study 2 also had three research questions (i.e., RQ2-1, RQ2-2, and RQ2-3). Studies 3, 4, and 5 focused on the diagnostic spelling tests developed by the author. However, the target words were different in each; their four research questions were basically the same (i.e., RQ3-1, RQ4-1, and RQ5-1. RQ3-2, RQ4-2, and RQ5-2. RQ3-3, RQ4-3, and RQ5-3. RQ3-4, RQ4-4, and RQ5-4) but different conditions.

Finally, another research question focused on the test-takers characteristics to categorize learners according to their test performances (RQ3-5, RQ4-5, and RQ5-5).

RQ1-1: Are sound-letter correspondence knowledge and spelling test performance related?

A pretest in Study 1 assessed the effects of sound-letter correspondence knowledge on test performance. It is said that the knowledge of sound-letter correspondence is deeply related to spelling performance. Thus, to evaluate Japanese EFL learners' (especially high school students') already acquired sound-letter correspondence knowledge; I conducted a dictation type test of 90 words considered to have regular spellings. The results showed that the correlations among the sound-letter correspondence test and three other tests (i.e., story form, timed dictation, and list form) were moderately high.

On the other hand, the correlations of the sound-letter correspondence test and two other tests (i.e., multiple-choice and matching task) were weak. These results indicated that learners' knowledge of sound-letter correspondence is related to story form, timed dictation, and list form tests—all dictation types. However, multiple-choice and matching tasks did not highly correlate with sound-letter correspondence test. Multiple-choice and matching tests do not require understanding the target words' pronunciations (sounds). Thus, to evaluate knowledge of word-pronunciation, we should conduct tests that include the sound form in the aspects of vocabulary knowledge.

RQ1-2: Do the types of spelling test formats affect learners' spelling test

performance?

RQ2-1: What are the characteristics of the spelling tests used in this study?

In order to examine the effects of test formats, several types of English spelling diagnostic tests were conducted during Study 1 (*RQ1-2*) and Study 2 (*RQ2-1*). Studies 1 and 2 differed in the number of tasks: five tasks were the same (i.e., story form, timed dictation, list form, multiple-choice, and matching task); however, Study 2 had a translation task to examine understanding written form and meaning of the target words. The test formats included two types of tasks: recall (i.e., story form, timed dictation, list form, and translation) and recognition (i.e., multiple-choice and matching). The targeted participants in Study 1 were high school students and in Study 2, university students.

The results of the tests were almost same in Study 1 and Study 2. The results of the recognition tasks exceeded the scores on recall tasks in both, especially for the translation task (added in Study 2): it seemed that translating the meanings into Japanese is difficult compared to the recognition tasks such as multiple-choice or matching.

Considering the results of the experiment, it seemed that the types of the test formats did affect learners' test performance. That is to say, different test formats effectively assess different aspects of knowledge.

RQ2-2: What relationships exist between estimated vocabulary size (breadth of vocabulary knowledge) and performance on spelling tests (depth of vocabulary knowledge)?

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RQ2-2 examined the relationships between the breadth of English vocabulary knowledge (estimated vocabulary size) and the depth of vocabulary knowledge (spelling test performances).

The participants' vocabulary size in Study 2 was about 2,600, which was not so high. The spelling tests conducted in this study measured depth of vocabulary knowledge. The results showed that the correlations among estimated vocabulary size and performance on spelling tests were high. In other words, depth of vocabulary knowledge correlates with estimated vocabulary size among Japanese university EFL students.

RQ1-3: What are the characteristics of the scalabilities among ten target words?
RQ2-3: What are the characteristics of the scalabilities among twelve target words?

The method called "implicational scaling" examined the acquisition order of English spelling knowledge among Japanese high school students (Study 1) and university students (Study 2). The value of scalability was adequately high, which showed that the use of implicational scaling was appropriate in Study 1 and Study 2. The results showed that task difficulties reflect the acquisition order of English spelling among Japanese EFL learners.

Choosing the English words' correct meaning from the options was not difficult; however, writing the spellings of the words was difficult for the learners. Not surprisingly, spot dictation or sentence dictation is much more difficult than single word dictation. Overall, the use of implicational scaling was useful and appropriate to investigate performances in diagnostic tests.

Studies 1 and 2 were based on previous English spelling diagnostic tests. However, Studies 3, 4, and 5 used originally prepared test formats. Prior to the testing sessions in the experiments in Study 3, 4, and 5, tests to measure estimated vocabulary size were given to the participants, who were then grouped according to their performances.

Testing too many words in one experimental design seemed inappropriate for precisely measuring knowledge. Thus, the testing session in Study 3 contained 35 target words, Study 4 had 32 target words, and Study 5 used 33 target words: a total of 100 target words were included in the three studies. Finally, the results of the test performances on 93 words were analyzed for the studies.

RQ3-1: Do the types of six recall test formats affect spelling test performance?

RQ4-1: Do task difficulties of recall test formats differ between Study 3 and Study 4?

RQ5-1: Do task difficulties of recall test formats differ among Study 3, Study 4, and Study 5?

Several statistical methods (i.e., ANOVA, Pearson's Correlation, Spearman's Rank-order Correlation, and Factor Analysis) examined the differences among recall tests developed for the study. *RQ3-1* was from Study 3, *RQ4-1* was from Study 4, and *RQ5-1* was from Study 5.

The results of the tests showed that learners' whose English vocabulary size measured under the 2500 word-level underperformed compared to the results from those over the 2500 word-level. This result was consistent among Studies 3,

4, and 5. At this word-level, it seemed that learners' vocabulary knowledge of form and meaning was not completely acquired.

In contrast, learners exceeding the 2500 word-level performed well on recall tasks even though the tasks measured different aspects of vocabulary knowledge.

RQ3-2: Do the types of six recognition test formats affect spelling test performance?

RQ4-2: Do task difficulties of recognition test formats differ between Study 3 and Study 4?

RQ5-2: Do task difficulties of recognition test formats differ among Study 3, Study 4, and Study 5?

Several statistical methods (i.e., ANOVA, Pearson's Correlation, Spearman's Rank-order Correlation, and Factor Analysis) examined the differences among recognition tests developed for the study. *RQ3-2* was from Study 3, *RQ4-2* was from Study 4, and *RQ5-2* was from Study 5.

The results showed few differences among the recognition tasks: recognition test formats had a weak effect on vocabulary knowledge. Moreover, learners could recognize the words and response correctly independent of task differences.

RQ3-3: Are estimated vocabulary size and spelling test performance related?

RQ4-3: Are estimated vocabulary size and spelling test performance related compared to Study 3?

RQ5-3: Are estimated vocabulary size and spelling test performance related among Study 3, Study 4 and Study 5?

In order to answer this research question, we applied Pearson's Correlation. The results of correlation coefficients from three studies (i.e., Studies 3, 4, and 5), showed correlations among vocabulary size, and the recall tasks were higher compared to those among the recognition tasks. Through the three experiments, there were significant tendencies that most answered correctly on recognition tasks, regardless of vocabulary size.

In sum, estimated vocabulary size and the performances on the recall type tests were strongly related. It is not too much to say that estimated vocabulary size partly reflected test-takers' depth of vocabulary knowledge.

RQ3-4: What are the characteristics of the scalabilities among thirty-five target words?

RQ4-4: What are the characteristics of the scalabilities among thirty-two target words focusing on silent letters?

RQ5-4: What are the characteristics of the scalabilities among thirty-three target words from high school textbooks?

Implicational scaling examined the acquisition order of English spelling among Japanese university students according to the difficulties of the tasks. Study 1 and Study 2 also used this method: the results of those scalabilities were sufficient, which means that the use of implicational scaling to interpret the data was appropriate.

The target words in the present study were from lists of high school or junior high school textbooks: this implies that the words had been introduced prior to university. Thus, some words seemed too easy for some learners. However, the scalabilities of several words showed that using this method to interpret the data was appropriate.

Implicational scaling seemed to be appropriate for interpreting the task difficulties or the acquisition order of targeted items. From this analysis, test B (L2 sound to L2 spelling), J (L1 meaning to L2 sound), and L (L1 meaning to L2 spelling) were determined as the difficult recall tasks.

RQ3-5: Will diagnostic spelling tests categorize the test-takers?

RQ4-5: Are there any learners who can be categorized as poor-decoders, good-spellers, poor-comprehenders (D- S+ C-)?

RQ5-5: Are good-spellers (S+) always good-decoders, good-comprehenders (D+ C+)?

The learners were categorized according to their test performances especially on recall tests. *RQ3-5* was from Study 3 and the number of the participants was 71. *RQ4-5* was from Study 4 and the number of the participants was 44. *RQ5-5* was from Study 5 and the number of the participants was 34.

Overall, the diagnostic spelling tests developed for this research succeeded in categorizing the learners according to their vocabulary knowledge: Good-decoder, good-speller, good-comprehender (D+ S+ C+), Good-decoder, poor-speller, good-comprehender (D+ S- C+), Good-decoder, good-speller, poor-comprehender (D+ S+ C-), and Poor-decoder, poor-speller, poor-comprehender (D- S- C-). Only one participant (in Study 3) categorized as

D- S- C-. It seems that Poor Decoders are rare if the target words have been introduced in the past. Added to this, Good-spellers are always Good-comprehenders, and Poor-spellers are always Poor-comprehenders. Almost half of the participants were Poor-spellers; they need special treatment to acquire English spellings. There were no Good-spellers, Poor-comprehenders in the present study. It should be noted that there exists lack of sound-letter correspondence knowledge among Japanese EFL learners. If they have sound-letter correspondence knowledge, they can write the correct spellings without knowing the correct meanings of the words.

Comparing the results with multiple-choice testing (a recognition test), it can be said that learners who could not answer correctly on multiple-choice tests failed to write the correct spellings. As far as we can tell from the results, multiple-choice tests diagnose knowledge of English spellings.

8.2 Implications of the Study

In sum, some interesting findings were as follows: (a) detecting difficult test formats on recall tasks among Japanese EFL learners through specifically designed diagnostic tests, (b) showing the appropriateness of utilizing implicational scaling (Hatch & Lazaraton, 1991) to examine the task difficulties, and (c) categorizing learners' types with three aspects: decode, spell, and comprehend.

Findings of the present study have significant implications in Japanese EFL learners' vocabulary knowledge especially for spelling acquisition. Through the five experiments (Study 1 to Study 5), the results indicated that writing English spelling is difficult for EFL learners. In English speaking countries,

acquiring the form of correct spelling is one of the most difficult aspects in language acquisition. The same tendencies were found among EFL learners in the present study: some have same characteristics as native English speakers, such as the good reader-poor speller (R+ S-) problem.

In the present study, learners were categorized based on previous studies; however, the author rearranged the categories into eight types:

(1) Good-decoder, Good-comprehender, Good-speller (D+ C+ S+),

(2) Good-decoder, Good-comprehender, Poor-speller (D+ C+ S-),

(3) Good-decoder, Poor-comprehender Good-speller (D+ C- S+),

(4) Good-decoder, Poor-comprehender Poor-speller (D+ C- S-),

(5) Poor-decoder, Good-comprehender, Good-speller (D- C+ S+),

(6) Poor-decoder, Good-comprehender, Poor-speller (D- C+ S-),

(7) Poor-decoder, Poor-comprehender, Good-speller (D- C- S+),

(8) Poor-decoder, Poor-comprehender, Poor-speller (D- C- S-).

Through this detailed classification system, teachers will be able to identify learners' problems and to construct effective teaching method for helping learners to acquire English spellings.

8.3 Limitations and Suggestions For Future Research

This study examined Japanese EFL learners' spelling knowledge in detail with various types of tests. The approaches and methods used in this study were basically related to previous studies on diagnostic tests for assessing learners' English spelling knowledge. The results found from the present study seemed

valuable; however, we need to seek further effective ways to evaluate spelling knowledge.

First, the types of recognition tasks should be reexamined because it seemed that the recognition tests in the present study were somewhat easy for the test-takers. There is a way to combine some tests, which includes some aspects of vocabulary knowledge.

Second, we need to think practically of utilizing diagnostic tests developed in the present study to consider how to reduce the number of test formats or to use tools such as PCs or Web programs. Conducting ten to twelve tests in the classroom seems impractical in high schools or junior high schools.

Third, the number and the levels of the participants were limited. There is a need to admit the possibility that different levels of the learners might react differently compared to the present study. Further analysis is needed with the participants over the 4000 or 5000-word level.

The target words in this study had been introduced in their junior-high to high school days; however, it was still difficult and challenging for them to write correct spellings of the words. The results of this research indicated that lack of spelling knowledge in EFL learners is a crucial problem. Without correct spellings, we could not communicate through writing; therefore, we should not view spelling errors as minor.

The developed test formats in the present study still need revisions and modifications. However, the findings from this research shed light on developing diagnostic tests for English spellings among Japanese EFL learners.

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Appendices

Appendix 3A

<u>Test Items used in Study 1: Sound-letter correspondence test (word list)</u>

The list of basic regular words spelling (Mori, 2007, p.102)

<u>Consonant</u>

b	[b]	boy, job	**n**	[n]	night, train	**y**	[j]	yes	
d	[d]	day, sad	**p**	[p]	park, ship	**z**	[z]	zoo	
f	[f]	five, festival	**r**	[r]	rice, around	**ch**	[ʧ]	child, rich	
h	[h]	hall, behind	**s**	[s]	six, insist	**ck**	[k]	back	
j	[ʤ]	job, subject	**t**	[t]	time, hat	**dg**	[ʤ]	bridge	
k	[k]	kiss, book	**v**	[v]	very, love	**sh**	[ʃ]	shop, shine	
l	[l]	large, feel	**w**	[w]	week, away	**th**	[θ]	three, thing	
m	[m]	make, room	**x**	[ks]	six	**wh**	[hw/w]	why, when	
						ng	[ŋ]	king, sing	

<u>Vowel</u>

short vowel			long vowel and diphthong					
a	[æ]	cat, bad	**a**	[ei]	late, make	**er**	[əːr]	her, person
e	[e]	end, leg	**e**	[iː]	he	**ir**	[əːr]	first, girl
i	[i]	big, in	**i**	[ai]	white, write	**ur**	[əːr]	turn, Thursday
o	[ɑ/ɒ]	hot, lot	**o**	[ou]	home, old	**ar**	[ɑːr]	March, farm
u	[ʌ]	cut, must	**u**	[juː]	use, cute	**or**	[ɔːr]	morning
ea	[e]	head, heavy	**ea**	[iː]	eat, season			
oo	[u]	book, took	**oo**	[uː]	cool, food			
			ai	[ei]	rain, raise			
			ee	[iː]	feet, see			
			au	[ɔː]	caught, because			
			ou	[au]	about, round			
			oa	[ou]	coach			

Appendix 3B

Test Items used in Study 1: Story form

Story Form[1] <u>CLASS.   NO.   NAME.</u>

◆今から物語を読みます。空欄の箇所で聞こえた単語を書き取りなさい。

　　　Yesterday was Tom's (　　birthday　　). His family had a (　party　　) for him.
His mother cooked a special dinner. After dinner, his brother played the (　guitar　) and
his sister sang a song. Then his father gave him a present. It was a big box. In that box, he
(　found　) a (　piece　) of paper. It said, "Go to your room. Look under your bed. You
will see three bags. Your present is in one of them."

　　　Tom went into his room. There were three bags under his bed. He had to open all of
them (　before　) he saw his father's present ── a (　pair　) of basketball (　shoes　).
He was so happy (　because　) he (　wanted　) them very much.

Appendix 3C

Test Items used in Study 1: Timed dictation

Target words are underlined.

Timed dictation[2] <u>CLASS.   NO.   NAME.</u>

◆聞こえてきた文を書き取りなさい。2回発音します。

1	My <u>birthday</u> was last month.
2	Let's have a <u>party</u>.
3	I enjoy playing <u>guitar</u>.
4	He <u>found</u> his notebook.
5	It's a <u>piece</u> of cake.
6	Have I seen you <u>before</u>?
7	I want to buy a <u>pair</u> of glasses.
8	Put your <u>shoes</u> on!
9	She didn't come home <u>because</u> it was raining.
10	He <u>wanted</u> to see her every day.

Appendix 3D

<u>Test Items used in Study 1: List form</u>

List form[3]   <u>CLASS.</u>   <u>NO.</u>   <u>NAME.</u>

◆聞こえてきた単語を書き取りなさい。2回発音します。

1	birthday
2	found
3	before
4	piece
5	shoes
6	party
7	pair
8	because
9	wanted
10	guitar

Appendix 3E

Test Items used in Study 1: Multiple-choice

Answer keys are framed.

Multiple-choice[4]   <u>CLASS.   NO.   NAME.</u>

◆正しいつづりに○をつけなさい。

1	faund	faunnd	founed	found	founned
2	party	parly	parti	partty	purty
3	wantid	wontted	wanteed	wontid	wanted
4	pearr	pairr	pair	paiir	paair
5	barthdey	barthday	birthday	barsdey	birthdey
6	shoes	shooz	shoues	shouez	shoez
7	gitar	guitar	geitar	guitur	guittar
8	bicause	bicouse	becauz	because	becouse
9	piese	piece	peece	peese	pieece
10	beforre	bifour	befour	bifore	before

Appendix 3F

Test Items used in Study 1: Matching task

Matching task[5]

◆英単語と日本語の意味を，線を引いて結びつけなさい。

guitar	・	・	誕生日
shoes	・	・	1組，1対
birthday	・	・	欲しかった
party	・	・	～の前に
piece	・	・	ギター
found	・	・	なぜならば
wanted	・	・	パーティー
before	・	・	一片，ひと切れ
pair	・	・	見つけた
because	・	・	靴

Appendix 3G

Matrices for Study 1: Implicational scaling for target words (3G-1 and 3G-2)

ID	Accuracy	SF1	TD1	LF1	MC1	MT1	Total	Non-fit
1	30%	1	1	1	1	1	5	0
4	64%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
6	66%	1	1	1	1	1	5	0
7	57%	1	1	1	1	1	5	0
9	80%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
13	64%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
15	56%	1	1	1	1	1	5	0
17	61%	1	1	1	1	1	5	0
18	27%	1	1	1	1	1	5	0
19	67%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
21	53%	1	1	1	1	1	5	0
22	54%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
28	68%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
34	70%	1	1	1	1	1	5	0
35	69%	1	1	1	1	1	5	0
36	67%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
42	63%	1	1	1	1	1	5	0
43	50%	1	1	1	1	1	5	0
44	58%	1	1	1	1	1	5	0
45	64%	1	1	1	1	1	5	0
46	70%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
58	68%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
64	72%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
66	70%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
68	69%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
71	77%	1	1	1	1	1	5	0
73	69%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
75	58%	1	1	1	1	1	5	0
76	58%	1	1	1	1	1	5	0
77	64%	1	1	1	1	1	5	0
2	39%	1	0	1	1	1	4	2
3	69%	0	1	1	1	1	4	0
8	73%	1	0	1	1	1	4	2
30	71%	1	1	0	1	1	4	2
31	69%	1	0	1	1	1	4	2
39	78%	0	1	1	1	1	4	0
47	64%	1	0	1	1	1	4	2
51	72%	0	1	1	1	1	4	0
52	68%	1	0	1	1	1	4	2
57	70%	1	0	1	1	1	4	2
61	63%	0	0	1	1	1	3	0
78	69%	0	1	1	0	1	3	2
10	56%	1	0	0	0	1	2	2
16	34%	0	0	0	1	1	2	0
41	66%	0	0	0	1	1	2	2
49	63%	1	0	0	0	1	2	2
53	64%	0	0	0	1	1	2	0
72	71%	0	0	0	1	1	2	0
40	59%	0	0	0	0	1	1	0
50	40%	0	0	0	0	1	1	0
55	61%	0	0	0	0	1	1	0
Total		61	57	64	66	73	321	
Non-fit		9	7	2	4	0		22

ID	Accuracy	SF2	TD2	LF2	MC2	MT2	Total	Non-fit
1	30%	1	1	1	1	1	5	0
2	39%	1	1	1	1	1	5	0
4	64%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
6	66%	1	1	1	1	1	5	0
7	57%	1	1	1	1	1	5	0
9	80%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
13	64%	1	1	1	1	1	5	0
17	61%	1	1	1	1	1	5	0
18	27%	1	1	1	1	1	5	0
19	67%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
22	54%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
30	71%	1	1	1	1	1	5	0
31	69%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
34	70%	1	1	1	1	1	5	0
35	69%	1	1	1	1	1	5	0
36	67%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
39	78%	1	1	1	1	1	5	0
43	50%	1	1	1	1	1	5	0
45	64%	1	1	1	1	1	5	0
46	70%	1	1	1	1	1	5	0
49	63%	1	1	1	1	1	5	0
55	61%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
64	72%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
68	69%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
71	77%	1	1	1	1	1	5	0
72	71%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
75	58%	1	1	1	1	1	5	0
76	58%	1	1	1	1	1	5	0
77	64%	1	1	1	1	1	5	0
3	69%	1	1	1	0	1	4	2
8	73%	0	1	1	1	1	4	0
14	83%	0	1	1	1	1	4	0
28	68%	1	0	1	1	1	4	2
42	63%	0	1	1	1	1	4	0
47	64%	1	0	1	1	1	4	2
50	40%	1	1	1	0	1	4	2
51	72%	1	0	1	1	1	4	2
53	64%	1	0	1	1	1	4	2
57	70%	1	0	1	1	1	4	2
58	68%	1	0	1	1	1	4	2
66	70%	1	0	1	1	1	4	2
78	69%	0	1	1	1	1	4	0
10	56%	0	0	1	1	1	3	0
41	66%	0	0	1	1	1	3	0
16	34%	0	0	0	1	1	2	0
38	70%	0	0	0	1	1	2	0
40	59%	0	0	0	1	1	2	0
52	68%	0	0	0	1	1	2	0
62	81%	0	0	0	1	1	2	0
15	56%	0	0	0	0	1	1	0
21	53%	0	0	0	0	1	1	0
44	58%	0	0	0	0	1	1	0
61	63%	0	0	0	0	1	1	0
70	67%	0	0	0	0	1	1	0
73	69%	0	0	0	0	1	1	0
Total		56	53	62	65	73	309	
Non-fit		9	7	0	2	0		18

Appendix 3G-1. Scale for "because".   *Appendix 3G-2*. Scale for "before".

Matrices for Study 1: Implicational scaling for target words (3G-3 and 3G-4)

ID	Accuracy	SF3	TD3	LF3	MC3	MT3	Total	Non-fit
4	64%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
6	66%	1	1	1	1	1	5	0
9	80%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
13	64%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
19	67%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
21	53%	1	1	1	1	1	5	0
22	54%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
28	68%	1	1	1	1	1	5	0
30	71%	1	1	1	1	1	5	0
31	69%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
34	70%	1	1	1	1	1	5	0
35	69%	1	1	1	1	1	5	0
36	67%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
39	78%	1	1	1	1	1	5	0
42	63%	1	1	1	1	1	5	0
45	64%	1	1	1	1	1	5	0
46	70%	1	1	1	1	1	5	0
51	72%	1	1	1	1	1	5	0
52	68%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
57	70%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
61	63%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
64	72%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
66	70%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
71	77%	1	1	1	1	1	5	0
72	71%	1	1	1	1	1	5	0
73	69%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
75	58%	1	1	1	1	1	5	0
77	64%	1	1	1	1	1	5	0
78	69%	1	1	1	1	1	5	0
2	39%	1	1	1	0	1	4	2
3	69%	1	0	1	1	1	4	2
10	56%	1	1	1	0	1	4	2
17	61%	1	1	1	0	1	4	2
18	27%	1	0	1	1	1	4	2
40	59%	1	0	1	1	1	4	2
49	63%	1	1	1	0	1	4	2
53	64%	0	1	1	1	1	4	0
1	30%	0	0	0	1	1	2	0
7	57%	1	0	0	0	1	2	2
16	34%	0	0	0	1	1	2	0
41	66%	0	0	0	1	1	2	0
50	40%	0	0	0	1	1	2	0
55	61%	0	0	0	1	1	2	0
58	68%	0	0	0	1	1	2	0
68	69%	0	0	0	1	1	2	0
76	58%	0	0	0	1	1	2	0
8	73%	0	0	0	0	1	1	0
15	56%	0	0	0	0	1	1	0
43	50%	0	0	0	0	1	1	0
44	58%	0	0	0	0	1	1	0
47	64%	0	0	0	0	1	1	0
Total		59	56	59	63	73	310	
Non-fit		8	3	0	5	0		16

ID	Accuracy	SF4	TD4	LF4	MC4	MT4	Total	Non-fit
1	30%	1	1	1	1	1	5	0
2	39%	1	1	1	1	1	5	0
3	69%	1	1	1	1	1	5	0
4	64%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
7	57%	1	1	1	1	1	5	0
8	73%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
13	64%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
17	61%	1	1	1	1	1	5	0
18	27%	1	1	1	1	1	5	0
19	67%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
30	71%	1	1	1	1	1	5	0
31	69%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
34	70%	1	1	1	1	1	5	0
35	69%	1	1	1	1	1	5	0
36	67%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
39	78%	1	1	1	1	1	5	0
40	59%	1	1	1	1	1	5	0
41	66%	1	1	1	1	1	5	0
42	63%	1	1	1	1	1	5	0
51	72%	1	1	1	1	1	5	0
52	68%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
57	70%	1	1	1	1	1	5	0
58	68%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
68	69%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
72	71%	1	1	1	1	1	5	0
73	69%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
78	69%	1	1	1	1	1	5	0
6	66%	0	1	1	1	1	4	0
9	80%	1	1	1	0	1	4	2
10	56%	0	1	1	1	1	4	0
16	34%	1	1	1	1	0	4	2
21	53%	1	0	1	1	1	4	2
22	54%	1	1	1	1	0	4	2
46	70%	1	0	1	1	1	4	2
47	64%	0	1	1	1	1	4	0
64	72%	1	0	1	1	1	4	2
77	64%	0	1	1	1	1	4	0
24	69%	1	0	0	1	1	3	2
28	68%	0	1	1	0	1	3	2
44	58%	0	0	1	1	1	3	0
53	64%	0	1	0	1	1	3	2
66	70%	0	0	1	1	1	3	0
71	77%	1	0	0	1	1	3	2
43	50%	0	0	0	1	1	2	0
49	63%	0	0	0	1	1	2	0
50	40%	0	0	0	1	1	2	0
55	61%	0	0	0	1	1	2	0
15	56%	0	0	0	0	1	1	0
45	64%	0	0	0	1	0	1	2
61	63%	0	0	0	0	1	1	0
75	58%	0	0	0	0	1	1	0
76	58%	0	0	0	0	1	1	0
Total		56	57	61	67	70	311	
Non-fit		8	5	3	3	3		22

Appendix 3G-3. Scale for "birthday".   *Appendix 3G-4*. Scale for "found".

Matrices for Study 1: Implicational scaling for target words (3G-5 and 3G-6)

ID	Accuracy	SF5	TD5	LF5	MC5	MT5	Total	Non-fit
2	39%	1	1	1	1	1	5	0
4	64%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
6	66%	1	1	1	1	1	5	0
7	57%	1	1	1	1	1	5	0
9	80%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
18	27%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
22	54%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
28	68%	1	1	1	1	1	5	0
30	71%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
39	78%	1	1	1	1	1	5	0
41	66%	1	1	1	1	1	5	0
45	64%	1	1	1	1	1	5	0
47	64%	1	1	1	1	1	5	0
49	63%	1	1	1	1	1	5	0
51	72%	1	1	1	1	1	5	0
55	61%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
57	70%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
64	72%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
71	77%	1	1	1	1	1	5	0
72	71%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
77	64%	1	1	1	1	1	5	0
33	69%	1	0	1	1	1	4	2
40	59%	1	0	1	1	1	4	2
44	58%	0	1	1	1	1	4	0
58	68%	0	1	1	1	1	4	0
66	70%	0	1	1	1	1	4	0
52	68%	1	0	0	1	1	3	2
1	30%	0	0	0	1	1	2	0
13	64%	0	0	0	1	1	2	0
17	61%	0	0	0	1	1	2	0
19	67%	0	0	0	1	1	2	0
21	53%	0	0	0	1	1	2	0
31	69%	0	0	0	1	1	2	0
35	69%	0	0	0	1	1	2	0
36	67%	0	0	0	1	1	2	0
42	63%	0	0	0	1	1	2	0
43	50%	0	0	0	1	1	2	0
46	70%	0	0	0	1	1	2	0
50	40%	0	0	0	1	1	2	0
53	64%	0	0	0	1	1	2	0
61	63%	0	0	0	1	1	2	0
68	69%	0	0	0	1	1	2	0
69	73%	0	0	0	1	1	2	0
73	69%	0	0	0	1	1	2	0
75	58%	0	0	0	1	1	2	0
76	58%	0	0	0	1	1	2	0
78	69%	0	0	0	1	1	2	0
3	69%	0	0	0	0	1	1	0
8	73%	0	0	0	0	1	1	0
10	56%	0	0	0	0	1	1	0
15	56%	0	0	0	0	1	1	0
16	34%	0	0	0	0	1	1	0
34	70%	0	0	0	0	1	1	0
Total		44	44	46	67	73	274	
Non-fit		3	2	1	0	0		6

ID	Accuracy	SF6	TD6	LF6	MC6	MT6	Total	Non-fit
1	30%	1	1	1	1	1	5	0
2	39%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
6	66%	1	1	1	1	1	5	0
7	57%	1	1	1	1	1	5	0
8	73%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
15	56%	1	1	1	1	1	5	0
18	27%	1	1	1	1	1	5	0
19	67%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
30	71%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
35	69%	1	1	1	1	1	5	0
36	67%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
45	64%	1	1	1	1	1	5	0
52	68%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
58	68%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
64	72%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
66	70%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
68	69%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
13	64%	1	0	1	1	1	4	2
17	61%	1	0	1	1	1	4	2
27	70%	1	0	1	1	1	4	2
31	69%	0	1	1	1	1	4	0
41	66%	0	1	1	1	1	4	0
44	58%	0	1	1	1	1	4	0
49	63%	1	0	1	1	1	4	2
57	70%	1	0	1	1	1	4	2
70	67%	1	0	1	1	1	4	2
73	69%	0	1	1	1	1	4	0
76	58%	1	0	1	1	1	4	2
77	64%	1	1	0	1	1	4	2
3	69%	0	0	1	1	1	3	0
4	64%	0	0	1	1	1	3	0
9	80%	0	0	1	1	1	3	0
21	53%	0	0	1	1	1	3	0
22	54%	0	0	1	1	1	3	0
42	63%	0	0	1	1	1	3	0
47	64%	0	0	1	1	1	3	0
50	40%	0	0	1	1	1	3	0
51	72%	0	0	1	1	1	3	0
62	81%	0	0	1	1	1	3	0
71	77%	0	0	1	1	1	3	0
75	58%	0	0	1	1	1	3	0
78	69%	0	0	1	1	1	3	0
10	56%	0	0	0	1	1	2	0
16	34%	0	0	0	1	1	2	0
28	68%	0	0	0	1	1	2	0
34	70%	0	0	0	1	1	2	0
39	78%	0	0	0	1	1	2	0
40	59%	0	0	0	1	1	2	0
43	50%	0	0	0	1	1	2	0
46	70%	0	0	0	1	1	2	0
53	64%	0	0	0	1	1	2	0
55	61%	0	0	0	1	1	2	0
61	63%	0	0	0	1	1	2	0
72	71%	0	0	0	1	1	2	0
Total		44	41	60	73	73	291	
Non-fit		8	7	1	0	0		16

Appendix 3G-5. Scale for "guitar".

Appendix 3G-6. Scale for "pair".

Matrices for Study 1: Implicational scaling for target words (3G-7 and 3G-8)

ID	Accuracy	SF7	TD7	LF7	MC7	MT7	Total	Non-fit
1	30%	1	1	1	1	1	5	0
2	39%	1	1	1	1	1	5	0
5	57%	1	1	1	1	1	5	0
9	80%	1	1	1	1	1	5	0
11	60%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
15	56%	1	1	1	1	1	5	0
17	61%	1	1	1	1	1	5	0
18	27%	1	1	1	1	1	5	0
19	67%	1	1	1	1	1	5	0
20	73%	1	1	1	1	1	5	0
21	53%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
28	68%	1	1	1	1	1	5	0
30	71%	1	1	1	1	1	5	0
32	72%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
34	70%	1	1	1	1	1	5	0
35	69%	1	1	1	1	1	5	0
36	67%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
39	78%	1	1	1	1	1	5	0
40	59%	1	1	1	1	1	5	0
42	63%	1	1	1	1	1	5	0
44	58%	1	1	1	1	1	5	0
45	64%	1	1	1	1	1	5	0
46	70%	1	1	1	1	1	5	0
47	64%	1	1	1	1	1	5	0
49	63%	1	1	1	1	1	5	0
51	72%	1	1	1	1	1	5	0
53	64%	1	1	1	1	1	5	0
56	84%	1	1	1	1	1	5	0
57	70%	1	1	1	1	1	5	0
58	68%	1	1	1	1	1	5	0
59	76%	1	1	1	1	1	5	0
60	74%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
63	77%	1	1	1	1	1	5	0
64	72%	1	1	1	1	1	5	0
65	82%	1	1	1	1	1	5	0
66	70%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
71	77%	1	1	1	1	1	5	0
72	71%	1	1	1	1	1	5	0
73	69%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
75	58%	1	1	1	1	1	5	0
76	58%	1	1	1	1	1	5	0
78	69%	1	1	1	1	1	5	0
3	69%	1	1	0	1	1	4	2
6	66%	0	1	1	1	1	4	0
10	56%	0	1	1	1	1	4	0
13	64%	1	1	0	1	1	4	2
22	54%	1	0	1	1	1	4	2
26	71%	0	1	1	1	1	4	0
31	69%	1	1	0	1	1	4	2
41	66%	0	1	1	1	1	4	0
43	50%	1	1	1	0	1	4	2
52	68%	1	0	1	1	1	4	2
61	63%	1	0	1	1	1	4	2
68	69%	0	1	1	1	1	4	0
7	57%	1	0	0	1	1	3	2
8	73%	0	1	1	0	1	3	2
55	61%	0	0	0	1	1	2	0
77	64%	0	0	0	1	1	2	0
4	64%	0	0	0	0	1	1	0
16	34%	0	0	0	0	1	1	0
50	40%	0	0	0	0	1	1	0
Total		62	64	64	68	73	331	
Non-fit		8	4	4	2	0		18

ID	Accuracy	SF8	TD8	LF8	MC8	MT8	Total	Non-fit
6	66%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
38	70%	1	1	1	1	1	5	0
39	78%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
2	39%	1	1	0	1	1	4	2
4	64%	1	0	1	1	1	4	2
31	69%	0	1	1	1	1	4	0
78	69%	0	1	1	1	1	4	0
1	30%	0	0	1	1	1	3	0
3	69%	0	0	1	1	1	3	0
5	57%	0	0	1	1	1	3	0
7	57%	0	0	1	1	1	3	0
8	73%	0	0	1	1	1	3	0
13	64%	0	0	1	1	1	3	0
14	83%	0	1	0	1	1	3	2
18	27%	0	0	1	1	1	3	0
19	67%	0	0	1	1	1	3	0
24	69%	0	0	1	1	1	3	0
26	71%	0	0	1	1	1	3	0
27	70%	0	0	1	1	1	3	0
30	71%	0	0	1	1	1	3	0
33	69%	0	0	1	1	1	3	0
35	69%	0	0	1	1	1	3	0
36	67%	0	0	1	1	1	3	0
40	59%	0	0	1	1	1	3	0
41	66%	0	0	1	1	1	3	0
45	64%	0	0	1	1	1	3	0
47	64%	0	0	1	1	1	3	0
49	63%	0	0	1	1	1	3	0
52	68%	0	0	1	1	1	3	0
53	64%	0	0	1	1	1	3	0
56	84%	0	0	1	1	1	3	0
57	70%	0	0	1	1	1	3	0
59	76%	0	0	1	1	1	3	0
61	63%	0	0	1	1	1	3	0
63	77%	0	0	1	1	1	3	0
68	69%	0	0	1	1	1	3	0
69	73%	0	0	1	1	1	3	0
73	69%	0	0	1	1	1	3	0
74	87%	0	0	1	1	1	3	0
75	58%	0	0	1	1	1	3	0
77	64%	0	0	1	1	1	3	0
11	60%	0	0	0	1	1	2	0
12	76%	0	0	0	1	1	2	0
15	56%	0	0	0	1	1	2	0
16	34%	0	0	0	1	1	2	0
17	61%	0	0	0	1	1	2	0
21	53%	0	0	0	1	1	2	0
22	54%	0	0	0	1	1	2	0
28	68%	0	0	1	0	1	2	2
32	72%	0	0	0	1	1	2	0
34	70%	0	0	0	1	1	2	0
42	63%	0	0	0	1	1	2	0
43	50%	0	0	0	1	1	2	0
44	58%	0	0	0	1	1	2	0
46	70%	0	0	0	1	1	2	0
50	40%	0	0	0	1	1	2	0
51	72%	0	0	0	1	1	2	0
55	61%	0	0	0	1	1	2	0
58	68%	0	0	0	1	1	2	0
60	74%	0	0	1	0	1	2	2
64	72%	0	0	0	1	1	2	0
65	82%	0	0	0	1	1	2	0
71	77%	0	0	1	0	1	2	2
76	58%	0	0	1	0	1	2	2
9	80%	0	0	0	0	1	1	0
10	56%	0	0	0	0	1	1	0
20	73%	0	0	0	0	1	1	0
66	70%	0	0	0	0	1	1	0
72	71%	0	0	0	0	1	1	0
Total		9	11	47	64	73	204	
Non-fit		2	2	6	4	0		14

Appendix 3G-7. Scale for "party".   *Appendix 3G-8*. Scale for "piece".

Matrices for Study 1: Implicational scaling for target words (3G-9 and 3G-10)

ID	Accuracy	SF9	TD9	LF9	MC9	MT9	Total	Non-fit
7	57%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
17	61%	1	1	1	1	1	5	0
26	71%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
78	69%	1	1	1	1	1	5	0
6	66%	0	1	1	1	1	4	0
56	84%	0	1	1	1	1	4	0
63	77%	1	1	0	1	1	4	2
67	84%	0	1	1	1	1	4	0
2	39%	0	0	1	1	1	3	0
32	72%	1	0	0	1	1	3	2
58	68%	0	0	1	1	1	3	0
65	82%	0	0	1	1	1	3	0
66	70%	0	1	0	1	1	3	2
1	30%	0	0	0	1	1	2	0
3	69%	0	0	0	1	1	2	0
8	73%	0	0	0	1	1	2	0
9	80%	0	0	0	1	1	2	0
16	34%	0	0	0	1	1	2	0
18	27%	0	0	0	1	1	2	0
19	67%	0	0	0	1	1	2	0
22	54%	0	0	0	1	1	2	0
24	69%	0	0	0	1	1	2	0
27	70%	0	0	0	1	1	2	0
30	71%	0	0	0	1	1	2	0
38	70%	0	0	1	0	1	2	2
39	78%	0	0	0	1	1	2	0
40	59%	0	0	0	1	1	2	0
41	66%	0	0	0	1	1	2	0
42	63%	0	0	0	1	1	2	0
43	50%	0	0	0	1	1	2	0
45	64%	0	0	0	1	1	2	0
46	70%	0	0	0	1	1	2	0
49	63%	0	0	0	1	1	2	0
51	72%	0	0	0	1	1	2	0
53	64%	0	0	0	1	1	2	0
57	70%	0	0	0	1	1	2	0
59	76%	0	0	0	1	1	2	0
60	74%	0	0	0	1	1	2	0
62	81%	0	0	0	1	1	2	0
64	72%	0	0	0	1	1	2	0
68	69%	0	0	0	1	1	2	0
71	77%	0	0	0	1	1	2	0
75	58%	0	0	0	1	1	2	0
76	58%	0	0	0	1	1	2	0
4	64%	0	0	0	0	1	1	0
5	57%	0	0	0	0	1	1	0
10	56%	0	0	0	0	1	1	0
11	60%	0	0	0	0	1	1	0
12	76%	0	0	0	0	1	1	0
13	64%	0	0	0	0	1	1	0
15	56%	0	0	0	0	1	1	0
20	73%	0	0	0	0	1	1	0
21	53%	0	0	0	0	1	1	0
28	68%	0	0	0	0	1	1	0
31	69%	0	0	0	0	1	1	0
34	70%	0	0	0	0	1	1	0
35	69%	0	0	0	0	1	1	0
36	67%	0	0	0	0	1	1	0
44	58%	0	0	0	0	1	1	0
47	64%	0	0	0	0	1	1	0
50	40%	0	0	0	0	1	1	0
52	68%	0	0	0	0	1	1	0
55	61%	0	0	0	0	1	1	0
61	63%	0	0	0	0	1	1	0
69	73%	0	0	0	0	1	1	0
72	71%	0	0	0	0	1	1	0
73	69%	0	0	0	0	1	1	0
77	64%	0	0	0	0	1	1	0
Total		11	14	16	48	73	162	
Non-fit		2	1	4	1	0		8

ID	Accuracy	SF10	TD10	LF10	MC10	MT10	Total	Non-fit
6	66%	1	1	1	1	1	5	0
12	76%	1	1	1	1	1	5	0
14	83%	1	1	1	1	1	5	0
21	53%	1	1	1	1	1	5	0
24	69%	1	1	1	1	1	5	0
27	70%	1	1	1	1	1	5	0
33	69%	1	1	1	1	1	5	0
34	70%	1	1	1	1	1	5	0
37	71%	1	1	1	1	1	5	0
62	81%	1	1	1	1	1	5	0
66	70%	1	1	1	1	1	5	0
67	84%	1	1	1	1	1	5	0
69	73%	1	1	1	1	1	5	0
70	67%	1	1	1	1	1	5	0
73	69%	1	1	1	1	1	5	0
74	87%	1	1	1	1	1	5	0
1	30%	0	1	1	1	1	4	0
3	69%	1	0	1	1	1	4	2
5	57%	0	1	1	1	1	4	0
9	80%	0	1	1	1	1	4	0
10	56%	0	1	1	1	1	4	0
11	60%	0	1	1	1	1	4	0
13	64%	0	1	1	1	1	4	
15	56%	0	1	1	1	1	4	0
17	61%	0	1	1	1	1	4	0
18	27%	1	1	0	1	1	4	2
19	67%	1	0	1	1	1	4	2
22	54%	1	0	1	1	1	4	2
26	71%	0	1	1	1	1	4	0
30	71%	1	0	1	1	1	4	2
31	69%	1	0	1	1	1	4	2
32	72%	1	0	1	1	1	4	2
35	69%	0	1	1	1	1	4	0
36	67%	0	1	1	1	1	4	0
39	78%	0	1	1	1	1	4	0
40	59%	0	1	1	1	1	4	0
41	66%	0	1	1	1	1	4	0
44	58%	0	1	1	1	1	4	0
45	64%	0	1	1	1	1	4	0
46	70%	0	1	1	1	1	4	0
49	63%	0	1	1	1	1	4	0
51	72%	0	1	1	1	1	4	0
53	64%	0	1	1	1	1	4	0
55	61%	0	1	1	1	1	4	0
56	84%	0	1	1	1	1	4	0
57	70%	0	1	1	1	1	4	0
58	68%	0	1	1	1	1	4	0
59	76%	0	1	1	1	1	4	0
61	63%	0	1	1	1	1	4	0
63	77%	0	1	1	1	1	4	0
65	82%	0	1	1	1	1	4	0
72	71%	0	1	1	1	1	4	0
77	64%	0	1	1	1	1	4	0
2	39%	0	0	1	1	1	3	0
7	57%	0	0	1	1	1	3	0
8	73%	0	0	1	1	1	3	0
20	73%	0	0	1	1	1	3	0
28	68%	0	1	1	0	1	3	2
38	70%	0	0	1	1	1	3	0
42	63%	0	1	1	1	0	3	2
43	50%	0	0	1	1	1	3	0
52	68%	0	0	1	1	1	3	0
60	74%	0	0	1	1	1	3	0
64	72%	0	0	1	1	1	3	0
68	69%	0	0	1	1	1	3	0
75	58%	0	0	1	1	1	3	0
76	58%	0	0	1	1	1	3	0
16	34%	0	0	1	1	0	2	2
47	64%	0	0	0	1	1	2	0
50	40%	0	0	0	1	1	2	0
71	77%	0	0	1	0	1	2	2
78	69%	0	0	0	1	1	2	0
4	64%	0	0	0	0	1	1	0
Total		23	49	68	70	71	281	
Non-fit		7	8	3	2	2		22

Appendix 3G-9. Scale for "shoes".   *Appendix 3G-10.* Scale for "wanted".

Appendix 4A

Test Items used in Study 2: Story form

Story Form[1]　　　　　　　　　　CLASS.　　　NO.　　　NAME.

◆今から物語を読みます。空欄の箇所で聞こえた単語を書き取りなさい。

　　（　Recently　）, more and more people are （　buying　） things from mail-order catalogs. One reason is that there is a （　wider　） （　choice　） of （　products　） （　compared　） with some stores. Some people, however, feel it takes too long （　before　） the ordered item is （　delivered　）. （　Still　）, many people find it more （　convenient　） to shop from their own homes （　rather　） than go to （　crowded　） stores.

Appendix 4B

Test Items used in Study 2: Timed dictation

Target words are underlined.

Timed dictation[2]　　　　　　　　CLASS.　　　NO.　　　NAME.

◆聞こえてきた文を書き取りなさい。2回発音します。

1	Recently a Web site was set up for this company
2	More and more women are buying chocolate.
3	English sound system is wider than Japanese sound system.
4	You make your choice, you know.

5	Now you can buy our <u>products</u> online.
6	<u>Compared</u> to high school, they really are very strict.
7	<u>Before</u> she came to Japan, Sara studied Japanese.
8	Mail is <u>delivered</u> every day except Sunday.
9	He <u>still</u> cannot speak Japanese.
10	It is very <u>convenient</u> for exchange students.
11	It's <u>rather</u> difficult to say.
12	I was on a <u>crowded</u> train in Tokyo at that time.

Appendix 4C

<u>Test Items used in Study 2: List form</u>

List form[3]   <u>CLASS.   NO.   NAME.</u>

◆聞こえてきた単語を書き取りなさい。2回発音します。

1	recently
2	buying
3	wider
4	choice
5	products
6	compared
7	before
8	delivered
9	still
10	convenient
11	rather
12	crowded

Appendix 4D

Test Items used in Study 2: Multiple-choice

Answer keys are framed.

Multiple-choice[4]   CLASS.   NO.   NAME.

◆正しいつづりに○をつけなさい。

1	recently	resentory	recentry	resentry	resently
2	baing	buyng	bying	bineg	buying
3	whyder	wider	wyther	widther	waider
4	choies	choise	choys	choice	chois
5	prodacts	products	productes	prodactes	ploducts
6	compared	conpered	compered	conpeard	conpaird
7	befor	bifore	before	befour	bifour
8	derivered	delibared	delibered	delivered	delivored
9	still	stil	stel	stell	steell
10	convinient	combinient	comvinient	conbinient	convenient
11	rader	rather	ruther	lather	lader
12	clowded	crouded	crowded	cllowded	crauded

Appendix 4E

Test Items used in Study 2: Translation task

Translation task[5]

◆英単語の意味を，日本語で書きなさい。

1	recently	最近，近年
2	buying	買う，買うこと
3	wider	より広い，広く
4	choice	選択，選ぶこと
5	products	農産物，生産品，製品
6	compared	比較した，対比する
7	before	～する前に，～より前に
8	delivered	配達された，送られた
9	still	まだ，今もなお，さらに
10	convenient	便利な，使いやすい，都合の良い
11	rather	どちらかといえば，むしろ，かなり，だいぶ
12	crowded	混雑した，いっぱいの，混み合った

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Appendix 4F

<u>Test Items used in Study 2: Matching task</u>

Matching task[6]

◆英単語と日本語の意味を，線を引いて結びつけなさい。

recently	・	・　便利な，使いやすい
buying	・	・　〜よりはむしろ
wider	・	・　最近，近頃，近年
choice	・	・　届けられた，配達された
products	・	・　〜を買う，買うこと
compared	・	・　〜より前に
before	・	・　選択，選ぶこと
delivered	・	・　幅広い
still	・	・　比較された
convenient	・	・　生産物，生産品，製品
rather	・	・　混雑した，混み合った
crowded	・	・　まだ，今でもまだ

Matrices for Study 2: Implicational scaling for target words (4G-1 and 4G-2)

ID	Mo_T	SF1	TD1	LF1	TT1	MC1	MT1	Total	Non-fit
1	2000	1	1	1	1	1	1	6	0
3	2923	1	1	1	1	1	1	6	0
4	1808	1	1	1	1	1	1	6	0
6	2231	1	1	1	1	1	1	6	0
7	2615	1	1	1	1	1	1	6	0
8	2385	1	1	1	1	1	1	6	0
9	2462	1	1	1	1	1	1	6	0
11	2423	1	1	1	1	1	1	6	0
12	2500	1	1	1	1	1	1	6	0
13	2308	1	1	1	1	1	1	6	0
17	2538	1	1	1	1	1	1	6	0
19	1654	1	1	1	1	1	1	6	0
20	2538	1	1	1	1	1	1	6	0
21	2385	1	1	1	1	1	1	6	0
24	2154	1	1	1	1	1	1	6	0
25	2731	1	1	1	1	1	1	6	0
26	2654	1	1	1	1	1	1	6	0
27	2038	1	1	1	1	1	1	6	0
29	2654	1	1	1	1	1	1	6	0
31	2500	1	1	1	1	1	1	6	0
34	1769	1	1	1	1	1	1	6	0
38	3000	1	1	1	1	1	1	6	0
39	2808	1	1	1	1	1	1	6	0
41	2000	1	1	1	1	1	1	6	0
43	2385	1	1	1	1	1	1	6	0
44	1962	1	1	1	1	1	1	6	0
45	1692	1	1	1	1	1	1	6	0
46	2538	1	1	1	1	1	1	6	0
47	3308	1	1	1	1	1	1	6	0
48	2923	1	1	1	1	1	1	6	0
49	2923	1	1	1	1	1	1	6	0
51	2577	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
53	2846	1	1	1	1	1	1	6	0
55	2846	1	1	1	1	1	1	6	0
56	2692	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
63	3462	1	1	1	1	1	1	6	0
65	3385	1	1	1	1	1	1	6	0
66	2808	1	1	1	1	1	1	6	0
67	2538	1	1	1	1	1	1	6	0
68	3692	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
70	2769	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
73	3462	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
76	2308	1	1	1	1	1	1	6	0
77	3038	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
79	3500	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
84	2423	1	1	1	1	1	1	6	0
85	2962	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
88	2846	1	1	1	1	1	1	6	0
89	2731	1	1	1	1	1	1	6	0
91	1769	1	1	1	1	1	1	6	0
95	3038	1	1	1	1	1	1	6	0
5	2269	1	1	1	0	1	1	5	2
16	2731	1	0	1	1	1	1	5	2
30	2154	1	1	1	1	0	1	5	2
33	2192	1	1	1	0	1	1	5	2
36	1962	1	1	1	0	1	1	5	2
42	2423	1	1	1	0	1	1	5	2
50	2538	1	1	1	0	1	1	5	2
90	2077	1	0	1	1	1	1	5	2
92	3346	0	1	1	1	1	1	5	0
10	1423	0	0	1	1	0	1	3	2
14	2385	0	0	0	1	1	1	3	0
15	1769	1	1	0	0	0	1	3	4
18	1846	0	0	0	1	1	1	3	0
35	2346	0	0	0	1	1	1	3	0
23	1923	0	0	0	1	0	1	2	2
32	2038	0	0	0	0	1	1	2	2
Total		77	76	78	79	78	84	472	
Non-fit		9	3	1	7	6	0		26

Appendix 4G-1. Scale for "before".

ID	Mo_T	SF2	TD2	LF2	TT2	MC2	MT2	Total	Non-fit
3	2923	1	1	1	1	1	1	6	0
5	2269	1	1	1	1	1	1	6	0
10	1423	1	1	1	1	1	1	6	0
11	2423	1	1	1	1	1	1	6	0
13	2308	1	1	1	1	1	1	6	0
16	2731	1	1	1	1	1	1	6	0
21	2385	1	1	1	1	1	1	6	0
25	2731	1	1	1	1	1	1	6	0
26	2654	1	1	1	1	1	1	6	0
29	2654	1	1	1	1	1	1	6	0
38	3000	1	1	1	1	1	1	6	0
46	2538	1	1	1	1	1	1	6	0
47	3308	1	1	1	1	1	1	6	0
50	2538	1	1	1	1	1	1	6	0
51	2577	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
55	2846	1	1	1	1	1	1	6	0
56	2692	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
63	3462	1	1	1	1	1	1	6	0
65	3385	1	1	1	1	1	1	6	0
67	2538	1	1	1	1	1	1	6	0
68	3692	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
70	2769	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
73	3462	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
76	2308	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
79	3500	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
85	2962	1	1	1	1	1	1	6	0
88	2846	1	1	1	1	1	1	6	0
90	2077	1	1	1	1	1	1	6	0
91	1769	1	1	1	1	1	1	6	0
92	3346	1	1	1	1	1	1	6	0
95	3038	1	1	1	1	1	1	6	0
8	2385	1	1	1	0	1	1	5	2
17	2538	1	0	1	1	1	1	5	2
24	2154	1	0	1	1	1	1	5	2
31	2500	1	1	1	0	1	1	5	2
33	2192	0	1	1	1	1	1	5	0
41	2000	1	0	1	1	1	1	5	2
43	2385	1	1	1	1	0	1	5	2
53	2846	1	0	1	1	1	1	5	2
60	2846	0	1	1	1	1	1	5	0
62	3577	0	1	1	1	1	1	5	0
66	2808	0	1	1	1	1	1	5	0
74	2846	1	1	1	1	0	1	5	2
77	3038	1	1	0	1	1	1	5	2
86	3808	1	0	1	1	1	1	5	2
89	2731	1	1	1	0	1	1	5	2
4	1808	0	0	1	1	1	1	4	0
20	2538	0	0	1	1	1	1	4	0
27	2038	0	0	1	1	1	1	4	0
35	2346	0	0	1	1	1	1	4	0
36	1962	0	0	1	1	1	1	4	0
45	1692	0	0	1	1	1	1	4	0
48	2923	0	0	1	0	1	1	4	2
84	2423	0	0	1	1	1	1	4	0
1	2000	0	0	0	1	1	1	3	0
9	2462	0	0	0	1	0	1	3	2
12	2500	0	0	0	1	1	1	3	0
14	2385	0	0	0	1	1	1	3	0
15	1769	0	0	0	1	1	1	3	0
19	1654	0	0	0	1	1	1	3	0
34	1769	0	0	1	0	1	1	3	2
39	2808	0	0	0	1	1	1	3	0
42	2423	0	0	0	1	1	1	3	0
44	1962	0	1	0	1	0	1	3	2
49	2923	0	0	0	1	1	1	3	0
6	2231	0	0	0	0	1	1	2	0
7	2615	0	0	0	1	0	1	2	2
23	1923	0	0	0	0	1	1	2	0
30	2154	0	0	0	0	1	1	2	0
32	2038	0	0	0	0	1	1	2	0
18	1846	0	0	0	0	0	1	1	0
Total		55	56	67	75	78	84	415	
Non-fit		11	7	4	5	5	0		32

Appendix 4G-2. Scale for "buying".

Matrices for Study 2: Implicational scaling for target words (4G-3 and 4G-4)

ID	Mo_T	SF3	TD3	LF3	TT3	MC3	MT3	Total	Non-fit
1	2000	1	1	1	1	1	1	6	0
9	2462	1	1	1	1	1	1	6	0
12	2500	1	1	1	1	1	1	6	0
16	2731	1	1	1	1	1	1	6	0
23	1923	1	1	1	1	1	1	6	0
34	1769	1	1	1	1	1	1	6	0
35	2346	1	1	1	1	1	1	6	0
38	3000	1	1	1	1	1	1	6	0
39	2808	1	1	1	1	1	1	6	0
42	2423	1	1	1	1	1	1	6	0
43	2385	1	1	1	1	1	1	6	0
44	1962	1	1	1	1	1	1	6	0
47	3308	1	1	1	1	1	1	6	0
50	2538	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
53	2846	1	1	1	1	1	1	6	0
55	2846	1	1	1	1	1	1	6	0
56	2692	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
63	3462	1	1	1	1	1	1	6	0
65	3385	1	1	1	1	1	1	6	0
66	2808	1	1	1	1	1	1	6	0
67	2538	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
77	3038	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
79	3500	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
84	2423	1	1	1	1	1	1	6	0
85	2962	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
88	2846	1	1	1	1	1	1	6	0
89	2731	1	1	1	1	1	1	6	0
90	2077	1	1	1	1	1	1	6	0
91	1769	1	1	1	1	1	1	6	0
4	1808	1	0	1	1	1	1	5	2
15	1769	1	1	1	1	0	1	5	2
31	2500	1	1	1	1	0	1	5	2
69	3038	1	1	1	1	0	1	5	2
73	3462	0	1	1	1	1	1	5	0
3	2923	0	0	1	1	1	1	4	0
7	2615	1	0	0	1	1	1	4	2
11	2423	0	0	1	1	1	1	4	0
13	2308	0	0	1	1	1	1	4	0
17	2538	0	0	1	1	1	1	4	0
20	2538	1	1	0	1	0	1	4	4
24	2154	1	1	0	1	0	1	4	4
27	2038	0	0	1	1	1	1	4	0
32	2038	0	1	1	1	0	1	4	2
41	2000	0	1	1	1	0	1	4	2
46	2538	1	0	0	1	1	1	4	2
5	2269	0	0	1	1	0	1	3	2
6	2231	0	0	0	1	1	1	3	0
14	2385	0	0	0	1	1	1	3	0
30	2154	0	0	0	1	1	1	3	0
36	1962	0	0	0	1	1	1	3	0
49	2923	0	0	0	1	1	1	3	0
68	3692	1	0	0	1	0	1	3	2
71	3154	0	0	0	1	1	1	3	0
72	3038	0	1	0	1	0	1	3	2
8	2385	0	0	0	1	0	1	2	2
10	1423	0	0	0	1	0	1	2	2
18	1846	0	0	0	1	0	1	2	2
19	1654	0	0	0	1	0	1	2	2
21	2385	0	0	0	1	0	1	2	2
25	2731	0	0	0	1	0	1	2	2
26	2654	0	0	0	1	0	1	2	2
29	2654	0	0	0	1	0	1	2	2
33	2192	0	0	0	1	0	1	2	2
45	1692	0	0	0	1	0	1	2	2
48	2923	0	0	0	1	0	1	2	2
51	2577	0	0	0	1	0	1	2	2
70	2769	0	0	0	1	0	1	2	2
76	2308	0	0	0	1	0	1	2	2
92	3346	0	0	0	1	0	1	2	2
95	3038	0	0	0	1	0	1	2	2
Total		52	52	56	84	58	84	386	
Non-fit		9	6	5	16	26	0		62

Appendix 4G-3. Scale for "choice".

ID	Mo_T	SF4	TD4	LF4	TT4	MC4	MT4	Total	Non-fit
3	2923	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
49	2923	1	1	1	0	1	1	5	2
65	3385	0	1	1	1	1	1	5	0
66	2808	0	1	1	1	1	1	5	0
80	3077	0	1	1	1	1	1	5	0
85	2962	1	1	1	0	1	1	5	2
86	3808	1	1	0	1	1	1	5	2
95	3038	0	1	1	1	1	1	5	0
47	3308	0	1	0	1	1	1	4	2
50	2538	1	1	0	0	1	1	4	4
57	3077	0	1	1	0	1	1	4	2
62	3577	0	1	0	1	1	1	4	2
63	3462	0	1	1	0	1	1	4	2
67	2538	0	1	0	1	1	1	4	2
68	3692	0	1	0	1	1	1	4	2
77	3038	0	1	0	1	1	1	4	2
91	1769	1	1	0	0	1	1	4	4
55	2846	0	0	1	1	0	1	3	2
56	2692	0	0	0	1	1	1	3	0
58	3769	0	0	0	1	1	1	3	0
72	3038	0	0	0	1	1	1	3	0
73	3462	0	0	0	1	1	1	3	0
83	3346	0	0	0	1	1	1	3	0
84	2423	0	1	1	0	1	0	3	4
9	2462	0	0	0	0	1	1	2	0
12	2500	0	0	0	0	1	1	2	0
17	2538	0	0	0	0	1	1	2	0
25	2731	0	0	0	0	1	1	2	0
26	2654	0	0	0	0	1	1	2	0
27	2038	0	0	0	0	1	1	2	0
29	2654	0	0	0	1	0	1	2	2
31	2500	0	0	0	0	1	1	2	0
38	3000	0	1	0	0	1	0	2	2
39	2808	0	0	0	0	1	1	2	0
42	2423	0	0	0	0	1	1	2	0
46	2538	0	0	0	0	1	1	2	0
48	2923	0	0	1	0	0	1	2	2
51	2577	0	0	0	1	0	1	2	2
60	2846	0	0	0	0	1	1	2	0
78	3346	0	0	0	1	0	1	2	2
79	3500	0	0	0	1	0	1	2	2
89	2731	0	0	0	1	0	1	2	2
92	3346	0	0	1	0	0	1	2	2
5	2269	0	0	0	0	1	0	1	2
7	2615	0	0	0	0	0	1	1	0
8	2385	0	0	0	0	1	0	1	2
10	1423	0	0	0	0	0	1	1	0
11	2423	0	0	0	0	0	1	1	0
16	2731	0	0	0	0	1	0	1	2
20	2538	0	0	0	0	1	0	1	2
33	2192	0	0	0	0	1	0	1	2
35	2346	0	0	0	0	0	1	1	0
36	1962	0	0	0	0	1	0	1	2
43	2385	0	0	0	0	1	0	1	2
45	1692	0	0	0	0	0	1	1	0
70	2769	0	0	0	0	0	1	1	0
71	3154	0	0	0	0	0	1	1	0
74	2846	0	0	0	0	0	1	1	0
76	2308	0	0	0	0	0	1	1	0
88	2846	0	0	0	0	0	1	1	0
90	2077	0	0	0	0	0	1	1	0
1	2000	0	0	0	0	0	0	0	0
4	1808	0	0	0	0	0	0	0	0
6	2231	0	0	0	0	0	0	0	0
13	2308	0	0	0	0	0	0	0	0
14	2385	0	0	0	0	0	0	0	0
15	1769	0	0	0	0	0	0	0	0
18	1846	0	0	0	0	0	0	0	0
19	1654	0	0	0	0	0	0	0	0
21	2385	0	0	0	0	0	0	0	0
23	1923	0	0	0	0	0	0	0	0
24	2154	0	0	0	0	0	0	0	0
30	2154	0	0	0	0	0	0	0	0
32	2038	0	0	0	0	0	0	0	0
34	1769	0	0	0	0	0	0	0	0
41	2000	0	0	0	0	0	0	0	0
44	1962	0	0	0	0	0	0	0	0
53	2846	0	0	0	0	0	0	0	0
Total		12	25	19	28	48	58	190	
Non-fit		5	11	12	12	15	9		64

Appendix 4G-4. Scale for "compared".

Matrices for Study 2: Implicational scaling for target words (4G-5 and 4G-6)

ID	Mo_T	SF5	TD5	LF5	TT5	MC5	MT5	Total	Non-fit
3	2923	1	1	1	1	1	1	6	0
21	2385	1	1	1	1	1	1	6	0
50	2538	1	1	1	1	1	1	6	0
56	2692	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
63	3462	1	1	1	1	1	1	6	0
70	2769	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
85	2962	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
91	1769	1	1	1	1	1	1	6	0
35	2346	0	1	1	1	1	1	5	0
89	2731	0	1	1	1	1	1	5	0
11	2423	0	0	1	1	1	1	4	0
69	3038	0	0	1	1	1	1	4	0
33	2192	0	0	0	1	1	1	3	0
49	2923	0	0	0	1	1	1	3	0
55	2846	0	0	0	1	1	1	3	0
68	3692	0	0	0	1	1	1	3	0
73	3462	0	0	0	1	1	1	3	0
76	2308	1	0	0	1	0	1	3	2
77	3038	0	0	0	1	1	1	3	0
78	3346	0	0	0	1	1	1	3	0
79	3500	0	1	0	1	0	1	3	2
82	3615	0	0	0	1	1	1	3	0
88	2846	0	1	0	1	0	1	3	2
92	3346	0	0	0	1	1	1	3	0
5	2269	0	0	0	1	0	1	2	2
7	2615	0	0	0	0	1	1	2	0
9	2462	0	0	0	1	0	1	2	2
12	2500	0	0	0	1	0	1	2	2
13	2308	0	0	0	1	0	1	2	2
17	2538	0	0	0	1	0	1	2	2
20	2538	0	0	0	0	1	1	2	0
23	1923	0	0	0	1	0	1	2	2
25	2731	0	0	0	1	0	1	2	2
26	2654	0	0	0	1	0	1	2	2
29	2654	0	0	0	1	0	1	2	2
31	2500	0	0	0	1	0	1	2	2
38	3000	0	0	0	1	0	1	2	2
39	2808	0	0	0	1	0	1	2	2
46	2538	0	0	0	1	0	1	2	2
47	3308	0	0	0	1	0	1	2	2
48	2923	0	0	0	1	0	1	2	2
51	2577	0	0	0	1	0	1	2	2
52	3192	0	0	0	1	0	1	2	2
53	2846	0	0	0	1	0	1	2	2
57	3077	0	0	0	1	0	1	2	2
62	3577	0	0	0	1	0	1	2	2
65	3385	0	0	0	1	0	1	2	2
66	2808	0	0	0	1	0	1	2	2
67	2538	0	0	0	1	0	1	2	2
75	3423	0	0	0	1	0	1	2	2
84	2423	0	0	0	1	0	1	2	2
90	2077	0	0	0	1	0	1	2	2
95	3038	0	0	0	1	0	1	2	2
8	2385	0	0	0	0	0	1	1	0
16	2731	0	0	0	0	0	1	1	0
24	2154	0	0	0	0	0	1	1	0
27	2038	0	0	0	0	0	1	1	0
34	1769	0	0	0	0	0	1	1	0
36	1962	0	0	0	0	0	1	1	0
42	2423	0	0	0	0	0	1	1	0
44	1962	0	0	0	0	0	1	1	0
45	1692	0	0	0	0	0	1	1	0
1	2000	0	0	0	0	0	0	0	0
4	1808	0	0	0	0	0	0	0	0
6	2231	0	0	0	0	0	0	0	0
10	1423	0	0	0	0	0	0	0	0
14	2385	0	0	0	0	0	0	0	0
15	1769	0	0	0	0	0	0	0	0
18	1846	0	0	0	0	0	0	0	0
19	1654	0	0	0	0	0	0	0	0
30	2154	0	0	0	0	0	0	0	0
32	2038	0	0	0	0	0	0	0	0
41	2000	0	0	0	0	0	0	0	0
43	2385	0	0	0	0	0	0	0	0
Total		19	22	22	61	33	72	229	
Non-fit		1	2	0	27	30	0		60

ID	Mo_T	SF6	TD6	LF6	TT6	MC6	TT6	Total	Non-fit
56	2692	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
65	3385	1	1	1	1	1	1	6	0
67	2538	1	1	1	1	1	1	6	0
68	3692	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
60	2846	0	1	1	1	1	1	5	0
63	3462	1	1	0	1	1	1	5	2
72	3038	1	0	1	1	1	1	5	2
76	2308	1	0	1	1	1	1	5	2
80	3077	1	0	1	1	1	1	5	2
16	2731	0	1	1	0	1	1	4	2
49	2923	1	0	0	1	1	1	4	2
51	2577	1	0	0	1	1	1	4	2
52	3192	0	0	1	1	1	1	4	0
53	2846	1	1	1	0	1	0	4	4
73	3462	0	0	1	1	1	1	4	0
79	3500	0	0	1	1	1	1	4	0
84	2423	0	1	1	0	1	1	4	2
85	2962	1	0	1	0	1	1	4	2
88	2846	0	1	1	1	0	1	4	2
89	2731	0	0	1	1	1	1	4	0
91	1769	0	0	1	1	1	1	4	0
95	3038	0	1	0	1	1	1	4	2
17	2538	0	0	0	1	1	1	3	0
31	2500	0	1	1	0	1	0	3	4
47	3308	0	0	0	1	1	1	3	0
62	3577	0	0	0	1	1	1	3	0
66	2808	0	0	0	1	1	1	3	0
69	3038	0	0	0	1	1	1	3	0
92	3346	0	0	0	1	1	1	3	0
3	2923	0	0	0	1	0	1	2	2
4	1808	0	0	0	0	1	1	2	0
7	2615	0	0	0	0	1	1	2	0
12	2500	0	0	0	0	1	1	2	0
25	2731	0	0	0	0	1	1	2	0
26	2654	0	0	0	1	0	1	2	2
29	2654	0	0	1	0	0	1	2	2
33	2192	0	0	0	0	1	1	2	0
38	3000	0	0	1	0	0	1	2	2
41	2000	0	0	0	0	1	1	2	0
43	2385	0	0	1	0	1	0	2	2
44	1962	0	0	0	0	1	1	2	0
48	2923	0	0	0	1	0	1	2	2
70	2769	0	0	0	1	0	1	2	2
71	3154	0	0	0	1	0	1	2	2
74	2846	0	0	0	1	0	1	2	2
77	3038	0	0	0	1	0	1	2	2
1	2000	0	0	0	0	0	1	1	0
6	2231	0	0	0	0	1	0	1	2
9	2462	0	0	0	0	0	1	1	0
11	2423	0	0	0	0	0	1	1	0
13	2308	0	0	0	0	0	1	1	0
18	1846	0	0	0	0	1	0	1	2
19	1654	0	0	0	0	0	1	1	0
20	2538	0	0	0	0	1	0	1	2
21	2385	0	0	0	0	0	1	1	0
24	2154	0	0	0	0	1	0	1	2
34	1769	0	0	0	0	0	1	1	0
35	2346	0	0	0	0	0	1	1	0
36	1962	0	0	0	0	0	1	1	0
39	2808	0	0	0	0	0	1	1	0
42	2423	0	0	0	0	0	1	1	0
46	2538	0	0	0	0	0	1	1	0
50	2538	0	0	0	0	0	1	1	0
55	2846	0	0	0	0	0	1	1	0
90	2077	0	0	0	0	0	1	1	0
5	2269	0	0	0	0	0	0	0	0
8	2385	0	0	0	0	0	0	0	0
10	1423	0	0	0	0	0	0	0	0
14	2385	0	0	0	0	0	0	0	0
15	1769	0	0	0	0	0	0	0	0
23	1923	0	0	0	0	0	0	0	0
27	2038	0	0	0	0	0	0	0	0
30	2154	0	0	0	0	0	0	0	0
32	2038	0	0	0	0	0	0	0	0
45	1692	0	0	0	0	0	0	0	0
Total		21	21	31	40	49	67	229	
Non-fit		8	9	8	12	14	7		58

Appendix 4G-5. Scale for "convenient".

Appendix 4G-6. Scale for "crowded".

Matrices for Study 2: Implicational scaling for target words (4G-7 and 4G-8)

ID	Mo_T	SF7	TD7	LF7	TT7	MC7	MT7	Total	Non-fit
47	3308	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
68	3692	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
73	3462	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
49	2923	1	1	0	1	1	1	5	2
50	2538	1	0	1	1	1	1	5	2
52	3192	0	1	1	1	1	1	5	0
67	2538	1	1	0	1	1	1	5	2
70	2769	0	1	1	1	1	1	5	0
83	3346	0	1	1	1	1	1	5	0
85	2962	1	0	1	1	1	1	5	2
86	3808	0	1	1	1	1	1	5	0
92	3346	1	0	1	1	1	1	5	2
48	2923	1	1	0	1	0	1	4	4
57	3077	0	0	1	1	1	1	4	0
72	3038	0	0	1	1	1	1	4	0
74	2846	0	1	0	1	1	1	4	2
79	3500	1	0	1	1	0	1	4	2
80	3077	0	1	0	1	1	1	4	2
89	2731	0	1	0	1	1	1	4	2
91	1769	0	0	1	1	1	1	4	0
3	2923	0	0	0	1	1	1	3	0
29	2654	0	0	0	1	1	1	3	0
38	3000	0	0	0	1	1	1	3	0
39	2808	0	0	0	1	1	1	3	0
43	2385	0	0	0	1	1	1	3	0
46	2538	0	0	0	1	1	1	3	0
53	2846	0	0	0	1	1	1	3	0
56	2692	0	0	0	1	1	1	3	0
58	3769	0	0	0	1	1	1	3	0
77	3038	0	0	0	1	1	1	3	0
84	2423	0	0	0	1	1	1	3	0
88	2846	0	0	0	1	1	1	3	0
1	2000	0	0	0	0	1	1	2	0
5	2269	0	0	0	0	1	1	2	0
6	2231	0	0	0	1	0	1	2	2
7	2615	0	0	0	1	0	1	2	2
8	2385	0	0	0	1	0	1	2	2
12	2500	0	0	0	1	0	1	2	2
16	2731	0	0	0	0	1	1	2	0
17	2538	0	0	0	1	0	1	2	2
24	2154	0	0	0	1	0	1	2	2
25	2731	0	0	0	1	0	1	2	2
26	2654	0	0	0	0	1	1	2	0
30	2154	0	0	0	1	0	1	2	2
33	2192	0	0	0	1	0	1	2	2
34	1769	0	0	0	0	1	1	2	0
35	2346	0	0	0	1	0	1	2	2
41	2000	0	0	0	0	1	1	2	0
42	2423	0	0	0	0	1	1	2	0
45	1692	0	0	0	0	1	1	2	0
51	2577	0	0	0	1	0	1	2	2
55	2846	0	0	0	1	0	1	2	2
63	3462	0	0	0	1	0	1	2	2
65	3385	0	0	0	1	0	1	2	2
66	2808	0	0	0	1	0	1	2	2
71	3154	0	0	0	1	0	1	2	2
78	3346	0	0	0	1	0	1	2	2
90	2077	0	0	0	1	0	1	2	2
95	3038	0	0	0	1	0	1	2	2
9	2462	0	0	0	0	0	1	1	0
10	1423	0	0	0	0	1	0	1	2
11	2423	0	0	0	0	0	1	1	0
13	2308	0	0	0	0	1	0	1	2
14	2385	0	0	0	1	0	0	1	2
19	1654	0	0	0	0	1	0	1	2
21	2385	0	0	0	0	0	1	1	0
23	1923	0	0	0	0	0	1	1	0
32	2038	0	0	0	0	0	1	1	0
76	2308	0	0	0	0	0	1	1	0
4	1808	0	0	0	0	0	0	0	0
15	1769	0	0	0	0	0	0	0	0
18	1846	0	0	0	0	0	0	0	0
20	2538	0	0	0	0	0	0	0	0
27	2038	0	0	0	0	0	0	0	0
31	2500	0	0	0	0	0	0	0	0
36	1962	0	0	0	0	0	0	0	0
44	1962	0	0	0	0	0	0	0	0
Total		17	20	21	59	48	72	237	
Non-fit		7	7	6	20	24	4		68

ID	Mo_T	SF8	TD8	LF8	TT8	MC8	MT8	Total	Non-fit
52	3192	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
63	3462	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
17	2538	1	1	0	1	1	1	5	2
38	3000	0	1	1	1	1	1	5	0
47	3308	0	1	1	1	1	1	5	0
55	2846	0	1	1	1	1	1	5	0
56	2692	1	0	1	1	1	1	5	2
57	3077	1	0	1	1	1	1	5	2
58	3769	0	1	1	1	1	1	5	0
69	3038	1	1	1	1	0	1	5	2
72	3038	0	1	1	1	1	1	5	0
73	3462	0	1	1	1	1	1	5	0
85	2962	1	0	1	1	1	1	5	2
95	3038	1	0	1	1	1	1	5	2
16	2731	0	0	1	1	1	1	4	0
49	2923	1	0	0	1	1	1	4	2
59	3077	0	0	1	1	1	1	4	0
75	3423	1	0	0	1	1	1	4	2
88	2846	0	0	1	1	1	1	4	0
90	2077	0	1	1	0	1	1	4	2
5	2269	0	0	0	1	1	1	3	0
9	2462	1	0	0	0	1	1	3	2
12	2500	0	0	0	1	1	1	3	0
14	2385	0	0	0	1	1	1	3	0
19	1654	0	0	1	0	1	1	3	2
24	2154	0	0	0	1	1	1	3	0
29	2654	0	0	0	1	1	1	3	0
35	2346	0	0	0	1	1	1	3	0
39	2808	0	0	0	1	1	1	3	0
48	2923	0	0	0	1	1	1	3	0
53	2846	0	0	0	1	1	1	3	0
60	2846	0	0	0	1	1	1	3	0
68	3692	0	0	0	1	1	1	3	0
70	2769	0	0	1	0	1	1	3	2
76	2308	0	0	0	1	1	1	3	0
77	3038	0	0	0	1	1	1	3	0
78	3346	0	0	0	1	1	1	3	0
79	3500	0	0	0	1	1	1	3	0
89	2731	0	0	0	1	1	1	3	0
91	1769	0	0	1	0	1	1	3	2
92	3346	0	0	0	1	1	1	3	0
3	2923	0	0	0	0	1	1	2	0
4	1808	0	0	0	0	1	1	2	0
7	2615	0	0	0	0	1	1	2	0
10	1423	0	0	0	1	0	1	2	2
11	2423	0	0	0	0	1	1	2	0
13	2308	0	0	0	1	0	1	2	2
21	2385	0	0	0	0	1	1	2	0
25	2731	0	0	0	0	1	1	2	0
26	2654	0	0	0	0	1	1	2	0
31	2500	0	0	0	0	1	1	2	0
34	1769	0	0	0	0	1	1	2	0
41	2000	0	0	0	0	1	1	2	0
42	2423	0	0	0	0	1	1	2	0
46	2538	0	0	0	1	0	1	2	2
50	2538	0	0	0	0	1	1	2	0
51	2577	0	0	0	0	1	1	2	0
65	3385	0	0	0	0	1	1	2	0
66	2808	0	0	0	0	1	1	2	0
67	2538	0	0	0	0	1	1	2	0
84	2423	0	0	0	0	1	1	2	0
1	2000	0	0	0	0	1	0	1	2
6	2231	0	0	0	0	0	1	1	0
15	1769	0	0	0	0	1	0	1	2
18	1846	0	0	0	0	1	0	1	2
20	2538	0	0	0	0	1	0	1	2
23	1923	0	0	0	0	0	1	1	0
27	2038	0	0	0	0	0	1	1	0
30	2154	0	0	0	0	1	0	1	2
32	2038	0	0	0	0	1	0	1	2
33	2192	0	0	0	0	1	0	1	2
36	1962	0	0	0	0	1	0	1	2
43	2385	0	0	0	0	0	1	1	0
44	1962	0	0	0	0	0	1	1	0
45	1692	0	0	0	0	1	0	1	2
8	2385	0	0	0	0	0	0	0	0
Total		19	19	28	47	74	74	261	
Non-fit		9	5	6	8	13	9		50

Appendix 4G-7. Scale for "delivered". *Appendix 4G-8.* Scale for "products".

Matrices for Study 2: Implicational scaling for target words (4G-9 and 4G-10)

ID	Mo_T	SF9	TD9	LF9	TT9	MC9	MT9	Total	Non-fit
29	2654	1	1	1	1	1	1	6	0
48	2923	1	1	1	1	1	1	6	0
51	2577	1	1	1	1	1	1	6	0
53	2846	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
66	2808	1	1	1	1	1	1	6	0
68	3692	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
76	2308	1	1	1	1	1	1	6	0
77	3038	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
89	2731	1	1	1	1	1	1	6	0
91	1769	1	1	1	1	1	1	6	0
92	3346	1	1	1	1	1	1	6	0
47	3308	0	1	1	1	1	1	5	0
49	2923	1	1	1	0	1	1	5	2
52	3192	0	1	1	1	1	1	5	0
55	2846	1	1	0	1	1	1	5	2
56	2692	1	1	1	0	1	1	5	2
60	2846	0	1	1	1	1	1	5	0
63	3462	1	0	1	1	1	1	5	2
65	3385	1	0	1	1	1	1	5	2
73	3462	0	1	1	1	1	1	5	0
75	3423	1	1	0	1	1	1	5	2
79	3500	0	1	1	1	1	1	5	0
95	3038	0	1	1	1	1	1	5	0
12	2500	0	1	1	0	1	1	4	2
16	2731	1	1	1	0	1	0	4	4
17	2538	1	1	1	0	1	0	4	4
50	2538	1	0	0	1	1	1	4	2
78	3346	0	1	1	0	1	1	4	2
84	2423	1	1	1	0	1	0	4	4
88	2846	1	0	1	0	1	1	4	2
3	2923	0	0	1	0	1	1	3	2
31	2500	0	0	1	0	1	1	3	2
38	3000	0	1	1	0	1	0	3	4
70	2769	0	0	0	1	1	1	3	0
85	2962	0	0	0	1	1	1	3	0
4	1808	0	0	0	1	0	1	2	2
7	2615	0	1	0	0	0	1	2	2
27	2038	0	0	1	0	1	0	2	2
35	2346	1	0	0	0	0	1	2	2
43	2385	0	0	1	0	1	0	2	2
67	2538	0	0	0	1	0	1	2	2
1	2000	0	0	0	0	1	0	1	2
6	2231	0	0	0	0	0	1	1	0
9	2462	0	0	0	0	0	1	1	0
11	2423	0	0	0	0	0	1	1	0
13	2308	0	0	0	0	0	1	1	0
18	1846	0	0	0	0	1	0	1	2
23	1923	0	0	0	0	0	1	1	0
24	2154	0	0	0	0	0	1	1	0
25	2731	0	0	0	0	0	1	1	0
26	2654	0	0	0	0	0	1	1	0
32	2038	0	0	0	0	1	0	1	2
33	2192	0	0	0	0	0	1	1	0
39	2808	0	0	0	0	0	1	1	0
41	2000	0	0	0	0	1	0	1	2
42	2423	0	0	0	0	0	1	1	0
46	2538	0	0	0	0	0	1	1	0
90	2077	0	0	0	0	0	1	1	0
5	2269	0	0	0	0	0	0	0	0
8	2385	0	0	0	0	0	0	0	0
10	1423	0	0	0	0	0	0	0	0
14	2385	0	0	0	0	0	0	0	0
15	1769	0	0	0	0	0	0	0	0
19	1654	0	0	0	0	0	0	0	0
20	2538	0	0	0	0	0	0	0	0
21	2385	0	0	0	0	0	0	0	0
30	2154	0	0	0	0	0	0	0	0
34	1769	0	0	0	0	0	0	0	0
36	1962	0	0	0	0	0	0	0	0
44	1962	0	0	0	0	0	0	0	0
45	1692	0	0	0	0	0	0	0	0
Total		36	41	45	39	54	61	276	
Non-fit		12	9	8	13	8	10		60

Appendix 4G-9. Scale for "rather".

ID	Mo_T	SF10	TD10	LF10	TT10	MC10	MT10	Total	Non-fit
16	2731	1	1	1	1	1	1	6	0
29	2654	1	1	1	1	1	1	6	0
46	2538	1	1	1	1	1	1	6	0
47	3308	1	1	1	1	1	1	6	0
51	2577	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
55	2846	1	1	1	1	1	1	6	0
56	2692	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
58	3769	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
70	2769	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
73	3462	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
77	3038	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
85	2962	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
92	3346	1	1	1	1	1	1	6	0
38	3000	1	1	1	0	1	1	5	2
68	3692	0	1	1	1	1	1	5	0
9	2462	0	0	1	1	1	1	4	0
31	2500	0	0	1	1	1	1	4	0
63	3462	1	0	0	1	1	1	4	2
88	2846	1	0	0	1	1	1	4	2
89	2731	0	1	1	0	1	1	4	2
8	2385	0	1	0	0	1	1	3	2
17	2538	1	0	1	0	1	0	3	4
21	2385	0	0	0	1	1	1	3	0
48	2923	0	0	0	1	1	1	3	0
50	2538	0	0	0	1	1	1	3	0
65	3385	0	0	0	1	1	1	3	0
71	3154	0	0	0	1	1	1	3	0
91	1769	0	0	0	1	1	1	3	0
95	3038	0	0	1	1	0	1	3	2
4	1808	0	0	0	0	1	1	2	0
7	2615	0	1	0	0	0	1	2	2
11	2423	0	0	0	0	1	1	2	0
14	2385	0	1	1	0	0	0	2	4
15	1769	0	0	0	0	1	1	2	0
25	2731	0	0	0	1	0	1	2	2
30	2154	0	0	0	0	1	1	2	0
33	2192	0	0	0	1	0	1	2	2
35	2346	0	0	0	1	0	1	2	2
39	2808	0	0	0	0	1	1	2	0
49	2923	0	0	0	1	0	1	2	2
53	2846	0	0	0	0	1	1	2	0
66	2808	0	0	0	1	0	1	2	2
67	2538	0	0	0	1	0	1	2	2
79	3500	0	0	0	1	0	1	2	2
84	2423	0	0	0	0	1	1	2	0
90	2077	0	0	0	1	0	1	2	2
3	2923	0	0	0	0	0	1	1	0
5	2269	0	0	0	0	0	1	1	0
6	2231	0	0	0	0	0	1	1	0
12	2500	0	0	0	0	0	1	1	0
19	1654	0	0	0	0	0	1	1	0
20	2538	0	0	1	0	0	0	1	2
24	2154	0	0	0	0	0	1	1	0
26	2654	0	0	0	0	0	1	1	0
27	2038	0	0	0	0	1	0	1	2
32	2038	0	0	0	0	1	0	1	2
34	1769	0	0	0	0	0	1	1	0
36	1962	0	0	0	0	0	1	1	0
42	2423	0	0	0	0	0	1	1	0
43	2385	0	0	0	0	0	1	1	0
44	1962	0	0	0	0	0	1	1	0
76	2308	0	0	0	0	0	1	1	0
1	2000	0	0	0	0	0	0	0	0
10	1423	0	0	0	0	0	0	0	0
13	2308	0	0	0	0	0	0	0	0
18	1846	0	0	0	0	0	0	0	0
23	1923	0	0	0	0	0	0	0	0
41	2000	0	0	0	0	0	0	0	0
45	1692	0	0	0	0	0	0	0	0
Total		32	34	37	48	52	72	275	
Non-fit		4	4	6	12	13	5		44

Appendix 4G-7. Scale for "recently".

Matrices for Study 2: Implicational scaling for target words (4G-11 and 4G-12)

ID	Mo_T	SF11	TD11	LF11	TT11	MC11	MT11	Total	Non-fit
3	2923	1	1	1	1	1	1	6	0
4	1808	1	1	1	1	1	1	6	0
9	2462	1	1	1	1	1	1	6	0
11	2423	1	1	1	1	1	1	6	0
16	2731	1	1	1	1	1	1	6	0
19	1654	1	1	1	1	1	1	6	0
20	2538	1	1	1	1	1	1	6	0
21	2385	1	1	1	1	1	1	6	0
24	2154	1	1	1	1	1	1	6	0
25	2731	1	1	1	1	1	1	6	0
26	2654	1	1	1	1	1	1	6	0
29	2654	1	1	1	1	1	1	6	0
31	2500	1	1	1	1	1	1	6	0
34	1769	1	1	1	1	1	1	6	0
35	2346	1	1	1	1	1	1	6	0
38	3000	1	1	1	1	1	1	6	0
42	2423	1	1	1	1	1	1	6	0
46	2538	1	1	1	1	1	1	6	0
47	3308	1	1	1	1	1	1	6	0
48	2923	1	1	1	1	1	1	6	0
49	2923	1	1	1	1	1	1	6	0
50	2538	1	1	1	1	1	1	6	0
51	2577	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
53	2846	1	1	1	1	1	1	6	0
55	2846	1	1	1	1	1	1	6	0
56	2692	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
59	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
63	3462	1	1	1	1	1	1	6	0
65	3385	1	1	1	1	1	1	6	0
66	2808	1	1	1	1	1	1	6	0
67	2538	1	1	1	1	1	1	6	0
68	3692	1	1	1	1	1	1	6	0
69	3038	1	1	1	1	1	1	6	0
70	2769	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
73	3462	1	1	1	1	1	1	6	0
74	2846	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
77	3038	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
79	3500	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
82	3615	1	1	1	1	1	1	6	0
83	3346	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
88	2846	1	1	1	1	1	1	6	0
89	2731	1	1	1	1	1	1	6	0
90	2077	1	1	1	1	1	1	6	0
91	1769	1	1	1	1	1	1	6	0
92	3346	1	1	1	1	1	1	6	0
95	3038	1	1	1	1	1	1	6	0
6	2231	1	1	1	0	1	1	5	2
7	2615	1	1	1	0	1	1	5	2
8	2385	1	1	1	0	1	1	5	2
12	2500	1	1	1	0	1	1	5	2
14	2385	1	1	1	0	1	1	5	2
30	2154	1	0	1	1	1	1	5	2
33	2192	1	1	1	0	1	1	5	2
39	2808	1	1	1	0	1	1	5	2
41	2000	1	1	1	0	1	1	5	2
43	2385	1	1	1	0	1	1	5	2
58	3769	1	1	1	0	1	1	5	2
84	2423	1	1	1	0	1	1	5	2
36	1962	0	1	1	0	1	1	4	2
76	2308	0	1	1	0	1	1	4	2
85	2962	1	0	0	1	1	1	4	2
5	2269	1	0	1	0	1	0	3	4
13	2308	1	1	1	0	0	0	3	6
15	1769	0	0	1	0	1	1	3	2
44	1962	0	0	0	1	1	1	3	0
1	2000	0	0	1	0	1	0	2	2
10	1423	0	0	1	0	1	0	2	2
27	2038	0	0	0	1	0	1	2	2
18	1846	0	0	0	0	0	1	1	0
23	1923	0	0	0	0	1	0	1	2
32	2038	0	0	0	0	1	0	1	2
45	1692	0	0	0	0	0	1	1	0
17	2538	0	0	0	0	0	0	0	0
Total		72	71	76	61	79	77	436	
Non-fit		15	4	6	17	4	6		52

ID	Mo_T	SF12	TD12	LF12	TT12	MC12	MT12	Total	Non-fit
3	2923	1	1	1	1	1	1	6	0
4	1808	1	1	1	1	1	1	6	0
7	2615	1	1	1	1	1	1	6	0
29	2654	1	1	1	1	1	1	6	0
38	3000	1	1	1	1	1	1	6	0
39	2808	1	1	1	1	1	1	6	0
47	3308	1	1	1	1	1	1	6	0
50	2538	1	1	1	1	1	1	6	0
52	3192	1	1	1	1	1	1	6	0
53	2846	1	1	1	1	1	1	6	0
55	2846	1	1	1	1	1	1	6	0
57	3077	1	1	1	1	1	1	6	0
60	2846	1	1	1	1	1	1	6	0
61	3269	1	1	1	1	1	1	6	0
62	3577	1	1	1	1	1	1	6	0
67	2538	1	1	1	1	1	1	6	0
70	2769	1	1	1	1	1	1	6	0
71	3154	1	1	1	1	1	1	6	0
72	3038	1	1	1	1	1	1	6	0
73	3462	1	1	1	1	1	1	6	0
75	3423	1	1	1	1	1	1	6	0
77	3038	1	1	1	1	1	1	6	0
78	3346	1	1	1	1	1	1	6	0
79	3500	1	1	1	1	1	1	6	0
80	3077	1	1	1	1	1	1	6	0
84	2423	1	1	1	1	1	1	6	0
86	3808	1	1	1	1	1	1	6	0
92	3346	1	1	1	1	1	1	6	0
8	2385	0	1	1	1	1	1	5	0
10	1423	0	1	1	1	1	1	5	0
11	2423	1	1	0	1	1	1	5	2
14	2385	0	1	1	1	1	1	5	0
15	1769	0	1	1	1	1	1	5	0
24	2154	1	0	1	1	1	1	5	2
25	2731	0	1	1	1	1	1	5	0
26	2654	0	1	1	1	1	1	5	0
31	2500	0	1	1	1	1	1	5	0
33	2192	1	1	1	1	0	1	5	2
35	2346	1	1	1	0	1	1	5	2
46	2538	0	1	1	1	1	1	5	0
48	2923	1	1	1	0	1	1	5	2
49	2923	1	0	1	1	1	1	5	2
51	2577	0	1	1	1	1	1	5	0
56	2692	1	1	1	0	1	1	5	2
58	3769	0	1	1	1	1	1	5	0
59	3077	1	1	1	0	1	1	5	2
63	3462	0	1	1	1	1	1	5	0
65	3385	1	0	1	1	1	1	5	2
69	3038	1	1	1	0	1	1	5	2
74	2846	0	1	1	1	1	1	5	0
82	3615	1	1	1	0	1	1	5	2
83	3346	0	1	1	1	1	1	5	0
85	2962	1	1	1	0	1	1	5	2
88	2846	1	1	1	1	0	1	5	2
89	2731	1	1	1	0	1	1	5	2
90	2077	1	1	0	1	1	1	5	2
91	1769	1	1	1	0	1	1	5	2
95	3038	1	1	1	0	1	1	5	2
5	2269	0	0	1	1	1	1	4	0
9	2462	0	1	1	0	1	1	4	2
30	2154	1	0	1	0	1	1	4	2
6	2231	0	1	1	0	0	1	3	4
12	2500	0	0	0	1	1	1	3	0
13	2308	0	1	1	0	1	0	3	4
16	2731	1	0	0	0	1	1	3	2
19	1654	0	0	1	0	1	1	3	2
23	1923	0	0	1	0	1	1	3	2
27	2038	0	0	0	1	1	1	3	0
42	2423	0	0	1	0	1	1	3	2
43	2385	1	0	1	0	1	0	3	4
66	2808	1	0	0	0	1	1	3	2
76	2308	0	0	0	1	1	1	3	0
1	2000	0	0	1	0	1	0	2	2
17	2538	0	0	0	0	1	1	2	0
20	2538	0	0	0	0	1	1	2	0
32	2038	0	1	0	0	0	1	2	2
68	3692	0	0	0	0	1	1	2	0
21	2385	0	0	0	0	0	1	1	0
34	1769	0	0	0	0	1	0	1	2
36	1962	0	0	0	0	0	1	1	0
41	2000	0	0	0	0	0	1	1	0
44	1962	0	0	0	0	0	1	1	0
18	1846	0	0	0	0	0	0	0	0
45	1692	0	0	0	0	0	0	0	0
Total		49	59	66	52	74	78	378	
Non-fit		21	7	9	20	5	4		66

Appendix 4G-11. Scale for "still".

Appendix 4G-12. Scale for "wider".

Appendix 5A

Test Items used in Study 3: (J)-1 [recall]

■ 1 ～ 35 の日本語を英語にして，正しく発音しなさい。
■発音は録音します。以下の手順で吹き込みなさい。
① 学籍番号
② 名前
③ 「始めます」➔ 1 ・・・, ・・・, 35 ・・・。 ➔「終了します」

1	科学	science	21	雑誌	magazine
2	ナイフ	knife	22	洗う	wash
3	住所	address	23	鳥	bird
4	やわらかい	soft	24	暖かい	warm
5	法律	law	25	署名する	sign
6	右	right	26	英雄	hero
7	農場	farm	27	動物	animal
8	切符	ticket	28	瓶（ビン）	bottle
9	ビデオ	video	29	鏡	mirror
10	雨	rain	30	明日	tomorrow
11	回転する	turn	31	台所	kitchen
12	パイロット	pilot	32	間違い	wrong
13	登る	climb	33	薬	medicine
14	雪	snow	34	安全な	safe
15	草・芝生	grass	35	黄色	yellow
16	隣人	neighbor			
17	月	moon			
18	質・品質	quality			
19	メッセージ	message			
20	眠る	sleep			

Appendix 5B

Test Items used in Study 3: (L)-2 [recall]

■ 1 ～ 35 の日本語に対応する英単語の綴りを書きなさい。

1	ナイフ	knife	21	安全な	safe
2	隣人	neighbor	22	雑誌	magazine
3	パイロット	pilot	23	暖かい	warm
4	薬	medicine	24	農場	farm
5	雨	rain	25	メッセージ	message
6	やわらかい	soft	26	瓶（ビン）	bottle
7	回転する	turn	27	住所	address
8	洗う	wash	28	黄色	yellow
9	法律	law	29	台所	kitchen
10	科学	science	30	右	right
11	間違い	wrong	31	眠る	sleep
12	鏡	mirror	32	動物	animal
13	鳥	bird	33	月	moon
14	署名する	sign	34	雪	snow
15	切符	ticket	35	明日	tomorrow
16	草・芝生	grass			
17	登る	climb			
18	ビデオ	video			
19	英雄	hero			
20	質・品質	quality			

Appendix 5C

<u>Test Items used in Study 3: (B)-3 [recall]</u>

■発音される単語のつづりを書き取りなさい。
■単語は全部で 35 語です。それぞれ 2 回ずつ発音されます。
■分からないところがあっても，音から予測をして書きなさい。

1	snow	21	wash
2	hero	22	magazine
3	science	23	farm
4	climb	24	sleep
5	message	25	wrong
6	sign	26	video
7	moon	27	bottle
8	tomorrow	28	kitchen
9	pilot	29	quality
10	ticket	30	turn
11	medicine	31	knife
12	bird	32	safe
13	mirror	33	grass
14	soft	34	neighbor
15	warm	35	law
16	right		
17	animal		
18	address		
19	rain		
20	yellow		

Appendix 5D

Test Items used in Study 3: (F)-4 [recall]

■これから 35 個の英単語が発音されます。<u>単語はそれぞれ 2 回ずつ発音されます。</u>
■聞こえてくる英単語の意味を日本語で書きなさい。

1	雪	21	洗う
2	英雄	22	雑誌
3	科学	23	農場
4	登る	24	眠る
5	メッセージ	25	間違い
6	署名する	26	ビデオ
7	月	27	瓶（ビン）
8	明日	28	台所
9	パイロット	29	質・品質
10	切符	30	回転する
11	薬	31	ナイフ
12	鳥	32	安全な
13	鏡	33	草・芝生
14	やわらかい	34	隣人
15	暖かい	35	法律
16	右		
17	動物		
18	住所		
19	雨		
20	黄色		

Appendix 5E

Test Items used in Study 3: (D)-5 [recall]

■ 1 ～ 35 までの単語を全て発音しなさい。
■読み方が分からないものがあっても，予測して発音しなさい。
■発音は録音します。以下の手順で吹き込みなさい。

① 学籍番号
② 名前
③ 「始めます」→ 1 ・・・, ・・・, 35 ・・・。 →「終了します」。

1	animal	21	right
2	pilot	22	mirror
3	medicine	23	wash
4	warm	24	grass
5	ticket	25	magazine
6	knife	26	sign
7	climb	27	bird
8	tomorrow	28	science
9	message	29	turn
10	moon	30	video
11	address	31	yellow
12	wrong	32	neighbor
13	farm	33	law
14	soft	34	sleep
15	rain	35	bottle
16	safe		
17	snow		
18	hero		
19	quality		
20	kitchen		

Appendix 5F

Test Items used in Study 3: (H)-6 [recall]

■ 1 ～ 35 までの単語を日本語に訳しなさい。

1	address	住所	21	ticket	切符
2	science	科学	22	rain	雨
3	hero	英雄	23	turn	回転する
4	pilot	パイロット	24	video	ビデオ
5	farm	農場	25	magazine	雑誌
6	safe	安全な	26	bottle	瓶（ビン）
7	wash	洗う	27	soft	やわらかい
8	message	メッセージ	28	animal	動物
9	grass	草・芝生	29	kitchen	台所
10	snow	雪	30	medicine	薬
11	right	右	31	moon	月
12	neighbor	隣人	32	mirror	鏡
13	sleep	眠る	33	knife	ナイフ
14	law	法律	34	bird	鳥
15	climb	登る	35	tomorrow	明日
16	warm	暖かい			
17	yellow	黄色			
18	sign	署名する			
19	quality	質・品質			
20	wrong	間違い			

Appendix 5G

Test Items used in Study 3: (K)-7 [recognition]

■ 1 ～ 35 をよく見なさい。
■4つの中から正しい英単語の綴りを 1 つだけ選び，○をつけなさい。

1	burd	bird	berd	bord
2	furm	faam	farm	faum
3	tirn	turne	turen	turn
4	werm	warm	wurm	wirm
5	quolity	quarity	quality	quority
6	lau	lauw	law	laaw
7	rayn	raym	raim	rain
8	sleep	sleap	sleip	sliep
9	snou	snough	snow	sknow
10	moen	moon	moun	muun
11	knife	knaigh	knaife	knigh
12	wrounge	wronge	wrong	wroung
13	claymb	clymb	claimb	climb
14	sign	singh	saing	saingh
15	raight	right	raite	righte
16	addres	address	adress	adres
17	botle	botole	bottle	bottel
18	grass	gras	greass	grase
19	kitchn	kitchen	kichin	kichen
20	medisun	medison	medicine	medisn

21	mirror	mirrar	mirlor	mirlar
22	neighber	neibor	neighbor	neiber
23	scaians	scaience	science	scaienth
24	tommorow	tomorow	tommorrow	tomorrow
25	yeloh	yellow	yelloh	yelow
26	animmal	animel	animal	animmel
27	hero	herro	hearo	hearro
28	magajine	magasine	magazine	magagene
29	mesaze	message	mesage	messeze
30	pillot	pailot	pilot	paillot
31	sayf	safe	saif	seef
32	softo	soft	sofut	sofuto
33	ticht	tikete	tickt	ticket
34	vedeo	vedeoh	videoh	video
35	wash	wosh	washe	woshe

（以上）

Appendix 5H

<u>Test Items used in Study 3: (I)-8 [recognition]</u>

■ 1 〜 35 の日本語を英語にしたものが流れます。
■単語の発音が 2 つ流れますが，正しいものは 1 つだけです。聞こえてくる英単語をよく聞き分け，適切な方に○をつけなさい。<u>a と b は 1 回だけ発音されます。</u>

1	やわらかい	【a】 ・ b	21	安全な	a ・ 【b】
2	台所	a ・ 【b】	22	洗う	a ・ 【b】
3	鏡	【a】 ・ b	23	パイロット	【a】 ・ b
4	回転する	a ・ 【b】	24	右	【a】 ・ b
5	間違い	a ・ 【b】	25	住所	a ・ 【b】
6	法律	【a】 ・ b	26	雪	【a】 ・ b
7	月	【a】 ・ b	27	雑誌	【a】 ・ b
8	ナイフ	a ・ 【b】	28	雨	a ・ 【b】
9	質・品質	【a】 ・ b	29	メッセージ	【a】 ・ b
10	瓶（ビン）	a ・ 【b】	30	登る	a ・ 【b】
11	科学	a ・ 【b】	31	署名する	a ・ 【b】
12	隣人	【a】 ・ b	32	ビデオ	【a】 ・ b
13	動物	a ・ 【b】	33	黄色	【a】 ・ b
14	暖かい	【a】 ・ b	34	薬	【a】 ・ b
15	英雄	【a】 ・ b	35	眠る	【a】 ・ b
16	草・芝生	a ・ 【b】			
17	農場	【a】 ・ b			
18	明日	a ・ 【b】			
19	鳥	【a】 ・ b			
20	切符	a ・ 【b】			

Appendix 5I

Test Items used in Study 3: (A)-9 [recognition]

■発音された単語として正しいものを，2つのうち1つ選んで○をつけなさい。
■発音は2回繰り返されます。

1	bird	bark	21	mirror	meter
2	far	farm	22	neither	neighbor
3	burn	turn	23	science	silence
4	warm	war	24	tournament	tomorrow
5	qualify	quality	25	yellow	mellow
6	law	loan	26	annual	animal
7	raise	rain	27	hello	hero
8	sleep	sweep	28	migrate	magazine
9	slow	snow	29	mirage	message
10	mood	moon	30	pilot	pillow
11	life	knife	31	sale	safe
12	wrong	road	32	soft	sort
13	climb	cry	33	trick	ticket
14	sight	sign	34	visitor	video
15	rate	right	35	wash	wish
16	address	dress			
17	battle	bottle			
18	gram	grass			
19	kitchen	kitten			
20	meditate	medicine			

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Appendix 5J

<u>Test Items used in Study 3: (E)-10 [recognition]</u>

■これから 35 個の英単語が発音されます。<u>単語はそれぞれ 2 回ずつ発音されます。</u>
■発音された単語の意味として正しいものを，選択肢から 1 つ選び記号を書きなさい。
※選択肢は 40 個あります。当てはまらないものが 5 つあります。注意しなさい。

1	の	21	し
2	に	22	く
3	ま	23	え
4	き	24	と
5	す	25	あ
6	ふ	26	ほ
7	ぬ	27	か
8	い	28	ち
9	う	29	よ
10	や	30	ひ
11	ね	31	そ
12	な	32	は
13	て	33	む
14	も	34	み
15	た	35	ゆ
16	せ		
17	を		
18	け		
19	へ		
20	お		

（あ）	明日	（な）	台所
（い）	暖かい	（に）	月
（う）	雨	（ぬ）	動物
（え）	洗う	（ね）	鳥
（お）	安全な	（の）	ナイフ
（か）	英雄	（は）	眠る
（き）	科学	（ひ）	農場
（く）	鏡	（ふ）	登る
（け）	回転する	（へ）	パイロット
（こ）	確認する	（ほ）	ビデオ
（さ）	感覚	（ま）	瓶（ビン）
（し）	黄色	（み）	法律
（す）	切符	（む）	間違い
（せ）	草・芝生	（め）	マッサージ
（そ）	薬	（も）	右
（た）	雑誌	（や）	メッセージ
（ち）	質・品質	（ゆ）	やわらかい
（つ）	支払い	（よ）	雪
（て）	住所	（わ）	夜
（と）	署名する	（を）	隣人

Appendix 5K

Test Items used in Study 3: (C)-11 [recognition]

■書かれている単語をよく見て，1 回目に発音される語と 2 回目に発音される語のうち，正しい方に〇をつけなさい。単語はそれぞれ一度しか流れません。

1	rain	ⓐ ・ b	21	medicine	a ・ ⓑ
2	grass	ⓐ ・ b	22	safe	ⓐ ・ b
3	moon	a ・ ⓑ	23	bottle	ⓐ ・ b
4	animal	ⓐ ・ b	24	turn	ⓐ ・ b
5	right	a ・ ⓑ	25	bird	a ・ ⓑ
6	kitchen	ⓐ ・ b	26	pilot	a ・ ⓑ
7	warm	a ・ ⓑ	27	tomorrow	ⓐ ・ b
8	mirror	a ・ ⓑ	28	sleep	a ・ ⓑ
9	farm	a ・ ⓑ	29	ticket	ⓐ ・ b
10	magazine	a ・ ⓑ	30	quality	a ・ ⓑ
11	address	ⓐ ・ b	31	law	a ・ ⓑ
12	snow	a ・ ⓑ	32	hero	a ・ ⓑ
13	wrong	ⓐ ・ b	33	neighbor	a ・ ⓑ
14	video	a ・ ⓑ	34	climb	ⓐ ・ b
15	science	ⓐ ・ b	35	wash	ⓐ ・ b
16	yellow	a ・ ⓑ			
17	message	a ・ ⓑ			
18	sign	ⓐ ・ b			
19	soft	a ・ ⓑ			
20	knife	ⓐ ・ b			

Appendix 5L

Test Items used in Study 3: (G)-12 [recognition]

■ 1 ～ 35 までの単語の意味として適切なものを，選択肢から 1 つ選び記号を書きなさい。
※選択肢は 40 個あります。当てはまらないものが 5 つあります。注意しなさい。

1	soft	ゆ	21	animal	ぬ
2	law	み	22	safe	お
3	sign	と	23	pilot	へ
4	wash	え	24	quality	ち
5	wrong	む	25	grass	せ
6	message	や	26	mirror	く
7	ticket	す	27	yellow	し
8	neighbor	を	28	bird	ね
9	knife	の	29	medicine	そ
10	warm	い	30	video	ほ
11	climb	ふ	31	tomorrow	あ
12	address	て	32	bottle	ま
13	science	き	33	turn	け
14	right	も	34	magazine	た
15	sleep	は	35	farm	ひ
16	rain	う			
17	hero	か			
18	moon	に			
19	kitchen	な			
20	snow	よ			

（あ）	明日	（な）	台所
（い）	暖かい	（に）	月
（う）	雨	（ぬ）	動物
（え）	洗う	（ね）	鳥
（お）	安全な	（の）	ナイフ
（か）	英雄	（は）	眠る
（き）	科学	（ひ）	農場
（く）	鏡	（ふ）	登る
（け）	回転する	（へ）	パイロット
（こ）	確認する	（ほ）	ビデオ
（さ）	感覚	（ま）	瓶（ビン）
（し）	黄色	（み）	法律
（す）	切符	（む）	間違い
（せ）	草・芝生	（め）	マッサージ
（そ）	薬	（も）	右
（た）	雑誌	（や）	メッセージ
（ち）	質・品質	（ゆ）	やわらかい
（つ）	支払い	（よ）	雪
（て）	住所	（わ）	夜
（と）	署名する	（を）	隣人

Appendix 5M

Matrices for Study 3: Implicational scaling for target words (5M-1 and 5M-2)

ID	Mo_T	l16	b16	j16	f16	h16	d16	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
7	2538	1	1	0	1	1	1	5
20	2192	1	1	0	1	1	1	5
43	2808	0	1	1	1	1	1	5
81	2077	1	1	0	1	1	1	5
10	1808	0	0	1	1	1	1	4
11	2269	0	1	0	1	1	1	4
17	1462	0	1	0	1	1	1	4
Total		67	70	66	71	71	71	416
Non-fit		3	2	5	0	0	0	10

ID	Mo_T	l26	b26	j26	f26	h26	d26	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
17	1462	0	1	1	1	1	1	5
69	4154	1	1	0	1	1	1	5
29	1808	0	0	1	1	1	1	4
Total		69	70	70	71	71	71	422
Non-fit		1	0	1	0	0	0	2

Appendix 5M-1. Scale for "address".　　　　*Appendix 5M-2*. Scale for "animal".

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Matrices for Study 3: Implicational scaling for target words (5M-3 and 5M-4)

ID	Mo_T	ll	b1	jl	f1	h1	d1	Total
10	1808	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
5	3308	0	1	1	1	1	1	5
43	2808	1	0	1	1	1	1	5
50	3308	0	1	1	1	1	1	5
60	4154	0	1	1	1	1	1	5
66	3000	0	1	1	1	1	1	5
82	1692	0	1	1	1	1	1	5
86	3962	0	1	1	1	1	1	5
87	2654	1	1	0	1	1	1	5
1	3038	0	0	1	1	1	1	4
3	1923	0	1	0	1	1	1	4
9	2846	0	1	0	1	1	1	4
12	2308	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
19	2231	0	0	1	1	1	1	4
20	2192	0	0	1	1	1	1	4
21	2000	0	0	1	1	1	1	4
22	2462	0	0	1	1	1	1	4
23	2692	0	0	1	1	1	1	4
24	2231	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
28	2692	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
33	2654	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
36	2577	0	0	1	1	1	1	4
38	3000	0	0	1	1	1	1	4
40	3154	0	0	1	1	1	1	4
44	3962	0	0	1	1	1	1	4
49	3385	0	0	1	1	1	1	4
54	3038	0	0	1	1	1	1	4
55	3692	0	0	1	1	1	1	4
56	3462	0	0	1	1	1	1	4
58	4077	0	0	1	1	1	1	4
59	3577	0	0	1	1	1	1	4
62	2885	0	0	1	1	1	1	4
64	3269	0	0	1	1	1	1	4
65	2154	0	0	1	1	1	1	4
67	3654	0	0	1	1	1	1	4
69	4154	0	0	1	1	1	1	4
79	1923	0	0	1	1	1	1	4
81	2077	0	0	1	1	1	1	4
85	2269	0	0	1	1	1	1	4
88	2077	0	0	1	1	1	1	4
89	2385	0	1	0	1	1	1	4
2	2692	0	0	0	1	1	1	3
7	2538	0	0	0	1	1	1	3
8	2269	0	0	0	1	1	1	3
11	2269	0	0	0	1	1	1	3
13	3308	0	0	0	1	1	1	3
14	2577	0	0	0	1	1	1	3
15	2538	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
27	2769	0	0	0	1	1	1	3
30	2385	0	0	0	1	1	1	3
35	2654	0	0	0	1	1	1	3
37	2654	0	0	0	1	1	1	3
70	2962	0	0	0	1	1	1	3
74	3000	0	0	0	1	1	1	3
77	3538	0	0	0	1	1	1	3
80	1769	0	0	0	1	1	1	3
90	2346	0	0	0	1	1	1	3
29	1808	0	0	0	0	1	1	2
17	1462	0	0	0	0	1	0	1
Total		10	18	48	69	71	70	286
Non-fit		2	4	4	0	1	1	12

ID	Mo_T	ll7	b17	jl7	f17	h17	d17	Total
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	0	5
23	2692	0	1	1	1	1	1	5
51	4038	0	1	1	1	1	1	5
70	2962	1	1	0	1	1	1	5
5	3308	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
27	2769	0	0	1	1	1	1	4
40	3154	0	0	1	1	1	1	4
44	3962	0	1	0	1	1	1	4
47	3115	0	1	0	1	1	1	4
52	3923	0	1	0	1	1	1	4
54	3038	0	0	1	1	1	1	4
59	3577	0	1	0	1	1	1	4
60	4154	0	1	0	1	1	1	4
63	2500	0	0	1	1	1	1	4
69	4154	0	1	0	1	1	1	4
73	3462	0	1	0	1	1	1	4
1	3038	0	0	0	1	1	1	3
2	2692	0	0	0	1	1	1	3
15	2538	0	0	0	1	1	1	3
18	2231	0	0	0	1	1	1	3
26	2692	0	0	0	1	1	1	3
28	2692	0	0	0	1	1	1	3
32	2077	0	0	0	1	1	1	3
37	2654	0	0	0	1	1	1	3
38	3000	0	0	0	1	1	1	3
43	2808	0	0	0	1	1	1	3
49	3385	0	0	0	1	1	1	3
50	3308	0	0	0	1	1	1	3
55	3692	0	0	0	1	1	1	3
62	2885	0	0	0	1	1	1	3
66	3000	0	0	0	1	1	1	3
67	3654	0	0	0	1	1	1	3
74	3000	0	0	0	1	1	1	3
75	2538	0	1	0	0	1	1	3
80	1769	0	0	0	1	1	1	3
87	2654	0	0	0	1	1	1	3
7	2538	0	0	0	0	1	1	2
21	2000	0	0	0	0	1	1	2
24	2231	0	0	0	0	1	1	2
25	2923	0	0	0	1	1	0	2
33	2654	0	0	0	1	1	0	2
36	2577	0	0	0	0	1	1	2
64	3269	0	0	0	1	1	0	2
65	2154	0	0	0	1	0	1	2
90	2346	0	0	0	0	1	1	2
3	1923	0	0	0	0	0	1	1
8	2269	0	0	0	0	1	0	1
9	2846	0	0	0	0	1	0	1
11	2269	0	0	0	0	0	1	1
16	2308	0	0	0	0	0	1	1
29	1808	0	0	0	0	0	1	1
79	1923	0	0	0	0	1	0	1
81	2077	0	0	0	0	1	0	1
88	2077	0	0	0	0	0	1	1
10	1808	0	0	0	0	0	0	0
12	2308	0	0	0	0	0	0	0
14	2577	0	0	0	0	0	0	0
17	1462	0	0	0	0	0	0	0
19	2231	0	0	0	0	0	0	0
20	2192	0	0	0	0	0	0	0
30	2385	0	0	0	0	0	0	0
34	2808	0	0	0	0	0	0	0
35	2654	0	0	0	0	0	0	0
82	1692	0	0	0	0	0	0	0
89	2385	0	0	0	0	0	0	0
Total		7	17	14	45	54	52	189
Non-fit		2	8	8	5	5	8	36

Appendix 5M-3. Scale for "bird".   *Appendix 5M-4*. Scale for "bottle".

Matrices for Study 3: Implicational scaling for target words (5M-5 and 5M-6)

ID	Mo_T	l13	b13	j13	f13	h13	d13	Total
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
28	2692	1	1	0	1	1	1	5
37	2654	1	0	1	1	1	1	5
50	3308	1	0	1	1	1	1	5
54	3038	1	0	1	1	1	1	5
58	4077	1	1	1	1	1	0	5
59	3577	1	0	1	1	1	1	5
60	4154	0	1	1	1	1	1	5
67	3654	1	1	1	1	1	0	5
74	3000	1	0	1	1	1	1	5
77	3538	0	1	1	1	1	1	5
7	2538	0	1	0	1	1	1	4
9	2846	0	0	1	1	1	1	4
10	1808	1	0	0	1	1	1	4
15	2538	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
21	2000	0	0	1	1	1	1	4
22	2462	0	0	1	1	1	1	4
23	2692	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
26	2692	0	1	0	1	1	1	4
27	2769	1	1	0	1	1	0	4
33	2654	1	1	0	1	1	0	4
34	2808	0	0	1	1	1	1	4
35	2654	0	0	1	1	1	1	4
38	3000	0	0	1	1	1	1	4
40	3154	0	1	0	1	1	1	4
70	2962	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
79	1923	0	0	1	1	1	1	4
85	2269	0	1	0	1	1	1	4
1	3038	0	0	0	1	1	1	3
2	2692	0	0	0	1	1	1	3
3	1923	0	0	0	1	1	1	3
12	2308	0	1	0	1	1	0	3
13	3308	0	0	0	1	1	1	3
18	2231	0	0	0	1	1	1	3
19	2231	0	0	0	1	1	1	3
20	2192	0	0	0	1	1	1	3
29	1808	0	0	0	1	1	1	3
32	2077	0	0	0	1	1	1	3
65	2154	0	0	0	1	1	1	3
66	3000	0	0	0	1	1	1	3
81	2077	0	0	0	1	1	1	3
87	2654	0	1	0	1	1	0	3
88	2077	0	0	0	1	1	1	3
11	2269	0	0	0	1	1	0	2
14	2577	0	0	0	1	0	1	2
24	2231	0	0	0	1	1	0	2
30	2385	0	0	0	1	1	0	2
44	3962	0	0	0	1	1	0	2
90	2346	0	0	0	0	1	1	2
17	1462	0	0	0	1	0	0	1
80	1769	0	0	0	0	1	0	1
82	1692	0	0	0	0	0	0	0
Total		28	30	39	68	68	58	291
Non-fit		11	13	8	6	2	12	52

ID	Mo_T	l2	b2	j2	f2	h2	d2	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
7	2538	1	0	1	1	1	1	5
23	2692	1	0	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
32	2077	1	0	1	1	1	1	5
55	3692	1	0	1	1	1	1	5
79	1923	1	0	1	1	1	1	5
81	2077	1	1	0	1	1	1	5
89	2385	0	1	1	1	1	1	5
8	2269	0	0	1	1	1	1	4
10	1808	1	0	1	0	1	1	4
14	2577	0	1	0	1	1	1	4
16	2308	0	1	0	1	1	1	4
18	2231	1	0	1	0	1	1	4
28	2692	0	1	0	1	1	1	4
37	2654	1	0	1	0	1	1	4
74	3000	0	1	0	1	1	1	4
17	1462	0	0	1	0	1	1	3
36	2577	0	0	0	0	1	1	2
Total		61	59	65	66	71	71	393
Non-fit		9	9	6	4	0	0	28

Appendix 5M-5. Scale for "climb". *Appendix 5M-6.* Scale for "farm".

Matrices for Study 3: Implicational scaling for target words (5M-7 and 5M-8)

ID	Mo_T	l18	b18	j18	f18	h18	d18	Total
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
1	3038	0	1	1	1	1	1	5
22	2462	0	1	1	1	1	1	5
23	2692	0	1	1	1	1	1	5
30	2385	1	0	1	1	1	1	5
35	2654	1	0	1	1	1	1	5
55	3692	0	1	1	1	1	1	5
79	1923	0	1	1	1	1	1	5
87	2654	0	1	1	1	1	1	5
89	2385	0	1	1	1	1	1	5
3	1923	0	0	1	1	1	1	4
5	3308	0	0	1	1	1	1	4
7	2538	0	0	1	1	1	1	4
8	2269	1	0	1	0	1	1	4
14	2577	0	0	1	1	1	1	4
15	2538	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
19	2231	0	0	1	1	1	1	4
20	2192	0	0	1	1	1	1	4
21	2000	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
29	1808	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
47	3115	1	0	1	0	1	1	4
50	3308	0	0	1	1	1	1	4
62	2885	0	0	1	1	1	1	4
63	2500	0	0	1	1	1	1	4
64	3269	0	0	1	1	1	1	4
65	2154	0	0	1	1	1	1	4
66	3000	0	0	1	1	1	1	4
69	4154	0	0	1	1	1	1	4
74	3000	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
80	1769	0	0	1	1	1	1	4
81	2077	0	0	1	1	1	1	4
82	1692	0	0	1	1	1	1	4
2	2692	0	0	1	0	1	1	3
9	2846	0	0	1	0	1	1	3
13	3308	0	0	1	0	1	1	3
37	2654	0	0	1	1	0	1	3
90	2346	0	0	0	1	1	1	3
10	1808	0	0	1	0	0	0	1
17	1462	0	0	1	0	0	0	1
Total		31	34	70	64	68	69	336
Non-fit		4	2	6	5	1	2	20

ID	Mo_T	l27	b27	j27	f27	h27	d27	Total
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
11	2269	1	1	0	1	1	1	5
13	3308	1	1	0	1	1	1	5
24	2231	0	1	1	1	1	1	5
29	1808	1	0	1	1	1	1	5
88	2077	1	1	0	1	1	1	5
90	2346	1	1	0	1	1	1	5
1	3038	0	1	0	1	1	1	4
14	2577	0	1	0	1	1	1	4
18	2231	0	1	0	1	1	1	4
26	2692	0	1	0	1	1	1	4
30	2385	0	1	0	1	1	1	4
33	2654	0	1	0	1	1	1	4
65	2154	0	1	0	1	1	1	4
89	2385	0	1	0	1	1	1	4
3	1923	0	0	0	1	1	1	3
87	2654	0	1	0	0	1	1	3
Total		60	69	57	70	71	71	398
Non-fit		5	10	12	1	0	0	28

Appendix 5M-7. Scale for "grass".   *Appendix 5M-8*. Scale for "hero".

Matrices for Study 3: Implicational scaling for target words (5M-9 and 5M-10)

ID	Mo_T	ll19	b19	j19	f19	h19	d19	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
9	2846	1	1	0	1	1	1	5
25	2923	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
54	3038	1	0	1	1	1	1	5
62	2885	0	1	1	1	1	1	5
64	3269	0	1	1	1	1	1	5
74	3000	1	0	1	1	1	1	5
8	2269	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
24	2231	0	0	1	1	1	1	4
27	2769	0	1	0	1	1	1	4
28	2692	0	1	0	1	1	1	4
32	2077	0	0	1	1	1	1	4
33	2654	0	0	1	1	1	1	4
43	2808	0	0	1	1	1	1	4
44	3962	0	0	1	1	1	1	4
51	4038	0	0	1	1	1	1	4
56	3462	0	1	0	1	1	1	4
58	4077	0	0	1	1	1	1	4
73	3462	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
81	2077	0	0	1	1	1	1	4
85	2269	0	0	1	1	1	1	4
5	3308	0	0	0	1	1	1	3
7	2538	0	0	0	1	1	1	3
11	2269	0	0	0	1	1	1	3
12	2308	0	0	0	1	1	1	3
14	2577	0	0	0	1	1	1	3
15	2538	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
20	2192	0	0	0	1	1	1	3
21	2000	0	0	0	1	1	1	3
22	2462	0	0	0	1	1	1	3
30	2385	0	0	0	1	1	1	3
37	2654	0	0	0	1	1	1	3
47	3115	0	0	0	1	1	1	3
49	3385	0	0	0	1	1	1	3
50	3308	0	0	0	1	1	1	3
59	3577	0	0	0	1	1	1	3
66	3000	0	0	0	1	1	1	3
79	1923	0	0	0	1	1	1	3
87	2654	0	0	0	1	1	1	3
90	2346	0	0	0	1	1	1	3
19	2231	0	0	0	1	1	0	2
35	2654	0	0	0	1	0	1	2
38	3000	0	1	0	0	0	1	2
3	1923	0	0	0	0	0	1	1
10	1808	0	0	0	0	0	1	1
17	1462	0	0	0	0	0	1	1
29	1808	0	0	0	0	0	1	1
65	2154	0	0	0	1	0	0	1
82	1692	0	0	0	0	0	1	1
88	2077	0	0	0	0	0	1	1
80	1769	0	0	0	0	0	0	0
89	2385	0	0	0	0	0	0	0
Total		18	24	35	62	60	67	266
Non-fit		3	6	4	3	2	2	20

ID	Mo_T	ll11	b11	j11	f11	h11	d11	Total
5	3308	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
2	2692	1	1	0	1	1	1	5
9	2846	1	1	0	1	1	1	5
25	2923	1	1	1	1	1	0	5
27	2769	1	0	1	1	1	1	5
38	3000	1	1	0	1	1	1	5
40	3154	1	1	1	1	1	0	5
50	3308	1	1	1	1	1	0	5
54	3038	1	1	1	1	1	0	5
67	3654	1	0	1	1	1	1	5
77	3538	1	1	0	1	1	1	5
15	2538	0	0	1	1	1	1	4
70	2962	0	0	1	1	1	1	4
73	3462	0	0	1	1	1	1	4
80	1769	0	0	1	1	1	1	4
13	3308	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
18	2231	0	0	1	1	1	0	3
28	2692	0	0	0	1	1	1	3
32	2077	0	0	0	1	1	1	3
43	2808	0	0	0	1	1	1	3
75	2538	0	0	0	1	1	1	3
19	2231	0	0	0	0	1	1	2
30	2385	0	0	0	0	1	1	2
34	2808	0	0	0	0	1	1	2
44	3962	0	0	0	0	1	1	2
65	2154	0	0	0	1	0	1	2
66	3000	0	0	0	0	1	1	2
79	1923	0	0	0	0	1	1	2
86	3962	1	0	0	0	1	0	2
1	3038	0	0	0	0	0	1	1
3	1923	0	0	0	0	0	1	1
7	2538	0	0	0	0	0	1	1
8	2269	0	0	0	0	0	1	1
10	1808	0	0	0	0	0	1	1
11	2269	0	0	0	0	0	1	1
12	2308	0	0	0	0	0	1	1
14	2577	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
21	2000	0	0	0	0	0	1	1
22	2462	0	0	0	0	0	1	1
23	2692	0	0	0	0	0	1	1
24	2231	0	0	0	0	0	1	1
33	2654	0	0	0	0	0	1	1
36	2577	0	0	0	0	0	1	1
82	1692	0	0	0	0	0	1	1
88	2077	0	0	0	0	0	1	1
89	2385	0	0	0	0	0	1	1
17	1462	0	0	0	0	0	0	0
29	1808	0	0	0	0	0	0	0
35	2654	0	0	0	0	0	0	0
37	2654	0	0	0	0	0	0	0
90	2346	0	0	0	0	0	0	0
Total		30	27	30	41	47	60	235
Non-fit		11	2	5	1	1	6	26

Appendix 5M-9. Scale for "kitchen".

Appendix 5M-10. Scale for "knife".

Matrices for Study 3: Implicational scaling for target words (5M-11 and 5M-12)

ID	Mo_T	l6	b6	j6	f6	h6	d6	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
11	2269	1	0	1	1	1	1	5
44	3962	0	1	1	1	1	1	5
49	3385	1	1	1	1	1	0	5
54	3038	1	1	1	0	1	1	5
63	2500	1	1	1	0	1	1	5
64	3269	1	1	0	1	1	1	5
75	2538	1	1	1	1	1	0	5
77	3538	1	1	1	1	1	0	5
81	2077	0	1	1	1	1	1	5
87	2654	1	1	1	1	1	0	5
3	1923	0	1	0	1	1	1	4
12	2308	0	1	0	1	1	1	4
15	2538	0	0	1	1	1	1	4
21	2000	0	1	0	1	1	1	4
29	1808	0	1	0	1	1	1	4
30	2385	0	1	0	1	1	1	4
38	3000	0	1	0	1	1	1	4
9	2846	0	1	1	0	0	1	3
37	2654	0	1	0	0	1	1	3
40	3154	0	0	0	1	1	1	3
50	3308	0	0	0	1	1	1	3
65	2154	0	1	1	0	0	1	3
89	2385	1	0	0	0	1	1	3
17	1462	0	0	0	0	1	1	2
18	2231	0	0	1	0	0	1	2
20	2192	0	0	0	1	0	1	2
35	2654	0	1	0	0	0	1	2
80	1769	0	0	0	0	1	1	2
82	1692	0	0	0	0	1	1	2
10	1808	0	0	0	0	0	0	0
16	2308	0	0	0	0	0	0	0
Total		49	59	53	58	64	65	348
Non-fit		9	11	10	7	5	4	46

ID	Mo_T	l28	b28	j28	f28	h28	d28	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
7	2538	1	0	1	1	1	1	5
22	2462	0	1	1	1	1	1	5
33	2654	1	1	0	1	1	1	5
38	3000	1	1	1	1	0	1	5
47	3115	1	1	0	1	1	1	5
54	3038	1	0	1	1	1	1	5
59	3577	1	1	0	1	1	1	5
63	2500	1	1	0	1	1	1	5
65	2154	0	1	1	1	1	1	5
88	2077	0	1	1	1	1	1	5
2	2692	0	0	1	1	1	1	4
3	1923	0	1	0	1	1	1	4
13	3308	0	0	1	1	1	1	4
14	2577	0	1	0	1	1	1	4
21	2000	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
30	2385	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
36	2577	1	1	0	0	0	1	4
69	4154	1	1	1	0	0	1	4
77	3538	0	1	0	1	1	1	4
81	2077	0	1	0	1	1	1	4
82	1692	0	1	0	1	1	1	4
8	2269	0	0	0	1	1	1	3
10	1808	0	0	0	1	1	1	3
15	2538	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
19	2231	0	0	0	1	1	1	3
28	2692	0	0	0	1	1	1	3
80	1769	0	0	0	1	1	1	3
90	2346	0	0	0	1	1	1	3
17	1462	0	0	1	0	0	1	2
29	1808	0	0	0	0	1	1	2
34	2808	0	0	0	0	1	1	2
73	3462	0	0	0	0	1	1	2
79	1923	0	0	0	0	0	1	1
Total		44	50	50	64	66	71	345
Non-fit		9	9	10	2	4	0	34

Appendix 5M-11. Scale for "law".　　*Appendix 5M-12*. Scale for "magazine".

Matrices for Study 3: Implicational scaling for target words (5M-13 and 5M-14)

ID	Mo_T	l29	b29	j29	f29	h29	d29	Total
1	3038	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
2	2692	0	1	1	1	1	1	5
10	1808	0	1	1	1	1	1	5
17	1462	1	0	1	1	1	1	5
32	2077	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
38	3000	1	0	1	1	1	1	5
55	3692	0	1	1	1	1	1	5
65	2154	1	0	1	1	1	1	5
88	2077	1	1	0	1	1	1	5
11	2269	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
15	2538	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
29	1808	0	0	1	1	1	1	4
54	3038	0	0	1	1	1	1	4
59	3577	0	0	1	1	1	1	4
62	2885	0	0	1	1	1	1	4
64	3269	0	1	0	1	1	1	4
75	2538	0	1	0	1	1	1	4
82	1692	0	0	1	1	1	1	4
85	2269	0	0	1	1	1	1	4
Total		54	58	68	71	71	71	393
Non-fit		4	5	3	0	0	0	12

Appendix 5M-13. Scale for "message".

ID	Mo_T	l21	b21	j21	f21	h21	d21	Total
1	3038	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	0	5
24	2231	0	1	1	1	1	1	5
36	2577	0	1	1	1	1	1	5
75	2538	1	1	0	1	1	1	5
82	1692	1	0	1	1	1	1	5
88	2077	0	1	1	1	1	1	5
8	2269	0	0	1	1	1	1	4
9	2846	0	0	1	1	1	1	4
20	2192	0	0	1	1	1	1	4
30	2385	0	0	1	1	1	1	4
58	4077	0	0	1	1	1	1	4
81	2077	0	0	1	1	1	1	4
89	2385	1	0	1	0	1	1	4
90	2346	0	0	1	1	1	1	4
17	1462	0	0	1	0	1	1	3
Total		60	61	70	69	71	70	401
Non-fit		4	1	2	2	0	1	10

Appendix 5M-14. Scale for "mirror".

Matrices for Study 3: Implicational scaling for target words (5M-15 and 5M-16)

ID	Mo_T	l10	b10	j10	f10	h10	d10	Total
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
1	3038	1	1	0	1	1	1	5
11	2269	1	1	0	1	1	1	5
47	3115	1	0	1	1	1	1	5
51	4038	0	1	1	1	1	1	5
58	4077	1	0	1	1	1	1	5
69	4154	0	1	1	1	1	1	5
88	2077	0	1	1	1	1	1	5
2	2692	0	0	1	1	1	1	4
8	2269	0	0	1	1	1	1	4
9	2846	0	0	1	1	1	1	4
10	1808	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
14	2577	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
19	2231	0	0	1	1	1	1	4
20	2192	0	0	1	1	1	1	4
21	2000	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
28	2692	0	0	1	1	1	1	4
29	1808	0	0	1	1	1	1	4
35	2654	0	0	1	1	1	1	4
36	2577	0	0	1	1	1	1	4
37	2654	0	0	1	1	1	1	4
50	3308	0	0	1	1	1	1	4
55	3692	0	0	1	1	1	1	4
63	2500	0	0	1	1	1	1	4
66	3000	0	0	1	1	1	1	4
70	2962	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
79	1923	0	0	1	1	1	1	4
80	1769	0	0	1	1	1	1	4
81	2077	0	0	1	1	1	1	4
90	2346	0	0	1	1	1	1	4
3	1923	0	0	1	1	1	0	3
17	1462	0	0	1	1	1	0	3
65	2154	0	0	1	1	1	0	3
82	1692	0	0	1	1	1	0	3
Total		37	38	69	71	71	67	353
Non-fit		4	2	6	0	0	4	16

Appendix 5M-15. Scale for "moon".

ID	Mo_T	l30	b30	j30	f30	h30	d30	Total
7	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
2	2692	0	1	1	1	1	1	5
5	3308	0	1	1	1	1	1	5
8	2269	0	1	1	1	1	1	5
23	2692	1	1	0	1	1	1	5
34	2808	1	1	0	1	1	1	5
50	3308	0	1	1	1	1	1	5
64	3269	1	1	0	1	1	1	5
70	2962	0	1	1	1	1	1	5
79	1923	0	1	1	1	1	1	5
1	3038	0	1	0	1	1	1	4
3	1923	0	1	0	1	1	1	4
9	2846	0	1	0	1	1	1	4
11	2269	0	1	0	1	1	1	4
13	3308	0	1	0	1	1	1	4
15	2538	0	1	0	1	1	1	4
19	2231	0	1	0	1	1	1	4
20	2192	0	1	0	1	1	1	4
22	2462	0	1	0	1	1	1	4
24	2231	0	1	0	1	1	1	4
25	2923	0	1	0	1	1	1	4
26	2692	0	1	0	1	1	1	4
27	2769	0	1	0	1	1	1	4
28	2692	0	1	0	1	1	1	4
29	1808	0	1	0	1	1	1	4
32	2077	0	1	0	1	1	1	4
33	2654	0	1	0	1	1	1	4
35	2654	0	1	0	1	1	1	4
37	2654	1	0	0	1	1	1	4
38	3000	0	1	0	1	1	1	4
43	2808	0	1	0	1	1	1	4
44	3962	0	1	0	1	1	1	4
49	3385	0	1	0	1	1	1	4
54	3038	0	1	0	1	1	1	4
55	3692	0	1	0	1	1	1	4
56	3462	0	1	0	1	1	1	4
58	4077	0	1	0	1	1	1	4
59	3577	0	1	0	1	1	1	4
60	4154	0	1	0	1	1	1	4
62	2885	0	1	0	1	1	1	4
63	2500	0	1	0	1	1	1	4
66	3000	0	1	0	1	1	1	4
67	3654	0	1	0	1	1	1	4
69	4154	0	1	0	1	1	1	4
74	3000	0	1	0	1	1	1	4
77	3538	0	1	0	1	1	1	4
86	3962	0	1	0	1	1	1	4
87	2654	0	1	0	1	1	1	4
89	2385	0	1	0	1	1	1	4
90	2346	0	1	0	1	1	1	4
12	2308	0	0	0	1	1	1	3
14	2577	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
21	2000	0	0	0	1	1	1	3
30	2385	0	0	0	1	1	1	3
47	3115	0	0	0	1	1	1	3
52	3923	0	0	0	1	1	1	3
65	2154	0	0	0	1	1	1	3
88	2077	0	0	0	1	1	1	3
36	2577	0	0	0	0	1	1	2
73	3462	0	0	0	0	1	1	2
82	1692	0	0	0	0	1	1	2
10	1808	0	0	0	0	1	0	1
17	1462	0	0	0	0	0	1	1
40	3154	0	0	0	0	0	1	1
80	1769	0	0	0	0	0	1	1
Total		10	54	12	64	68	70	278
Non-fit		4	39	43	0	1	1	88

Appendix 5M-16. Scale for "pilot".

Matrices for Study 3: Implicational scaling for target words (5M-17 and 5M-18)

ID	Mo_T	l5	b5	j5	f5	h5	d5	Total
7	2538	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
18	2231	1	0	1	1	1	1	5
40	3154	1	1	0	1	1	1	5
43	2808	1	0	1	1	1	1	5
44	3962	0	1	1	1	1	1	5
55	3692	1	0	1	1	1	1	5
60	4154	1	1	0	1	1	1	5
69	4154	1	1	0	1	1	1	5
85	2269	1	1	0	1	1	1	5
1	3038	0	0	1	1	1	1	4
5	3308	0	0	1	1	1	1	4
9	2846	0	1	0	1	1	1	4
12	2308	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
22	2462	0	0	1	1	1	1	4
24	2231	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
27	2769	0	0	1	1	1	1	4
28	2692	0	0	1	1	1	1	4
33	2654	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
35	2654	0	0	1	1	1	1	4
49	3385	0	0	1	1	1	1	4
52	3923	0	0	1	1	1	1	4
62	2885	1	0	0	1	1	1	4
70	2962	1	0	1	0	1	1	4
73	3462	1	0	1	0	1	1	4
2	2692	0	0	0	1	1	1	3
3	1923	0	0	0	1	1	1	3
11	2269	0	0	0	1	1	1	3
14	2577	0	0	0	1	1	1	3
23	2692	0	0	0	1	1	1	3
38	3000	0	0	0	1	1	1	3
47	3115	0	0	0	1	1	1	3
54	3038	0	0	0	1	1	1	3
56	3462	0	0	0	1	1	1	3
59	3577	0	0	0	1	1	1	3
66	3000	0	0	0	1	1	1	3
75	2538	0	0	1	0	1	1	3
86	3962	0	0	0	1	1	1	3
88	2077	0	0	0	1	1	1	3
10	1808	0	0	0	1	1	0	2
32	2077	0	0	0	1	1	0	2
65	2154	0	0	0	1	0	1	2
79	1923	0	0	0	1	1	0	2
80	1769	0	0	0	0	1	1	2
90	2346	0	0	0	0	1	1	2
8	2269	0	0	0	0	1	0	1
29	1808	0	0	0	1	0	0	1
89	2385	0	0	0	0	1	0	1
17	1462	0	0	0	0	0	0	0
19	2231	0	0	0	0	0	0	0
20	2192	0	0	0	0	0	0	0
81	2077	0	0	0	0	0	0	0
82	1692	0	0	0	0	0	0	0
Total		26	22	38	59	64	60	269
Non-fit		10	4	7	8	3	6	38

Appendix 5M-17. Scale for "quality".

ID	Mo_T	l7	b7	j7	f7	h7	d7	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
16	2308	1	1	0	1	1	1	5
37	2654	0	1	1	1	1	1	5
55	3692	0	1	1	1	1	1	5
56	3462	1	0	1	1	1	1	5
60	4154	0	1	1	1	1	1	5
66	3000	0	1	1	1	1	1	5
2	2692	0	1	0	1	1	1	4
7	2538	0	1	0	1	1	1	4
11	2269	0	1	0	1	1	1	4
13	3308	0	1	0	1	1	1	4
15	2538	0	0	1	1	1	1	4
28	2692	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
58	4077	0	0	1	1	1	1	4
59	3577	0	0	1	1	1	1	4
62	2885	0	0	1	1	1	1	4
64	3269	0	0	1	1	1	1	4
65	2154	1	1	0	0	1	1	4
74	3000	0	0	1	1	1	1	4
79	1923	0	0	1	1	1	1	4
88	2077	0	1	0	1	1	1	4
90	2346	0	0	1	1	1	1	4
14	2577	0	1	1	0	0	1	3
20	2192	0	1	0	0	1	1	3
25	2923	0	0	0	1	1	1	3
27	2769	0	0	0	1	1	1	3
36	2577	0	0	0	1	1	1	3
38	3000	0	0	0	1	1	1	3
40	3154	0	1	0	0	1	1	3
52	3923	0	0	0	1	1	1	3
81	2077	0	0	0	1	1	1	3
3	1923	0	1	0	0	0	1	2
8	2269	0	1	0	0	0	1	2
10	1808	0	1	0	0	0	1	2
12	2308	0	1	0	0	0	1	2
19	2231	0	0	0	1	0	1	2
21	2000	0	0	0	0	1	1	2
23	2692	0	0	0	0	1	1	2
24	2231	0	1	0	0	0	1	2
29	1808	0	0	0	0	1	1	2
30	2385	0	1	0	0	0	1	2
33	2654	0	0	1	0	0	1	2
47	3115	0	0	0	0	1	1	2
77	3538	0	0	0	0	1	1	2
82	1692	0	1	0	0	0	1	2
85	2269	0	1	0	0	0	1	2
87	2654	0	0	0	0	1	1	2
17	1462	0	0	0	0	0	1	1
22	2462	0	0	0	0	0	1	1
32	2077	0	0	0	0	0	1	1
35	2654	0	0	0	0	0	1	1
80	1769	0	0	0	0	0	1	1
89	2385	0	0	0	0	0	1	1
Total		21	40	35	46	54	71	267
Non-fit		3	18	9	5	11	0	46

Appendix 5M-18. Scale for "rain".

Matrices for Study 3: Implicational scaling for target words (5M-19 and 5M-20)

ID	Mo_T	l15	b15	j15	f15	h15	d15	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
10	1808	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
20	2192	1	0	1	1	1	1	5
24	2231	1	1	0	1	1	1	5
28	2692	0	1	1	1	1	1	5
33	2654	0	1	1	1	1	1	5
34	2808	1	0	1	1	1	1	5
40	3154	0	1	1	1	1	1	5
56	3462	1	1	1	1	1	0	5
67	3654	1	1	1	1	1	0	5
81	2077	1	1	1	1	1	0	5
7	2538	0	0	1	1	1	1	4
8	2269	0	0	1	1	1	1	4
11	2269	0	0	1	1	1	1	4
12	2308	0	0	1	1	1	1	4
15	2538	0	0	1	1	1	1	4
17	1462	0	0	1	1	1	1	4
22	2462	0	0	1	1	1	1	4
23	2692	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
27	2769	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
35	2654	0	0	1	1	1	1	4
38	3000	0	0	1	1	1	1	4
49	3385	0	0	1	1	1	1	4
51	4038	0	0	1	1	1	1	4
59	3577	0	0	1	1	1	1	4
63	2500	0	0	1	1	1	1	4
70	2962	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
79	1923	1	1	0	1	1	0	4
87	2654	0	0	1	1	1	1	4
88	2077	0	0	1	1	1	1	4
2	2692	0	0	1	1	1	0	3
3	1923	0	0	1	0	1	1	3
9	2846	0	0	1	0	1	1	3
14	2577	0	0	1	0	1	1	3
18	2231	0	0	1	0	1	1	3
29	1808	0	0	1	0	1	1	3
30	2385	0	0	0	1	1	1	3
80	1769	0	0	0	1	1	1	3
82	1692	0	0	0	1	1	1	3
90	2346	0	0	0	1	1	1	3
13	3308	0	0	1	0	0	0	1
37	2654	0	0	0	0	1	0	1
21	2000	0	0	0	0	0	0	0
89	2385	0	0	0	0	0	0	0
Total		31	34	62	62	68	62	319
Non-fit		7	3	9	5	1	7	32

ID	Mo_T	l23	b23	j23	f23	h23	d23	Total
1	3038	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
12	2308	0	1	1	1	1	1	5
13	3308	1	0	1	1	1	1	5
20	2192	1	1	0	1	1	1	5
22	2462	1	0	1	1	1	1	5
24	2231	0	1	1	1	1	1	5
25	2923	1	0	1	1	1	1	5
35	2654	1	0	1	1	1	1	5
36	2577	1	0	1	1	1	1	5
38	3000	1	0	1	1	1	1	5
49	3385	0	1	1	1	1	1	5
63	2500	0	1	1	1	1	1	5
2	2692	0	0	1	1	1	1	4
8	2269	0	0	1	1	1	1	4
9	2846	0	0	1	1	1	1	4
10	1808	0	0	1	1	1	1	4
15	2538	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
17	1462	0	0	1	1	1	1	4
19	2231	0	0	1	1	1	1	4
28	2692	0	0	1	1	1	1	4
29	1808	0	0	1	1	1	1	4
30	2385	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
37	2654	0	0	1	1	1	1	4
65	2154	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
79	1923	0	0	1	1	1	1	4
80	1769	0	0	1	1	1	1	4
81	2077	0	0	1	1	1	1	4
82	1692	0	0	1	1	1	1	4
Total		47	45	70	71	71	71	375
Non-fit		7	6	1	0	0	0	14

Appendix 5M-19. Scale for "right". *Appendix 5M-20.* Scale for "science".

Matrices for Study 3: Implicational scaling for target words (5M-21 and 5M-22)

ID	Mo_T	ll4	b14	j14	f14	h14	d14	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
2	2692	0	1	1	1	1	1	5
8	2269	0	1	1	1	1	1	5
9	2846	0	1	1	1	1	1	5
11	2269	0	1	1	1	1	1	5
22	2462	1	0	1	1	1	1	5
64	3269	1	0	1	1	1	1	5
81	2077	0	1	1	1	1	1	5
82	1692	1	0	1	1	1	1	5
3	1923	0	1	1	1	0	1	4
10	1808	0	0	1	1	1	1	4
12	2308	0	0	1	1	1	1	4
15	2538	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
21	2000	0	0	1	1	1	1	4
24	2231	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
27	2769	0	0	1	1	1	1	4
29	1808	0	0	1	1	1	1	4
30	2385	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
38	3000	0	0	1	1	1	1	4
58	4077	1	1	1	0	0	1	4
66	3000	0	0	1	1	1	1	4
80	1769	0	0	1	1	1	1	4
90	2346	0	0	1	1	1	1	4
17	1462	0	0	1	0	1	1	3
Total		47	50	71	69	69	71	377
Non-fit		4	5	1	2	2	0	14

ID	Mo_T	l8	b8	j8	f8	h8	d8	Total
2	2692	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	0	5
21	2000	0	1	1	1	1	1	5
26	2692	1	1	0	1	1	1	5
35	2654	0	1	1	1	1	1	5
36	2577	1	0	1	1	1	1	5
49	3385	1	1	0	1	1	1	5
50	3308	1	1	1	1	1	0	5
55	3692	1	1	0	1	1	1	5
58	4077	0	1	1	1	1	1	5
62	2885	0	1	1	1	1	1	5
64	3269	1	1	0	1	1	1	5
65	2154	1	1	0	1	1	1	5
1	3038	0	1	0	1	1	1	4
17	1462	0	1	1	1	1	0	4
22	2462	0	0	1	1	1	1	4
28	2692	0	0	1	1	1	1	4
59	3577	0	0	1	1	1	1	4
63	2500	0	1	0	1	1	1	4
75	2538	0	1	0	1	1	1	4
88	2077	0	1	0	1	1	1	4
3	1923	0	1	0	1	0	1	3
11	2269	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
34	2808	0	0	0	1	1	1	3
80	1769	0	0	0	1	1	1	3
82	1692	0	0	0	1	1	1	3
89	2385	0	1	0	0	1	1	3
20	2192	0	0	0	0	1	1	2
90	2346	0	0	0	0	1	1	2
Total		50	59	54	68	70	68	369
Non-fit		8	9	8	1	1	3	30

Appendix 5M-21. Scale for "sign".   *Appendix 5M-22*. Scale for "sleep".

Matrices for Study 3: Implicational scaling for target words (5M-23 and 5M-24)

ID	Mo_T	l9	b9	j9	f9	h9	d9	Total
1	3038	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
3	1923	0	1	1	1	1	1	5
5	3308	0	1	1	1	1	1	5
11	2269	1	1	0	1	1	1	5
35	2654	0	1	1	1	1	1	5
2	2692	1	0	0	1	1	1	4
8	2269	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
17	1462	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
19	2231	0	0	1	1	1	1	4
20	2192	0	0	1	1	1	1	4
24	2231	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
26	2692	0	1	0	1	1	1	4
27	2769	0	0	1	1	1	1	4
30	2385	0	0	1	1	1	1	4
32	2077	0	0	1	1	1	1	4
34	2808	0	0	1	1	1	1	4
37	2654	0	0	1	1	1	1	4
40	3154	0	1	0	1	1	1	4
44	3962	0	0	1	1	1	1	4
49	3385	0	0	1	1	1	1	4
50	3308	0	1	0	1	1	1	4
54	3038	0	0	1	1	1	1	4
55	3692	0	1	0	1	1	1	4
62	2885	0	0	1	1	1	1	4
65	2154	0	1	0	1	1	1	4
69	4154	0	0	1	1	1	1	4
73	3462	0	0	1	1	1	1	4
75	2538	0	0	1	1	1	1	4
79	1923	0	0	1	1	1	1	4
85	2269	0	0	1	1	1	1	4
7	2538	0	0	0	1	1	1	3
10	1808	0	0	0	1	1	1	3
14	2577	0	0	0	1	1	1	3
15	2538	0	0	0	1	1	1	3
16	2308	0	0	0	1	1	1	3
21	2000	0	0	0	1	1	1	3
28	2692	0	0	0	1	1	1	3
29	1808	0	0	0	1	1	1	3
33	2654	0	0	0	1	1	1	3
82	1692	0	0	0	1	1	1	3
90	2346	0	0	0	1	1	1	3
80	1769	0	0	0	1	0	1	2
Total		29	36	52	71	70	71	329
Non-fit		2	5	7	1	1	0	16

ID	Mo_T	l32	b32	j32	f32	h32	d32	Total
1	3038	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
7	2538	0	1	1	1	1	1	5
9	2846	1	0	1	1	1	1	5
12	2308	1	1	1	1	1	0	5
13	3308	1	0	1	1	1	1	5
20	2192	1	0	1	1	1	1	5
22	2462	0	1	1	1	1	1	5
25	2923	0	1	1	1	1	1	5
28	2692	0	1	1	1	1	1	5
44	3962	1	1	0	1	1	1	5
47	3115	1	1	0	1	1	1	5
51	4038	1	1	0	1	1	1	5
56	3462	1	1	0	1	1	1	5
66	3000	1	1	1	1	1	0	5
74	3000	1	1	1	1	1	0	5
86	3962	1	1	0	1	1	1	5
88	2077	1	0	1	1	1	1	5
89	2385	1	1	0	1	1	1	5
2	2692	0	1	1	1	1	0	4
5	3308	1	0	1	0	1	1	4
18	2231	1	0	1	1	1	0	4
23	2692	1	1	0	1	1	0	4
27	2769	0	0	1	1	1	1	4
32	2077	1	1	0	1	1	0	4
34	2808	0	0	1	1	1	1	4
49	3385	1	1	0	1	1	0	4
54	3038	1	1	0	1	1	0	4
70	2962	1	1	0	1	1	0	4
73	3462	1	1	0	1	1	0	4
81	2077	1	0	0	1	1	1	4
15	2538	0	0	0	1	1	1	3
65	2154	1	0	0	1	1	0	3
3	1923	0	0	0	0	1	1	2
19	2231	0	0	0	1	1	0	2
8	2269	0	1	0	0	0	0	1
10	1808	0	0	0	0	1	0	1
14	2577	0	0	0	0	0	1	1
17	1462	0	0	1	0	0	0	1
29	1808	0	0	0	0	0	1	1
30	2385	0	0	0	0	0	1	1
82	1692	0	0	0	0	0	1	1
Total		54	52	48	62	65	55	336
Non-fit		23	12	14	2	1	16	68

Appendix 5M-23. Scale for "snow".

Appendix 5M-24. Scale for "soft".

Matrices for Study 3: Implicational scaling for target words (5M-25 and 5M-26)

ID	Mo_T	l33	b33	j33	f33	h33	d33	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	0	5
8	2269	1	1	0	1	1	1	5
29	1808	1	0	1	1	1	1	5
80	1769	1	1	1	1	1	0	5
82	1692	1	1	0	1	1	1	5
3	1923	0	1	0	1	1	1	4
17	1462	0	0	1	1	1	0	3
Total		69	69	68	71	71	68	416
Non-fit		5	2	4	0	0	3	14

ID	Mo_T	l24	b24	j24	f24	h24	d24	Total
2	2692	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
5	3308	0	1	1	1	1	1	5
8	2269	1	1	1	1	0	1	5
37	2654	1	1	0	1	1	1	5
38	3000	1	0	1	1	1	1	5
54	3038	1	1	1	0	1	1	5
63	2500	0	1	1	1	1	1	5
86	3962	0	1	1	1	1	1	5
1	3038	0	1	0	1	1	1	4
9	2846	1	1	0	0	1	1	4
12	2308	0	1	0	1	1	1	4
19	2231	0	0	1	1	1	1	4
25	2923	0	0	1	1	1	1	4
27	2769	0	1	0	1	1	1	4
28	2692	0	1	0	1	1	1	4
33	2654	0	1	0	1	1	1	4
35	2654	0	0	1	1	1	1	4
47	3115	0	1	0	1	1	1	4
49	3385	0	1	0	1	1	1	4
64	3269	0	1	0	1	1	1	4
66	3000	0	1	0	1	1	1	4
74	3000	0	1	0	1	1	1	4
77	3538	0	1	0	1	1	1	4
87	2654	0	1	0	1	1	1	4
90	2346	1	1	1	0	0	1	4
7	2538	0	0	0	1	1	1	3
10	1808	0	0	0	1	1	1	3
13	3308	0	0	1	0	1	1	3
14	2577	0	0	0	1	1	1	3
20	2192	0	0	0	1	1	1	3
24	2231	0	0	0	1	1	1	3
26	2692	0	0	0	1	1	1	3
32	2077	0	0	0	1	1	1	3
34	2808	0	0	0	1	1	1	3
59	3577	0	0	1	0	1	1	3
65	2154	0	0	0	1	1	1	3
79	1923	0	1	0	1	0	1	3
81	2077	0	0	0	1	1	1	3
88	2077	0	0	0	1	1	1	3
3	1923	0	0	0	0	1	1	2
15	2538	0	0	0	0	1	1	2
18	2231	0	0	0	0	1	1	2
21	2000	0	1	0	0	0	1	2
82	1692	0	0	0	0	1	1	2
16	2308	0	0	0	0	0	1	1
17	1462	0	0	1	0	0	0	1
30	2385	0	0	0	0	1	0	1
80	1769	0	0	0	0	1	0	1
29	1808	0	0	0	0	0	0	0
Total		29	45	36	56	64	67	297
Non-fit		6	17	17	5	6	3	54

Appendix 5M-25. Scale for "ticket".　　　*Appendix 5M-26.* Scale for "tomorrow".

Matrices for Study 3: Implicational scaling for target words (5M-27 and 5M-28)

ID	Mo_T	l34	b34	j34	f34	h34	d34	Total
47	3115	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
3	1923	1	1	0	1	1	1	5
69	4154	1	1	0	1	1	1	5
26	2692	0	1	0	1	1	1	4
28	2692	0	1	0	1	1	1	4
40	3154	0	1	0	1	1	1	4
43	2808	0	1	0	1	1	1	4
51	4038	0	1	0	1	1	1	4
52	3923	0	1	0	1	1	1	4
55	3692	0	1	0	1	1	1	4
62	2885	1	1	1	0	0	1	4
63	2500	0	1	0	1	1	1	4
66	3000	0	1	0	1	1	1	4
67	3654	0	1	0	1	1	1	4
74	3000	0	1	0	1	1	1	4
79	1923	0	1	0	1	1	1	4
16	2308	0	0	1	1	0	1	3
21	2000	0	0	0	1	1	1	3
27	2769	0	1	0	1	1	0	3
34	2808	0	0	0	1	1	1	3
38	3000	0	0	0	1	1	1	3
44	3962	0	1	0	0	1	1	3
49	3385	0	0	0	1	1	1	3
50	3308	0	1	0	0	1	1	3
85	2269	0	1	0	0	1	1	3
87	2654	1	0	0	0	1	1	3
88	2077	0	1	1	0	0	1	3
1	3038	0	0	0	0	1	1	2
5	3308	0	0	1	0	1	0	2
7	2538	0	0	0	0	1	1	2
12	2308	0	0	0	0	1	1	2
29	1808	0	0	0	1	0	1	2
54	3038	0	0	0	0	1	1	2
59	3577	0	1	0	0	0	1	2
60	4154	0	0	0	0	1	1	2
64	3269	0	0	0	0	1	1	2
73	3462	0	0	0	0	1	1	2
80	1769	0	0	0	0	1	1	2
81	2077	0	0	0	0	1	1	2
86	3962	0	0	0	0	1	1	2
2	2692	0	0	0	0	0	1	1
9	2846	0	0	0	0	0	1	1
11	2269	0	0	0	0	0	1	1
13	3308	0	0	0	0	0	1	1
14	2577	0	0	0	0	0	1	1
18	2231	0	0	0	0	0	1	1
19	2231	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
22	2462	0	0	0	0	0	1	1
23	2692	0	0	0	0	0	1	1
24	2231	0	0	0	0	0	1	1
25	2923	0	0	0	0	0	1	1
30	2385	0	0	0	0	0	1	1
32	2077	0	0	0	0	0	1	1
33	2654	0	0	0	0	0	1	1
35	2654	0	0	0	0	0	1	1
36	2577	0	0	0	0	0	1	1
37	2654	0	0	0	0	0	1	1
58	4077	0	0	0	0	1	0	1
75	2538	0	0	0	0	0	1	1
82	1692	0	0	0	0	0	1	1
89	2385	0	0	0	0	0	1	1
90	2346	0	0	0	0	0	1	1
8	2269	0	0	0	0	0	0	0
10	1808	0	0	0	0	0	0	0
15	2538	0	0	0	0	0	0	0
17	1462	0	0	0	0	0	0	0
65	2154	0	0	0	0	0	0	0
Total		8	25	8	25	39	63	168
Non-fit		4	19	17	7	6	3	56

ID	Mo_T	l4	b4	j4	f4	h4	d4	Total
51	4038	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
49	3385	1	1	0	1	1	1	5
52	3923	1	1	0	1	1	1	5
58	4077	1	1	0	1	1	1	5
67	3654	1	0	1	1	1	1	5
2	2692	0	0	1	1	1	1	4
9	2846	0	0	1	1	1	1	4
23	2692	0	1	0	1	1	1	4
25	2923	0	0	1	1	1	1	4
26	2692	1	0	1	0	1	1	4
28	2692	0	1	0	1	1	1	4
43	2808	0	1	0	1	1	1	4
47	3115	1	0	1	0	1	1	4
55	3692	0	0	1	1	1	1	4
59	3577	0	1	0	1	1	1	4
66	3000	1	0	0	1	1	1	4
77	3538	1	0	1	0	1	1	4
88	2077	1	0	0	1	1	1	4
90	2346	0	0	1	1	1	1	4
5	3308	0	0	1	0	1	1	3
11	2269	1	0	0	0	1	1	3
18	2231	0	0	1	0	1	1	3
27	2769	0	0	1	0	1	1	3
32	2077	0	0	1	0	1	1	3
33	2654	1	0	0	0	1	1	3
34	2808	0	0	1	0	1	1	3
50	3308	0	0	0	1	1	1	3
62	2885	1	0	0	0	1	1	3
70	2962	0	0	0	1	1	1	3
86	3962	0	0	0	1	1	1	3
1	3038	0	0	0	0	1	1	2
3	1923	0	0	0	0	1	1	2
7	2538	0	0	0	0	1	1	2
8	2269	0	0	0	0	1	1	2
13	3308	0	0	0	0	1	1	2
15	2538	0	0	0	0	1	1	2
19	2231	0	0	0	0	1	1	2
20	2192	0	0	0	0	1	1	2
21	2000	0	0	0	0	1	1	2
22	2462	0	0	0	0	1	1	2
24	2231	0	0	0	0	1	1	2
36	2577	0	0	0	0	1	1	2
37	2654	0	0	0	0	1	1	2
38	3000	0	0	0	0	1	1	2
40	3154	0	0	0	0	1	1	2
44	3962	0	0	0	0	1	1	2
56	3462	0	0	0	0	1	1	2
63	2500	0	0	0	0	1	1	2
65	2154	0	0	0	0	1	1	2
75	2538	0	0	0	0	1	1	2
80	1769	0	0	0	1	1	1	2
81	2077	0	0	0	0	1	1	2
82	1692	0	0	0	0	1	1	2
85	2269	0	0	0	0	1	1	2
87	2654	0	0	0	0	1	1	2
89	2385	0	0	0	0	1	1	2
10	1808	0	0	0	0	0	1	1
12	2308	0	0	0	0	0	1	1
14	2577	0	0	0	0	0	1	1
29	1808	0	0	0	0	1	0	1
30	2385	0	0	0	0	0	1	1
35	2654	0	0	0	0	0	1	1
73	3462	0	0	0	0	0	1	1
79	1923	0	0	0	0	0	1	1
16	2308	0	0	0	0	0	0	0
17	1462	0	0	0	0	0	0	0
Total		18	13	20	24	62	68	205
Non-fit		12	6	14	11	1	1	44

Appendix 5M-27. Scale for "video". *Appendix 5M-28.* Scale for "warm".

Matrices for Study 3: Implicational scaling for target words (5M-29 and 5M-30)

ID	Mo_T	l35	b35	j35	f35	h35	d35	Total
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	0	5
30	2385	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
35	2654	0	1	1	1	1	1	5
59	3577	0	1	1	1	1	1	5
75	2538	0	1	1	1	1	1	5
85	2269	1	1	0	1	1	1	5
1	3038	0	0	1	1	1	1	4
13	3308	0	0	1	1	1	1	4
16	2308	0	0	1	1	1	1	4
18	2231	0	0	1	1	1	1	4
19	2231	0	0	1	1	1	1	4
21	2000	0	0	1	1	1	1	4
29	1808	0	0	1	1	1	1	4
37	2654	0	0	1	1	1	1	4
38	3000	0	0	1	1	1	1	4
54	3038	0	0	1	1	1	1	4
65	2154	0	0	1	1	1	1	4
90	2346	0	0	1	1	1	1	4
17	1462	0	0	1	0	1	1	3
Total		53	58	70	70	71	70	392
Non-fit		2	0	2	1	0	1	6

ID	Mo_T	l25	b25	j25	f25	h25	d25	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
11	2269	1	1	0	1	1	1	5
17	1462	1	1	1	0	1	1	5
62	2885	1	1	1	1	0	1	5
65	2154	1	1	0	1	1	1	5
77	3538	0	1	1	1	1	1	5
89	2385	1	1	0	1	1	1	5
18	2231	1	1	1	0	0	1	4
25	2923	0	1	1	1	1	1	4
36	2577	0	1	0	1	1	1	4
Total		68	71	66	69	69	71	414
Non-fit		6	3	5	2	2	0	18

Appendix 5M-29. Scale for "wash".   *Appendix 5M-30.* Scale for "yellow".

Appendix 5N

Matrices for Study 3: Implicational scaling for target words (5N-1 and 5N-2)

ID	Mo_T	k16	i16	e16	c16	g16	a16	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
54	3038	1	1	1	0	1	1	5
Total		71	71	71	70	71	71	425
Non-fit		1	0	0	1	0	0	2

ID	Mo_T	k26	i26	e26	c26	g26	a26	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
13	3308	0	1	1	1	1	1	5
19	2231	1	1	1	1	1	0	5
32	2077	1	1	0	1	1	1	5
33	2654	1	0	1	1	1	1	5
86	3962	1	1	1	1	1	0	5
Total		70	70	70	71	71	69	421
Non-fit		4	1	1	0	0	2	8

Appendix 5N-1. Scale for "address".   *Appendix 5N-2*. Scale for "animal".

Matrices for Study 3: Implicational scaling for target words (5N-3 and 5N-4)

ID	Mo_T	k1	i1	e1	c1	g1	a1	Total
1	3038	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
2	2692	0	1	1	1	1	1	5
7	2538	0	1	1	1	1	1	5
13	3308	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
19	2231	0	1	1	1	1	1	5
23	2692	0	1	1	1	1	1	5
25	2923	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
30	2385	0	1	1	1	1	1	5
32	2077	0	1	1	1	1	1	5
33	2654	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
35	2654	0	1	1	1	1	1	5
55	3692	0	1	1	1	1	1	5
59	3577	0	1	1	1	1	1	5
63	2500	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
67	3654	0	1	1	1	1	1	5
69	4154	0	1	1	1	1	1	5
70	2962	0	1	1	1	1	1	5
81	2077	0	1	1	1	1	1	5
90	2346	0	1	1	1	1	1	5
14	2577	0	1	0	1	1	1	4
17	1462	0	1	1	1	0	1	4
28	2692	0	1	1	1	1	0	4
Total		46	71	70	71	70	70	398
Non-fit		0	3	1	0	1	1	6

ID	Mo_T	k17	i17	e17	c17	g17	a17	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
8	2269	1	0	1	1	1	1	5
12	2308	0	1	1	1	1	1	5
13	3308	0	1	1	1	1	1	5
15	2538	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
22	2462	1	1	1	0	1	1	5
25	2923	0	1	1	1	1	1	5
27	2769	0	1	1	1	1	1	5
32	2077	0	1	1	1	1	1	5
33	2654	1	1	1	0	1	1	5
34	2808	0	1	1	1	1	1	5
36	2577	1	0	1	1	1	1	5
37	2654	0	1	1	1	1	1	5
38	3000	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
82	1692	1	1	0	1	1	1	5
87	2654	0	1	1	1	1	1	5
90	2346	0	1	1	1	1	1	5
9	2846	0	0	1	1	1	1	4
10	1808	0	1	1	1	0	1	4
20	2192	0	0	1	1	1	1	4
7	2538	0	1	0	1	0	1	3
19	2231	0	1	0	1	0	1	3
30	2385	0	1	0	0	1	1	3
3	1923	0	1	0	1	0	0	2
14	2577	0	1	0	1	0	0	2
17	1462	0	0	0	1	0	1	2
29	1808	0	1	0	1	0	0	2
Total		48	65	64	68	64	68	377
Non-fit		5	8	2	7	7	3	32

Appendix 5N-3. Scale for "bird".

Appendix 5N-4. Scale for "bottle".

Matrices for Study 3: Implicational scaling for target words (5N-5 and 5N-6)
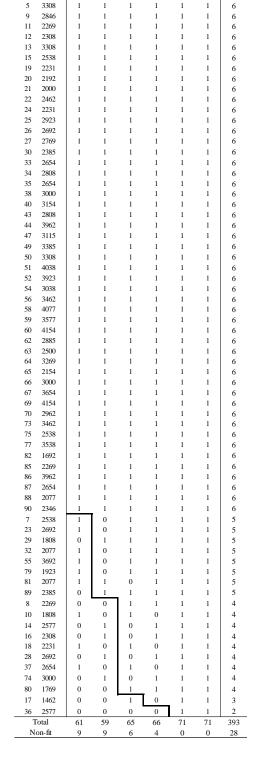
ID	Mo_T	k13	i13	e13	c13	g13	a13	Total
1	3038	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
2	2692	0	1	1	1	1	1	5
7	2538	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
19	2231	0	1	1	1	1	1	5
20	2192	0	1	1	1	1	1	5
25	2923	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
32	2077	0	1	1	1	1	1	5
36	2577	0	1	1	1	1	1	5
82	1692	0	1	1	1	1	1	5
17	1462	0	1	1	1	0	1	4
14	2577	0	1	0	1	0	1	3
Total		59	71	70	71	69	71	411
Non-fit		0	2	0	0	2	0	4

ID	Mo_T	k2	i2	e2	c2	g2	a2	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
3	1923	0	1	1	1	1	1	5
10	1808	1	1	0	1	1	1	5
19	2231	1	0	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
30	2385	1	0	1	1	1	1	5
35	2654	1	1	1	1	0	1	5
36	2577	1	0	1	1	1	1	5
51	4038	0	1	1	1	1	1	5
56	3462	0	1	1	1	1	1	5
79	1923	0	1	1	1	1	1	5
17	1462	0	0	1	1	1	1	4
37	2654	0	0	1	1	1	1	4
Total		64	66	70	71	70	71	412
Non-fit		5	3	1	0	1	0	10

Appendix 5N-5. Scale for "climb".   *Appendix 5N-6.* Scale for "farm".

Matrices for Study 3: Implicational scaling for target words (5N-7 and 5N-8)

ID	Mo_T	k18	i18	e18	c18	g18	a18	Total
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
1	3038	0	1	1	1	1	1	5
7	2538	0	1	1	1	1	1	5
8	2269	0	1	1	1	1	1	5
10	1808	0	1	1	1	1	1	5
11	2269	0	1	1	1	1	1	5
13	3308	0	1	1	1	1	1	5
14	2577	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
20	2192	0	1	1	1	1	1	5
22	2462	0	1	1	1	1	1	5
25	2923	0	1	1	1	1	1	5
27	2769	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
30	2385	0	1	1	1	1	1	5
33	2654	0	1	1	1	1	1	5
47	3115	0	1	1	1	1	1	5
49	3385	1	1	0	1	1	1	5
50	3308	0	1	1	1	1	1	5
58	4077	0	1	1	1	1	1	5
59	3577	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
74	3000	0	1	1	1	1	1	5
79	1923	0	1	1	1	1	1	5
80	1769	0	1	1	1	1	1	5
81	2077	0	1	1	1	1	1	5
90	2346	1	0	1	1	1	1	5
3	1923	0	1	1	0	1	1	4
17	1462	0	1	1	1	1	0	4
Total		45	70	70	70	71	70	396
Non-fit		2	3	1	1	0	1	8

ID	Mo_T	k27	i27	e27	c27	g27	a27	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
14	2577	1	1	0	1	1	1	5
65	2154	0	1	1	1	1	1	5
Total		70	71	70	71	71	71	424
Non-fit		1	0	1	0	0	0	2

Appendix 5N-7. Scale for "grass". *Appendix 5N-8.* Scale for "hero".

Matrices for Study 3: Implicational scaling for target words (5N-9 and 5N-10)

ID	Mo_T	k19	i19	e19	c19	g19	a19	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
3	1923	1	1	1	0	1	1	5
10	1808	0	1	1	1	1	1	5
11	2269	0	1	1	1	1	1	5
15	2538	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
17	1462	1	1	1	1	0	1	5
18	2231	0	1	1	1	1	1	5
24	2231	1	1	1	0	1	1	5
27	2769	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
33	2654	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
36	2577	1	1	1	0	1	1	5
43	2808	0	1	1	1	1	1	5
49	3385	0	1	1	1	1	1	5
58	4077	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
66	3000	0	1	1	1	1	1	5
75	2538	0	1	1	1	1	1	5
80	1769	0	1	1	1	1	1	5
81	2077	0	1	1	1	1	1	5
85	2269	0	1	1	1	1	1	5
89	2385	0	1	1	1	1	1	5
90	2346	0	1	1	1	1	1	5
19	2231	0	1	1	1	0	1	4
82	1692	0	1	0	1	0	1	3
Total		49	71	70	67	69	71	397
Non-fit		4	2	0	4	2	0	12

ID	Mo_T	k11	i11	e11	c11	g11	a11	Total
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
1	3038	1	0	1	1	1	1	5
14	2577	1	1	0	1	1	1	5
16	2308	1	0	1	1	1	1	5
19	2231	0	1	1	1	1	1	5
24	2231	1	0	1	1	1	1	5
33	2654	1	1	1	0	1	1	5
36	2577	1	0	1	1	1	1	5
79	1923	1	1	0	1	1	1	5
86	3962	1	0	1	1	1	1	5
88	2077	1	1	0	1	1	1	5
10	1808	1	1	0	1	0	1	4
82	1692	1	1	0	1	0	1	4
3	1923	1	0	0	1	0	1	3
17	1462	1	0	0	1	0	1	3
30	2385	1	0	0	1	0	1	3
Total		70	63	63	70	66	71	403
Non-fit		14	7	5	1	5	0	32

Appendix 5N-9. Scale for "kitchen".   *Appendix 5N-10.* Scale for "knife".

Matrices for Study 3: Implicational scaling for target words (5N-11 and 5N-12)

ID	Mo_T	k6	i6	e6	c6	g6	a6	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
3	1923	1	1	1	0	1	1	5
14	2577	0	1	1	1	1	1	5
22	2462	1	0	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
30	2385	1	1	0	1	1	1	5
40	3154	1	1	1	0	1	1	5
64	3269	1	1	1	0	1	1	5
10	1808	1	1	0	1	0	1	4
17	1462	0	1	0	1	1	1	4
16	2308	0	0	1	0	1	1	3
82	1692	1	0	0	1	0	1	3
Total		67	68	67	67	69	71	409
Non-fit		7	3	4	4	2	0	20

ID	Mo_T	k28	i28	e28	c28	g28	a28	Total
1	3038	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	0	5
7	2538	0	1	1	1	1	1	5
10	1808	0	1	1	1	1	1	5
13	3308	0	1	1	1	1	1	5
19	2231	0	1	1	1	1	1	5
20	2192	0	1	1	1	1	1	5
27	2769	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
32	2077	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
43	2808	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
80	1769	0	1	1	1	1	1	5
81	2077	0	1	1	1	1	1	5
37	2654	0	1	1	1	1	0	4
Total		57	71	71	71	71	69	410
Non-fit		1	1	0	0	0	2	4

Appendix 5N-11. Scale for "law".   *Appendix 5N-12*. Scale for "magazine".

Matrices for Study 3: Implicational scaling for target words (5N-13 and 5N-14)

ID	Mo_T	k29	i29	e29	c29	g29	a29	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
3	1923	0	1	1	1	1	1	5
5	3308	0	1	1	1	1	1	5
10	1808	0	1	1	1	1	1	5
13	3308	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	1	5
17	1462	0	1	1	1	1	1	5
27	2769	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
38	3000	0	1	1	1	1	1	5
52	3923	0	1	1	1	1	1	5
54	3038	0	1	1	1	1	1	5
59	3577	0	1	1	1	1	1	5
62	2885	0	1	1	1	1	1	5
79	1923	0	1	1	1	1	1	5
Total		57	71	71	71	71	71	412
Non-fit		0	0	0	0	0	0	0

ID	Mo_T	k21	i21	e21	c21	g21	a21	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
14	2577	1	1	0	1	1	1	5
17	1462	0	1	1	1	1	1	5
49	3385	1	1	1	0	1	1	5
79	1923	0	1	1	1	1	1	5
82	1692	1	1	0	1	1	1	5
Total		69	71	69	70	71	71	421
Non-fit		3	0	2	1	0	0	6

Appendix 5N-13. Scale for "message". *Appendix 5N-14*. Scale for "mirror".

Matrices for Study 3: Implicational scaling for target words (5N-15 and 5N-16)

ID	Mo_T	k10	i10	e10	c10	g10	a10	Total
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
1	3038	1	0	1	1	1	1	5
3	1923	1	1	1	0	1	1	5
7	2538	1	0	1	1	1	1	5
9	2846	1	1	1	0	1	1	5
10	1808	1	0	1	1	1	1	5
11	2269	1	0	1	1	1	1	5
12	2308	1	0	1	1	1	1	5
17	1462	0	1	1	1	1	1	5
19	2231	1	0	1	1	1	1	5
27	2769	1	0	1	1	1	1	5
28	2692	1	0	1	1	1	1	5
36	2577	1	0	1	1	1	1	5
51	4038	1	0	1	1	1	1	5
63	2500	1	0	1	1	1	1	5
67	3654	1	1	1	0	1	1	5
2	2692	1	0	1	0	1	1	4
Total		70	59	71	67	71	71	409
Non-fit		15	11	0	4	0	0	30

ID	Mo_T	k30	i30	e30	c30	g30	a30	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
16	2308	0	1	1	1	1	1	5
33	2654	1	1	1	1	0	1	5
49	3385	1	1	0	1	1	1	5
Total		70	71	70	71	70	71	423
Non-fit		2	0	1	0	1	0	4

Appendix 5N-15. Scale for "moon".   *Appendix 5N-16.* Scale for "pilot".

Matrices for Study 3: Implicational scaling for target words (5N-17 and 5N-18)

ID	Mo_T	k5	i5	e5	c5	g5	a5	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
7	2538	1	1	1	0	1	1	5
8	2269	1	0	1	1	1	1	5
9	2846	1	1	1	0	1	1	5
11	2269	1	1	1	0	1	1	5
17	1462	1	1	1	1	0	1	5
32	2077	0	1	1	1	1	1	5
35	2654	0	1	1	1	1	1	5
47	3115	1	0	1	1	1	1	5
62	2885	1	1	1	1	1	0	5
64	3269	1	1	1	1	0	1	5
81	2077	1	1	1	1	1	0	5
86	3962	1	1	1	1	1	0	5
88	2077	0	1	1	1	1	1	5
10	1808	0	1	1	0	1	1	4
19	2231	1	0	1	1	1	0	4
82	1692	1	0	0	0	0	0	1
Total		67	67	70	66	68	66	404
Non-fit		12	3	0	4	2	5	26

ID	Mo_T	k7	i7	e7	c7	g7	a7	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
38	3000	0	1	1	1	1	1	5
80	1769	0	1	1	1	1	1	5
85	2269	1	0	1	1	1	1	5
22	2462	1	0	0	1	1	1	4
40	3154	1	0	0	1	1	1	4
10	1808	0	1	0	1	0	1	3
14	2577	1	0	0	1	0	1	3
82	1692	1	0	0	1	0	1	3
89	2385	1	0	0	1	0	1	3
17	1462	0	0	0	1	0	1	2
29	1808	0	0	0	1	0	1	2
Total		66	63	63	71	65	71	399
Non-fit		6	2	2	2	6	0	18

Appendix 5N-17. Scale for "quality".   *Appendix 5N-18.* Scale for "rain".

Matrices for Study 3: Implicational scaling for target words (5N-19 and 5N-20)

ID	Mo_T	k15	i15	e15	c15	g15	a15	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
5	3308	1	0	1	1	1	1	5
7	2538	0	1	1	1	1	1	5
8	2269	0	1	1	1	1	1	5
11	2269	1	0	1	1	1	1	5
15	2538	0	1	1	1	1	1	5
17	1462	0	1	1	1	1	1	5
21	2000	1	1	1	0	1	1	5
22	2462	1	0	1	1	1	1	5
23	2692	1	0	1	1	1	1	5
25	2923	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
38	3000	0	1	1	1	1	1	5
50	3308	1	0	1	1	1	1	5
52	3923	1	0	1	1	1	1	5
54	3038	0	1	1	1	1	1	5
55	3692	1	0	1	1	1	1	5
58	4077	1	0	1	1	1	1	5
62	2885	1	0	1	1	1	1	5
65	2154	1	0	1	1	1	1	5
67	3654	1	1	1	0	1	1	5
82	1692	1	0	1	1	1	1	5
89	2385	1	0	1	1	1	1	5
9	2846	1	0	1	0	1	1	4
18	2231	1	0	1	0	1	1	4
20	2192	1	0	1	0	1	1	4
29	1808	1	0	1	0	1	1	4
32	2077	0	0	1	1	1	1	4
33	2654	1	0	1	0	1	1	4
36	2577	1	0	1	0	1	1	4
44	3962	1	0	1	0	1	1	4
74	3000	1	0	1	0	1	1	4
3	1923	0	0	1	0	1	1	3
13	3308	0	0	1	0	1	1	3
14	2577	0	0	1	0	1	1	3
37	2654	0	0	1	0	1	1	3
80	1769	0	0	1	0	1	1	3
Total		57	45	71	56	71	71	371
Non-fit		22	12	5	15	0	0	54

Appendix 5N-19. Scale for "right".

ID	Mo_T	k23	i23	e23	c23	g23	a23	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
2	2692	1	1	1	0	1	1	5
3	1923	1	1	1	0	1	1	5
17	1462	0	1	1	1	1	1	5
22	2462	1	0	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
30	2385	0	1	1	1	1	1	5
34	2808	1	1	1	1	0	1	5
37	2654	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
Total		66	70	71	69	70	71	417
Non-fit		4	1	0	2	1	0	8

Appendix 5N-20. Scale for "science".

Matrices for Study 3: Implicational scaling for target words (5N-21 and 5N-22)

ID	Mo_T	k14	i14	e14	c14	g14	a14	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
7	2538	1	1	1	1	0	1	5
10	1808	0	1	1	1	1	1	5
14	2577	1	1	0	1	1	1	5
15	2538	0	1	1	1	1	1	5
17	1462	0	1	1	1	1	1	5
19	2231	0	1	1	1	1	1	5
30	2385	1	1	1	1	0	1	5
33	2654	1	1	1	1	0	1	5
Total		67	71	70	71	68	71	418
Non-fit		4	0	1	0	3	0	8

Appendix 5N-21. Scale for "sign".

ID	Mo_T	k8	i8	e8	c8	g8	a8	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
3	1923	1	1	0	1	1	1	5
9	2846	1	1	0	1	1	1	5
17	1462	0	1	1	1	1	1	5
19	2231	0	1	1	1	1	1	5
59	3577	0	1	1	1	1	1	5
65	2154	0	1	1	1	1	1	5
16	2308	0	1	1	1	1	0	4
Total		66	71	69	71	71	70	418
Non-fit		2	0	2	0	0	0	4

Appendix 5N-22. Scale for "sleep".

Matrices for Study 3: Implicational scaling for target words (5N-23 and 5N-24)

Appendix 5N-23 (Scale for "snow")

ID	Mo_T	k9	i9	e9	c9	g9	a9	Total
1	3038	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
2	2692	0	1	1	1	1	1	5
3	1923	0	1	1	1	1	1	5
5	3308	1	1	1	1	1	0	5
7	2538	1	1	1	1	1	0	5
14	2577	1	1	0	1	1	1	5
16	2308	0	1	1	1	1	1	5
28	2692	0	1	1	1	1	1	5
29	1808	0	1	1	1	1	1	5
30	2385	0	1	1	1	1	1	5
32	2077	0	1	1	1	1	1	5
34	2808	0	1	1	1	1	1	5
37	2654	0	1	1	1	1	1	5
44	3962	0	1	1	1	1	1	5
75	2538	0	1	1	1	1	1	5
80	1769	0	1	1	1	1	1	5
85	2269	0	1	1	1	1	1	5
88	2077	0	1	1	1	1	1	5
90	2346	0	1	1	1	1	1	5
19	2231	0	1	1	1	1	0	4
Total		55	71	70	71	71	68	406
Non-fit		3	1	1	0	0	2	8

Appendix 5N-24 (Scale for "soft")

ID	Mo_T	k32	i32	e32	c32	g32	a32	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
14	2577	1	1	0	1	1	1	5
19	2231	0	1	1	1	1	1	5
30	2385	1	1	0	1	1	1	5
37	2654	1	1	0	1	1	1	5
64	3269	0	1	1	1	1	1	5
17	1462	1	0	0	1	1	1	4
82	1692	1	1	0	1	0	1	4
3	1923	1	0	0	1	0	1	3
Total		69	69	65	71	69	71	414
Non-fit		6	1	5	0	2	0	14

Appendix 5N-23. Scale for "snow".

Appendix 5N-24. Scale for "soft".

Matrices for Study 3: Implicational scaling for target words (5N-25 and 5N-26)

ID	Mo_T	k33	i33	e33	c33	g33	a33	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
23	2692	1	1	1	1	0	1	5
65	2154	0	1	1	1	1	1	5
Total		70	71	71	71	70	71	424
Non-fit		1	0	0	0	1	0	2

ID	Mo_T	k24	i24	e24	c24	g24	a24	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
16	2308	1	1	1	1	0	1	5
26	2692	0	1	1	1	1	1	5
35	2654	0	1	1	1	1	1	5
79	1923	0	1	1	1	1	1	5
3	1923	1	1	0	1	0	1	4
10	1808	0	1	1	1	1	0	4
17	1462	1	1	1	1	0	0	4
30	2385	1	1	0	1	1	0	4
29	1808	0	1	0	1	0	0	2
Total		66	71	68	71	67	67	410
Non-fit		4	5	2	1	4	4	20

Appendix 5N-25. Scale for "ticket".   *Appendix 5N-26*. Scale for "tomorrow".

Matrices for Study 3: Implicational scaling for target words (5N-27 and 5N-28)

ID	Mo_T	k34	i34	e34	c34	g34	a34	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
3	1923	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
24	2231	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
9	2846	1	0	1	1	1	1	5
17	1462	1	1	1	0	1	1	5
34	2808	0	1	1	1	1	1	5
49	3385	0	1	1	1	1	1	5
82	1692	1	1	0	1	1	1	5
88	2077	1	1	0	1	1	1	5
89	2385	1	0	1	1	1	1	5
7	2538	1	1	0	1	0	1	4
10	1808	0	1	1	1	0	1	4
14	2577	1	0	0	1	0	1	3
29	1808	1	0	0	1	0	1	3
Total		68	67	66	71	66	71	409
Non-fit		8	4	3	0	5	0	20

Appendix 5N-27. Scale for "video".

ID	Mo_T	k4	i4	e4	c4	g4	a4	Total
1	3038	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
33	2654	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
10	1808	0	1	1	1	1	1	5
14	2577	1	1	0	1	1	1	5
19	2231	1	1	1	1	1	0	5
21	2000	0	1	1	1	1	1	5
24	2231	1	0	1	1	1	1	5
27	2769	1	1	1	1	1	0	5
35	2654	0	1	1	1	1	1	5
36	2577	1	1	0	1	1	1	5
37	2654	1	1	0	1	1	1	5
50	3308	1	0	1	1	1	1	5
51	4038	1	1	1	1	1	0	5
64	3269	1	0	1	1	1	1	5
70	2962	1	1	1	0	1	1	5
80	1769	1	1	1	0	1	1	5
81	2077	1	1	1	0	1	1	5
86	3962	1	1	1	1	1	0	5
2	2692	0	0	1	1	1	1	4
7	2538	0	1	1	1	1	0	4
16	2308	0	1	1	1	1	0	4
20	2192	1	0	1	0	1	1	4
22	2462	1	1	0	0	1	1	4
25	2923	0	1	1	1	1	0	4
29	1808	1	0	0	1	1	1	4
79	1923	0	1	0	1	1	1	4
3	1923	1	0	0	1	1	0	3
30	2385	1	0	0	1	1	0	3
62	2885	1	0	1	0	1	0	3
89	2385	1	1	0	1	0	0	3
82	1692	0	1	0	0	0	1	2
17	1462	0	1	0	0	0	0	1
Total		61	62	60	63	68	59	373
Non-fit		20	11	7	6	2	12	58

Appendix 5N-28. Scale for "warm".

Matrices for Study 3: Implicational scaling for target words (5N-29 and 5N-30)

ID	Mo_T	k35	i35	e35	c35	g35	a35	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
18	2231	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2000	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
3	1923	1	1	1	0	1	1	5
24	2231	1	1	1	0	1	1	5
33	2654	1	0	1	1	1	1	5
Total		71	70	71	69	71	71	423
Non-fit		3	1	0	2	0	0	6

Appendix 5N-29. Scale for "sign".

ID	Mo_T	k25	i25	e25	c25	g25	a25	Total
1	3038	1	1	1	1	1	1	6
2	2692	1	1	1	1	1	1	6
5	3308	1	1	1	1	1	1	6
7	2538	1	1	1	1	1	1	6
8	2269	1	1	1	1	1	1	6
9	2846	1	1	1	1	1	1	6
10	1808	1	1	1	1	1	1	6
11	2269	1	1	1	1	1	1	6
12	2308	1	1	1	1	1	1	6
13	3308	1	1	1	1	1	1	6
14	2577	1	1	1	1	1	1	6
15	2538	1	1	1	1	1	1	6
16	2308	1	1	1	1	1	1	6
17	1462	1	1	1	1	1	1	6
19	2231	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
22	2462	1	1	1	1	1	1	6
23	2692	1	1	1	1	1	1	6
25	2923	1	1	1	1	1	1	6
26	2692	1	1	1	1	1	1	6
27	2769	1	1	1	1	1	1	6
28	2692	1	1	1	1	1	1	6
29	1808	1	1	1	1	1	1	6
30	2385	1	1	1	1	1	1	6
32	2077	1	1	1	1	1	1	6
34	2808	1	1	1	1	1	1	6
35	2654	1	1	1	1	1	1	6
36	2577	1	1	1	1	1	1	6
37	2654	1	1	1	1	1	1	6
38	3000	1	1	1	1	1	1	6
40	3154	1	1	1	1	1	1	6
43	2808	1	1	1	1	1	1	6
44	3962	1	1	1	1	1	1	6
47	3115	1	1	1	1	1	1	6
49	3385	1	1	1	1	1	1	6
50	3308	1	1	1	1	1	1	6
51	4038	1	1	1	1	1	1	6
52	3923	1	1	1	1	1	1	6
54	3038	1	1	1	1	1	1	6
55	3692	1	1	1	1	1	1	6
56	3462	1	1	1	1	1	1	6
58	4077	1	1	1	1	1	1	6
59	3577	1	1	1	1	1	1	6
60	4154	1	1	1	1	1	1	6
62	2885	1	1	1	1	1	1	6
63	2500	1	1	1	1	1	1	6
64	3269	1	1	1	1	1	1	6
65	2154	1	1	1	1	1	1	6
66	3000	1	1	1	1	1	1	6
67	3654	1	1	1	1	1	1	6
69	4154	1	1	1	1	1	1	6
70	2962	1	1	1	1	1	1	6
73	3462	1	1	1	1	1	1	6
74	3000	1	1	1	1	1	1	6
75	2538	1	1	1	1	1	1	6
77	3538	1	1	1	1	1	1	6
79	1923	1	1	1	1	1	1	6
80	1769	1	1	1	1	1	1	6
81	2077	1	1	1	1	1	1	6
82	1692	1	1	1	1	1	1	6
85	2269	1	1	1	1	1	1	6
86	3962	1	1	1	1	1	1	6
87	2654	1	1	1	1	1	1	6
88	2077	1	1	1	1	1	1	6
89	2385	1	1	1	1	1	1	6
90	2346	1	1	1	1	1	1	6
18	2231	1	1	1	0	1	1	5
21	2000	1	0	1	1	1	1	5
24	2231	0	1	1	1	1	1	5
33	2654	1	1	0	1	1	1	5
3	1923	1	1	0	0	1	1	4
Total		70	70	69	69	71	71	420
Non-fit		4	2	2	2	0	0	10

Appendix 5N-30. Scale for "sleep".

Appendix 6A

Test Items used in Study 4: (J)-1 [recall]

■ 1 ～ 32 の日本語を英語にして，正しく発音しなさい。
■発音は録音します。以下の手順で吹き込みなさい。
① 学籍番号
② 名前
③ 「始めます」→ 1 …，…，32 …。 →「終了します」。

1	同じ, 同一の	21	中止, 休憩／壊れる, 割れる
2	内部, 内側／内側の	22	～を横切って／交差した
3	(考え, 気持ちなどを)表す, 述べる	23	閉める／閉じる
4	受け取る	24	希望／望む
5	(2つの)間で／中間に	25	いっぱいの, 満ちた
6	建てる, 組み立てる（make 以外）	26	信じる
7	汚れていない, きれいな	27	孤立した, 単独の／単独で（lonely 以外）
8	難しい, 困難な（hard 以外）	28	深み, 深さ／深い
9	～を引き起こす, ～の原因になる	29	伸ばすこと／伸びる, 到着する
10	答え／答える（respond 以外）	30	驚き／～を驚かす
11	～を選ぶ	31	紹介する, 案内する
12	有名な	32	(偶然に)起こる
13	手紙, 文字		
14	運ぶ／運ぶこと, 持つこと		
15	貧しい／貧困層		
16	続く, 持続する		
17	実際は, 実は		
18	見る／容貌, 見ること		
19	心臓		
20	ついに, 最後に		

Appendix 6B

Test Items used in Study 4: (L)-2 [recall]

■ 1 ～ 32 の日本語に対応する英単語の綴りを書きなさい。

1	閉める／閉じる		21	孤立した，単独の／単独で（lonely 以外）	
2	内部，内側／内側の		22	（考え，気持ちなどを）表す，述べる	
3	答え／答える（respond 以外）		23	運ぶ／運ぶこと，持つこと	
4	貧しい／貧困層		24	いっぱいの，満ちた	
5	汚れていない，きれいな		25	希望／望む	
6	驚き／〜を驚かす		26	心臓	
7	信じる		27	中止，休憩／壊れる，割れる	
8	受け取る		28	伸ばすこと／伸びる，到着する	
9	紹介する，案内する		29	ついに，最後に	
10	（偶然に）起こる		30	同じ，同一の	
11	続く，持続する		31	建てる，組み立てる（make 以外）	
12	〜を引き起こす，〜の原因になる		32	実際は，実は	
13	〜を横切って／交差した				
14	深み，深さ／深い				
15	（2つの）間で／中間に				
16	有名な				
17	難しい，困難な（hard 以外）				
18	〜を選ぶ				
19	手紙，文字				
20	見る／容貌，見ること				

Appendix 6C

<u>Test Items used in Study 4: (B)-3 [recall]</u>

■発音される単語のつづりを書き取りなさい。[1]
■単語は全部で 32 語です。それぞれ 2 回ずつ発音されます。
■分からないところがあっても，音から予測をして書きなさい。

1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13			
14			
15			
16			
17			
18			
19			
20			

Appendix 6D

<u>Test Items used in Study 4: (F)-4 [recall]</u>

■これから 32 個の英単語が発音されます。<u>単語はそれぞれ 2 回ずつ発音されます。</u>
■聞こえてくる英単語の意味を日本語で書きなさい。[2]

1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13			
14			
15			
16			
17			
18			
19			
20			

Appendix 6E

Test Items used in Study 4: (D)-5 [recall]

■ 1 ～ 32 までの単語を全て発音しなさい。
■読み方が分からないものがあっても，予測して発音しなさい。
■発音は録音します。以下の手順で吹き込みなさい。
① 学籍番号
② 名前
③ 「始めます」→ 1 ・・・, ・・・, 32 ・・・。 →「終了します」。

1	continue	21	actually
2	across	22	choose
3	receive	23	between
4	finally	24	cause
5	difficult	25	clean
6	reach	26	answer
7	happen	27	famous
8	believe	28	deep
9	hope	29	alone
10	carry	30	express
11	letter	31	same
12	close	32	introduce
13	heart		
14	look		
15	poor		
16	break		
17	surprise		
18	full		
19	inside		
20	build		

Appendix 6F

Test Items used in Study 4: (H)-6 [recall]

■ 1 ～ 32 までの単語を日本語に訳しなさい。

1	express		21	heart	
2	between		22	receive	
3	close		23	actually	
4	deep		24	full	
5	letter		25	answer	
6	break		26	same	
7	build		27	across	
8	cause		28	continue	
9	choose		29	alone	
10	inside		30	introduce	
11	difficult		31	carry	
12	reach		32	believe	
13	surprise				
14	look				
15	famous				
16	happen				
17	hope				
18	clean				
19	poor				
20	finally				

Appendix 6G

Test Items used in Study 4: (K)-7 [recognition]

■ 1 ～ 32 をよく見なさい。
■4 つの中から正しい英単語の綴りを 1 つだけ選び，○をつけなさい。

1	resive	receive	reseave	resieve
2	arown	arone	alone	alown
3	haat	heart	haart	huart
4	famouse	famouce	famus	famous
5	puur	puor	poor	puar
6	break	breik	braik	breike
7	bitwen	between	betwen	bitween
8	deip	diip	deep	diep
9	chooes	choose	choes	choese
10	clouse	crose	crouse	close
11	lettar	leter	letter	letar
12	answer	answor	answar	ansar
13	introduce	introduse	intorduce	intorduse
14	dificult	difficult	difficalt	dificalt
15	bild	bilde	build	billd
16	ecspres	expres	ecspress	express
17	insaid	enside	enside	inside
18	howp	hope	howpe	houp
19	carry	carelly	carrly	cally
20	belive	believe	bereve	berieve

21	crean	clein	clean	crein
22	cause	coose	couse	cauz
23	louk	loook	luuk	look
24	surpuries	surprise	sarprise	sarpuries
25	actualy	actually	axturaly	actioly
26	accros	acros	across	accross
27	happen	hapen	happun	hapun
28	contenue	continue	continu	contenu
29	finaly	fainally	fainaly	finally
30	saime	saim	same	seim
31	rech	reech	reach	raech
32	fulu	full	fuul	ful

（以上）

Test Items used in Study 4: (I)-8 [recognition]

■ 1 ～ 32 の日本語を英語にしたものが流れます。
■単語の発音が 2 つ流れますが，正しいものは 1 つだけです。聞こえてくる英単語をよく聞き分け，適切な方に〇をつけなさい。aとbは 1 回だけ発音されます。

1	閉める／閉じる	a ・ b	21	（2つの）間で／中間に	a ・ b
2	手紙，文字	a ・ b	22	希望／望む	a ・ b
3	続く，持続する	a ・ b	23	中止，休憩／壊れる，割れる	a ・ b
4	実際は，実は	a ・ b	24	（考え，気持ちなどを)表す，述べる	a ・ b
5	建てる，組み立てる	a ・ b	25	（偶然に）起こる	a ・ b
6	紹介する，案内する	a ・ b	26	ついに，最後に	a ・ b
7	深み，深さ／深い	a ・ b	27	内部，内側／内側の	a ・ b
8	～を横切って／交差した	a ・ b	28	難しい，困難な	a ・ b
9	貧しい／貧困層	a ・ b	29	同じ，同一の	a ・ b
10	信じる	a ・ b	30	汚れていない，きれいな	a ・ b
11	いっぱいの，満ちた	a ・ b	31	答え／答える	a ・ b
12	見る／容貌，見ること	a ・ b	32	驚き／～を驚かす	a ・ b
13	心臓	a ・ b			
14	運ぶ／運ぶこと，持つこと	a ・ b			
15	伸ばすこと／伸びる，到着する	a ・ b			
16	～を選ぶ	a ・ b			
17	受け取る	a ・ b			
18	孤立した，単独の／単独で	a ・ b			
19	～を引き起こす，～の原因になる	a ・ b			
20	有名な	a ・ b			

Appendix 6I

Test Items used in Study 4: (A)-9 [recognition]

■発音された単語として正しいものを，2 つのうち 1 つ選んで○をつけなさい。
■発音は 2 回繰り返されます。

1	answer	anchor	21	believe	beneath
2	case	cause	22	crane	clean
3	expect	express	23	carry	career
4	full	pull	24	bill	build
5	each	reach	25	induce	introduce
6	look	luck	26	between	betray
7	pure	poor	27	choice	choose
8	inside	insight	28	finally	finance
9	continent	continue	29	receipt	receive
10	cloth	close	30	happen	heaven
11	letter	latter	31	along	alone
12	difference	difficult	32	hurt	heart
13	actually	activity			
14	same	shame			
15	surprise	subscribe			
16	weep	deep			
17	across	cross			
18	break	brick			
19	famine	famous			
20	anchor	answer			

Appendix 6J

Test Items used in Study 4: (E)-10 [recognition]

■これから 32 個の英単語が発音されます。<u>単語はそれぞれ 2 回ずつ発音されます。</u>
■発音された単語の意味として正しいものを，選択肢から 1 つ選び記号を書きなさい。
※選択肢は 40 個あります。当てはまらないものが 8 つあります。注意しなさい。

1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13			
14			
15			
16			
17			
18			
19			
20			

(1)	有名な	(21)	同じ, 同一の
(2)	深み, 深さ／深い	(22)	驚き／～を驚かす
(3)	休憩／壊れる,	(23)	表面
(4)	～を横切って	(24)	～を選ぶ
(5)	専門家	(25)	～を引き起こす
(6)	貧しい／貧困層	(26)	希望／望む
(7)	閉める／閉じる	(27)	難しい, 困難な
(8)	手紙, 文字	(28)	建てる, 組み立てる
(9)	容貌, 見ること	(29)	続く, 持続する
(10)	（2つの）間で	(30)	汚れていない, きれいな
(11)	内部, 内側	(31)	心臓
(12)	伸ばすこと	(32)	（偶然に）起こる
(13)	実際は, 実は	(33)	尊敬する
(14)	いっぱいの, 満ちた	(34)	ついに, 最後に
(15)	受け取る	(35)	傷つける
(16)	答え／答える	(36)	表す, 述べる
(17)	紹介する, 案内する	(37)	交代する
(18)	運ぶ／運ぶこと	(38)	借りる
(19)	孤立した, 単独の	(39)	困惑する
(20)	信じる	(40)	木々

Appendix 6K

Test Items used in Study 4: (C)-11 [recognition]

■書かれている単語をよく見て，1 回目に発音される語と 2 回目に発音される語のうち，正しい方に○をつけなさい。単語はそれぞれ一度しか流れません。

1	continue	a ・ b	21	express	a ・ b
2	believe	a ・ b	22	full	a ・ b
3	introduce	a ・ b	23	difficult	a ・ b
4	look	a ・ b	24	hope	a ・ b
5	alone	a ・ b	25	surprise	a ・ b
6	clean	a ・ b	26	cause	a ・ b
7	across	a ・ b	27	break	a ・ b
8	actually	a ・ b	28	same	a ・ b
9	letter	a ・ b	29	heart	a ・ b
10	famous	a ・ b	30	build	a ・ b
11	between	a ・ b	31	finally	a ・ b
12	deep	a ・ b	32	receive	a ・ b
13	carry	a ・ b			
14	happen	a ・ b			
15	inside	a ・ b			
16	choose	a ・ b			
17	reach	a ・ b			
18	close	a ・ b			
19	answer	a ・ b			
20	continue	a ・ b			

Appendix 6L

Test Items used in Study 4: (G)-12 [recognition]

■ 1 ～ 32 までの単語の意味として適切なものを，選択肢から 1 つ選び数字を書きなさい。
※選択肢は 40 個あります。当てはまらないものが 8 つあります。注意しなさい。

1	inside		21	full			-1	有名な	-21	同じ, 同一の
2	break		22	clean			-2	深み, 深さ／深い	-22	驚き／～を驚かす
3	across		23	surprise			-3	休憩／壊れる,	-23	表面
4	poor		24	express			-4	～を横切って	-24	～を選ぶ
5	difficult		25	alone			-5	専門家	-25	～を引き起こす
6	heart		26	look			-6	貧しい／貧困層	-26	希望／望む
7	same		27	happen			-7	閉める／閉じる	-27	難しい, 困難な
8	receive		28	build			-8	手紙, 文字	-28	建てる, 組み立てる
9	letter		29	believe			-9	容貌, 見ること	-29	続く, 持続する
10	carry		30	cause			-10	(2つの)間で	-30	汚れていない, きれいな
11	introduce		31	choose			-11	内部, 内側	-31	心臓
12	finally		32	reach			-12	伸ばすこと	-32	(偶然に)起こる
13	close						-13	実際は, 実は	-33	尊敬する
14	famous						-14	いっぱいの, 満ちた	-34	ついに, 最後に
15	between						-15	受け取る	-35	傷つける
16	answer						-16	答え／答える	-36	表す, 述べる
17	actually						-17	紹介する, 案内する	-37	交代する
18	hope						-18	運ぶ／運ぶこと	-38	借りる
19	deep						-19	孤立した, 単独の	-39	困惑する
20	continue						-20	信じる	-40	木々

Appendix 6M

Matrices for Study 4: Implicational scaling for target words (6M-1 and 6M-2)

ID	Mo_T	ll	j1	b1	f1	h1	d1	Total
6	3115	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
13	2923	0	1	1	1	1	1	5
29	2269	0	1	1	1	1	1	5
43	2885	1	0	1	1	1	1	5
46	2692	1	1	1	0	1	1	5
4	2423	0	0	1	1	1	1	4
5	4231	0	0	1	1	1	1	4
7	3000	1	0	0	1	1	1	4
8	3962	0	0	1	1	1	1	4
11	3000	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
18	2038	0	0	1	1	1	1	4
34	2769	0	0	1	1	1	1	4
1	3462	0	0	1	0	1	1	3
14	1731	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
41	2077	0	0	0	1	1	1	3
20	2192	0	0	0	1	0	1	2
23	1846	0	0	1	0	0	1	2
39	2385	0	1	0	0	0	1	2
16	1654	0	0	0	0	0	1	1
26	1615	0	0	0	0	0	1	1
33	1846	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	1	1
Total		24	25	34	36	37	44	200
Non-fit		3	2	3	3	3	0	14

ID	Mo_T	l2	j2	b2	f2	h2	d2	Total
12	2885	1	1	1	1	1	1	6
16	1654	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
5	4231	1	0	1	1	1	1	5
31	2538	0	1	1	1	1	1	5
35	2038	1	1	0	1	1	1	5
44	2385	0	1	1	1	1	1	5
4	2423	0	0	1	1	1	1	4
8	3962	0	0	1	1	1	1	4
9	3154	0	0	1	1	1	1	4
10	3231	0	0	1	1	1	1	4
11	3000	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
17	2654	0	1	0	1	1	1	4
21	2231	0	1	0	1	1	1	4
24	2769	0	1	0	1	1	1	4
29	2269	1	0	1	0	1	1	4
32	2154	0	0	1	1	1	1	4
34	2769	0	1	0	1	1	1	4
37	2538	0	0	1	1	1	1	4
40	2385	0	1	0	1	1	1	4
46	2692	1	0	0	1	1	1	4
7	3000	0	0	0	1	1	1	3
18	2038	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
43	2885	0	0	0	1	0	1	2
6	3115	0	0	1	0	0	1	2
19	2462	0	0	1	0	0	1	2
27	2231	0	0	1	0	0	1	2
30	2000	0	0	1	0	0	1	2
33	1846	0	0	0	0	1	1	2
42	2731	0	0	1	0	0	1	2
1	3462	0	0	0	0	0	1	1
13	2923	0	0	0	0	0	1	1
14	1731	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	1	1
26	1615	0	0	0	0	0	1	1
36	2731	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
41	2077	0	0	0	0	0	1	1
45	2308	0	0	0	0	0	1	1
47	2500	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	0	0
Total		7	12	18	25	28	43	133
Non-fit		4	7	12	1	4	0	28

Appendix 6M-1. Scale for "across".   *Appendix 6M-2.* Scale for "actually".

Matrices for Study 4: Implicational scaling for target words (6M-3 and 6M-4)

ID	Mo_T	l11	j11	b11	f11	h11	d11	Total
6	3115	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
13	2923	1	0	1	1	1	1	5
30	2000	1	0	1	1	1	1	5
37	2538	1	0	1	1	1	1	5
47	2500	1	0	1	1	1	1	5
1	3462	1	1	0	0	1	1	4
4	2423	0	0	1	1	1	1	4
7	3000	1	1	0	0	1	1	4
8	3962	0	0	1	1	1	1	4
27	2231	0	0	1	1	1	1	4
29	2269	0	0	1	1	1	1	4
31	2538	1	1	0	0	1	1	4
41	2077	0	0	1	1	1	1	4
42	2731	0	0	1	1	1	1	4
9	3154	0	0	0	1	1	1	3
17	2654	0	0	1	0	1	1	3
21	2231	0	0	1	0	1	1	3
24	2769	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
26	1615	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
40	2385	1	0	0	0	1	1	3
45	2308	0	0	0	1	1	1	3
5	4231	0	0	0	0	1	1	2
14	1731	0	0	0	0	1	1	2
15	2885	0	0	0	0	1	1	2
16	1654	0	0	0	1	0	1	2
18	2038	0	0	0	0	1	1	2
19	2462	0	0	0	0	1	1	2
22	2385	0	0	1	0	0	1	2
38	1692	0	0	0	0	1	1	2
39	2385	0	0	0	0	1	1	2
44	2385	0	0	1	0	0	1	2
20	2192	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	1	1
Total		18	13	24	27	39	44	165
Non-fit		8	7	7	7	3	0	32

ID	Mo_T	l31	j31	b31	f31	h31	d31	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
44	2385	0	1	1	1	1	1	5
14	1731	0	1	0	1	1	1	4
15	2885	0	0	1	1	1	1	4
16	1654	0	1	0	1	1	1	4
17	2654	0	1	0	1	1	1	4
22	2385	0	1	0	1	1	1	4
23	1846	0	1	0	1	1	1	4
24	2769	0	1	0	1	1	1	4
29	2269	0	1	0	1	1	1	4
30	2000	0	1	0	1	1	1	4
32	2154	0	1	0	1	1	1	4
33	1846	0	1	0	1	1	1	4
36	2731	0	1	0	1	1	1	4
40	2385	0	1	0	1	1	1	4
41	2077	0	1	0	1	1	1	4
43	2885	0	1	0	1	1	1	4
47	2500	0	1	0	1	1	1	4
1	3462	0	0	0	1	1	1	3
13	2923	0	0	0	1	1	1	3
18	2038	0	0	0	1	1	1	3
20	2192	0	0	0	1	1	1	3
21	2231	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
26	1615	0	0	0	1	1	1	3
34	2769	0	1	0	0	1	1	3
39	2385	0	0	0	1	1	1	3
45	2308	0	0	0	1	1	1	3
42	2731	0	0	0	1	0	1	2
38	1692	0	0	0	0	0	0	0
Total		15	31	18	41	43	43	191
Non-fit		0	15	15	1	0	0	30

Appendix 6M-3. Scale for "alone".   *Appendix 6M-4.* Scale for "believe".

Matrices for Study 4: Implicational scaling for target words (6M-5 and 6M-6)

ID	Mo_T	l20	j20	b20	f20	h20	d20	Total
1	3462	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
13	2923	1	0	1	1	1	1	5
25	1308	1	0	1	1	1	1	5
29	2269	1	0	1	1	1	1	5
4	2423	0	0	1	1	1	1	4
5	4231	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
26	1615	0	0	1	1	1	1	4
32	2154	0	0	1	1	1	1	4
36	2731	0	0	1	1	1	1	4
42	2731	0	0	1	1	1	1	4
45	2308	1	0	1	1	1	0	4
16	1654	0	0	1	1	1	0	3
43	2885	0	0	0	1	1	1	3
14	1731	0	0	1	0	0	1	2
23	1846	0	0	1	0	0	1	2
33	1846	0	0	0	0	1	1	2
38	1692	0	1	0	0	0	1	2
39	2385	0	0	1	0	0	1	2
18	2038	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
41	2077	0	0	0	0	0	0	0
Total		27	24	38	36	37	42	204
Non-fit		4	4	4	0	4	2	18

Appendix 6M-5. Scale for "between".

ID	Mo_T	l21	j21	b21	f21	h21	d21	Total
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
7	3000	1	0	1	1	1	1	5
20	2192	0	1	1	1	1	1	5
23	1846	1	1	0	1	1	1	5
24	2769	1	1	1	0	1	1	5
31	2538	0	1	1	1	1	1	5
33	1846	0	1	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
42	2731	1	0	1	1	1	1	5
4	2423	0	0	1	1	1	1	4
8	3962	1	1	0	0	1	1	4
10	3231	1	1	0	0	1	1	4
12	2885	1	1	0	0	1	1	4
17	2654	0	0	1	1	1	1	4
21	2231	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
25	1308	1	0	0	1	1	1	4
29	2269	0	0	1	1	1	1	4
36	2731	0	0	1	1	1	1	4
39	2385	0	0	1	1	1	1	4
40	2385	0	0	1	1	1	1	4
41	2077	0	0	1	1	1	1	4
46	2692	0	0	1	1	1	1	4
15	2885	0	0	0	1	1	1	3
16	1654	0	0	0	1	1	1	3
43	2885	0	0	0	1	1	1	3
45	2308	0	0	0	1	1	1	3
1	3462	0	0	0	1	1	0	2
18	2038	0	0	0	0	1	1	2
26	1615	0	0	0	0	1	1	2
47	2500	0	0	0	0	1	1	2
14	1731	0	0	0	0	0	1	1
30	2000	0	0	0	0	1	0	1
38	1692	0	0	0	0	0	0	0
Total		19	20	28	34	42	41	184
Non-fit		8	5	5	5	1	2	26

Appendix 6M-6. Scale for "break".

Matrices for Study 4: Implicational scaling for target words (6M-7 and 6M-8)

ID	Mo_T	l4	j4	b4	f4	h4	d4	Total
4	2423	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
7	3000	1	0	1	1	1	1	5
8	3962	1	0	1	1	1	1	5
9	3154	1	0	1	1	1	1	5
11	3000	1	1	1	1	1	1	5
17	2654	0	1	1	1	1	1	5
25	1308	1	1	0	1	1	1	5
37	2538	0	1	1	1	1	1	5
45	2308	1	0	1	1	1	1	5
1	3462	0	1	0	1	1	1	4
5	4231	0	0	1	1	1	1	4
6	3115	0	0	1	1	1	1	4
22	2385	0	1	0	1	1	1	4
30	2000	0	1	0	1	1	1	4
32	2154	0	0	1	1	1	1	4
34	2769	0	1	0	1	1	1	4
35	2038	0	0	1	1	1	1	4
10	3231	0	0	0	1	1	1	3
12	2885	0	0	0	1	1	1	3
18	2038	0	0	0	1	1	1	3
19	2462	0	0	0	1	1	1	3
23	1846	0	0	0	1	1	1	3
26	1615	0	1	0	1	1	0	3
36	2731	0	1	0	0	1	1	3
39	2385	0	1	0	0	1	1	3
41	2077	0	0	0	1	1	1	3
46	2692	0	0	0	1	1	1	3
47	2500	0	0	0	1	1	1	3
14	1731	0	0	0	0	1	1	2
16	1654	0	0	0	0	1	1	2
20	2192	0	0	0	1	1	0	2
24	2769	0	0	0	0	1	1	2
29	2269	0	0	0	1	1	0	2
42	2731	0	0	0	0	1	1	2
38	1692	0	0	0	0	0	0	0
Total		15	21	21	37	43	40	177
Non-fit		5	11	5	4	0	3	28

Appendix 6M-7. Scale for "build".

ID	Mo_T	l29	j29	b29	f29	h29	d29	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
8	3962	1	1	0	1	1	1	5
40	2385	1	1	1	0	1	1	5
44	2385	1	0	1	1	1	1	5
6	3115	0	0	1	1	1	1	4
10	3231	0	0	1	1	1	1	4
11	3000	0	0	1	1	1	1	4
14	1731	1	1	0	0	1	1	4
24	2769	0	0	1	1	1	1	4
25	1308	0	0	1	1	1	1	4
26	1615	0	1	0	1	1	1	4
27	2231	1	1	0	0	1	1	4
31	2538	0	0	1	1	1	1	4
32	2154	0	0	1	1	1	1	4
35	2038	0	0	1	1	1	1	4
37	2538	0	0	1	1	1	1	4
42	2731	0	0	1	1	1	1	4
43	2885	0	1	0	1	1	1	4
21	2231	0	0	0	1	1	1	3
22	2385	0	0	0	1	1	1	3
30	2000	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
38	1692	0	1	0	1	0	1	3
39	2385	0	0	0	1	1	1	3
41	2077	0	0	0	1	1	1	3
46	2692	0	0	0	1	1	1	3
9	3154	0	0	0	0	1	1	2
17	2654	0	0	0	0	1	1	2
45	2308	0	0	0	0	1	1	2
16	1654	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
29	2269	0	0	0	0	0	1	1
33	1846	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	0	0
Total		16	19	22	33	38	43	171
Non-fit		5	5	6	3	1	0	20

Appendix 6M-8. Scale for "carry".

Matrices for Study 4: Implicational scaling for target words (6M-9 and 6M-10)

ID	Mo_T	l16	j16	b16	f16	h16	d16	Total
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
12	2885	0	0	1	1	1	1	4
15	2885	1	0	1	1	1	0	4
19	2462	0	0	1	1	1	1	4
37	2538	0	0	1	1	1	1	4
11	3000	0	0	1	1	1	0	3
24	2769	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
35	2038	0	0	0	1	1	1	3
4	2423	0	0	0	1	0	1	2
14	1731	0	0	0	0	1	1	2
17	2654	0	0	0	1	0	1	2
32	2154	0	0	0	1	0	1	2
33	1846	0	0	0	0	1	1	2
36	2731	0	0	1	0	0	1	2
21	2231	0	0	0	0	0	1	1
22	2385	0	0	0	0	0	1	1
23	1846	0	0	0	0	1	0	1
26	1615	0	0	1	0	0	0	1
29	2269	0	0	0	0	0	1	1
30	2000	0	0	0	0	0	1	1
31	2538	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
44	2385	0	0	0	0	0	1	1
45	2308	0	0	0	0	0	1	1
47	2500	0	0	0	0	0	1	1
1	3462	0	0	0	0	0	0	0
13	2923	0	0	0	0	0	0	0
16	1654	0	0	0	0	0	0	0
18	2038	0	0	0	0	0	0	0
20	2192	0	0	0	0	0	0	0
25	1308	0	0	0	0	0	0	0
27	2231	0	0	0	0	0	0	0
38	1692	0	0	0	0	0	0	0
40	2385	0	0	0	0	0	0	0
41	2077	0	0	0	0	0	0	0
42	2731	0	0	0	0	0	0	0
43	2885	0	0	0	0	0	0	0
46	2692	0	0	0	0	0	0	0
Total		7	6	13	16	18	27	87
Non-fit		1	0	3	2	4	4	14

ID	Mo_T	l22	j22	b22	f22	h22	d22	Total
4	2423	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
14	1731	1	0	1	1	1	1	5
17	2654	0	1	1	1	1	1	5
31	2538	1	1	0	1	1	1	5
37	2538	1	0	1	1	1	1	5
41	2077	1	0	1	1	1	1	5
43	2885	0	1	1	1	1	1	5
1	3462	0	0	1	1	1	1	4
5	4231	0	0	1	1	1	1	4
10	3231	0	0	1	1	1	1	4
11	3000	0	0	1	1	1	1	4
12	2885	0	0	1	1	1	1	4
18	2038	0	0	1	1	1	1	4
19	2462	0	0	1	1	1	1	4
21	2231	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
32	2154	0	0	1	1	1	1	4
45	2308	0	0	1	1	1	1	4
46	2692	0	1	0	1	1	1	4
15	2885	0	0	1	1	1	0	3
16	1654	0	0	0	1	1	1	3
27	2231	0	0	1	1	1	0	3
30	2000	0	0	0	1	1	1	3
35	2038	0	0	0	1	1	1	3
36	2731	0	0	0	1	1	1	3
39	2385	0	0	1	0	1	1	3
40	2385	0	0	0	1	1	1	3
47	2500	0	0	0	1	1	1	3
24	2769	0	0	0	1	1	0	2
29	2269	0	0	1	1	0	0	2
33	1846	0	0	0	0	1	1	2
34	2769	0	0	0	1	1	0	2
42	2731	0	0	1	0	0	1	2
13	2923	0	0	0	0	0	1	1
20	2192	0	0	0	0	1	0	1
23	1846	0	0	0	0	0	1	1
25	1308	0	0	0	0	0	1	1
44	2385	0	0	0	0	0	1	1
26	1615	0	0	0	0	0	0	0
38	1692	0	0	0	0	0	0	0
Total		9	9	25	34	37	36	150
Non-fit		4	4	6	4	2	6	26

Appendix 6M-9. Scale for "cause".

Appendix 6M-10. Scale for "choose".

Matrices for Study 4: Implicational scaling for target words (6M-11 and 6M-12)

ID	Mo_T	l23	j23	b23	f23	h23	d23	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
9	3154	0	1	1	1	1	1	5
10	3231	1	0	1	1	1	1	5
13	2923	1	1	0	1	1	1	5
20	2192	1	1	0	1	1	1	5
24	2769	0	1	1	1	1	1	5
37	2538	0	1	1	1	1	1	5
5	4231	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
21	2231	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
25	1308	1	0	0	1	1	1	4
30	2000	0	0	1	1	1	1	4
44	2385	0	0	1	1	1	1	4
16	1654	0	0	1	0	1	1	3
19	2462	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
38	1692	0	1	0	1	0	1	3
39	2385	0	0	0	1	1	1	3
45	2308	0	0	0	1	1	1	3
18	2038	0	0	0	0	1	1	2
23	1846	0	0	0	0	1	1	2
26	1615	0	0	0	0	1	1	2
33	1846	0	0	0	0	1	1	2
46	2692	0	0	0	1	1	0	2
Total		24	26	31	39	43	43	206
Non-fit		4	2	4	2	1	1	14

ID	Mo_T	l17	j17	b17	f17	h17	d17	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
13	2923	0	1	1	1	1	1	5
16	1654	1	0	1	1	1	1	5
23	1846	1	1	0	1	1	1	5
24	2769	0	1	1	1	1	1	5
26	1615	1	1	1	1	1	0	5
32	2154	1	0	1	1	1	1	5
40	2385	1	0	1	1	1	1	5
42	2731	1	1	1	1	1	0	5
47	2500	1	1	1	1	1	0	5
20	2192	0	1	1	1	1	0	4
34	2769	0	1	1	0	1	1	4
39	2385	0	1	0	1	1	1	4
43	2885	0	1	1	1	1	0	4
15	2885	0	0	0	1	1	1	3
38	1692	0	0	1	1	1	0	3
41	2077	0	0	1	1	1	0	3
27	2231	0	0	0	1	1	0	2
Total		34	37	38	43	44	38	234
Non-fit		7	7	4	2	0	6	26

Appendix 6M-11. Scale for "clean".

Appendix 6M-12. Scale for "close".

Matrices for Study 4: Implicational scaling for target words (6M-13 and 6M-14)

ID	Mo_T	l24	j24	b24	f24	h24	d24	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
17	2654	1	1	1	0	1	1	5
19	2462	1	0	1	1	1	1	5
27	2231	1	1	1	0	1	1	5
30	2000	1	0	1	1	1	1	5
37	2538	1	0	1	1	1	1	5
38	1692	1	1	0	1	1	1	5
47	2500	1	1	1	0	1	1	5
1	3462	0	0	1	1	1	1	4
14	1731	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
25	1308	0	0	1	1	1	1	4
31	2538	0	0	1	1	1	1	4
33	1846	0	0	1	1	1	1	4
40	2385	0	0	1	1	1	1	4
45	2308	1	0	0	1	1	1	4
41	2077	0	0	0	1	1	1	3
23	1846	0	0	1	0	0	1	2
42	2731	0	0	0	0	1	1	2
16	1654	0	0	0	0	0	1	1
Total		31	28	39	39	42	44	223
Non-fit		7	3	3	2	1	0	16

ID	Mo_T	l5	j5	b5	f5	h5	d5	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
1	3462	1	0	1	1	1	1	5
17	2654	1	1	1	0	1	1	5
18	2038	0	1	1	1	1	1	5
30	2000	0	1	1	1	1	1	5
31	2538	1	0	1	1	1	1	5
39	2385	0	1	1	1	1	1	5
40	2385	1	0	1	1	1	1	5
16	1654	0	0	1	1	1	1	4
25	1308	0	0	1	1	1	1	4
27	2231	0	0	1	1	1	1	4
35	2038	0	0	1	1	1	1	4
36	2731	0	0	1	1	1	1	4
44	2385	1	0	1	1	1	0	4
26	1615	0	0	0	1	1	1	3
34	2769	0	0	1	1	1	1	3
20	2192	0	1	0	0	0	1	2
33	1846	0	0	0	0	1	1	2
38	1692	0	0	0	0	0	1	1
Total		31	31	39	40	42	43	226
Non-fit		5	4	0	1	1	1	12

Appendix 6M-13. Scale for "deep".   *Appendix 6M-14.* Scale for "difficult".

Matrices for Study 4: Implicational scaling for target words (6M-15 and 6M-16)

ID	Mo_T	l6	j6	b6	f6	h6	d6	Total
21	2231	1	1	1	1	1	1	6
1	3462	0	0	1	1	1	1	4
5	4231	0	0	1	1	1	1	4
6	3115	0	0	1	1	1	1	4
7	3000	0	0	1	1	1	1	4
8	3962	0	0	1	1	1	1	4
10	3231	0	0	1	1	1	1	4
11	3000	0	0	1	1	1	1	4
12	2885	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
31	2538	0	0	1	1	1	1	4
14	1731	0	0	1	0	1	1	3
39	2385	0	0	1	0	1	1	3
40	2385	0	0	1	1	0	1	3
42	2731	0	0	1	0	1	1	3
45	2308	0	0	1	1	0	1	3
4	2423	0	0	1	0	0	1	2
9	3154	0	0	0	0	1	1	2
16	1654	0	0	1	0	0	1	2
18	2038	0	0	1	0	0	1	2
19	2462	0	0	1	0	0	1	2
20	2192	0	0	1	0	0	1	2
23	1846	0	0	1	0	0	1	2
24	2769	0	0	1	0	0	1	2
25	1308	0	0	1	0	0	1	2
33	1846	0	0	1	0	0	1	2
35	2038	0	0	1	0	0	1	2
36	2731	0	0	1	0	0	1	2
37	2538	0	0	0	1	0	1	2
44	2385	0	0	1	0	0	1	2
47	2500	0	0	1	0	0	1	2
13	2923	0	0	0	0	0	1	1
17	2654	0	0	0	0	0	1	1
22	2385	0	0	0	0	0	1	1
26	1615	0	0	0	0	0	1	1
27	2231	0	0	0	0	0	1	1
29	2269	0	0	1	0	0	0	1
30	2000	0	0	0	0	0	1	1
32	2154	0	0	0	0	0	1	1
34	2769	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	1	1
41	2077	0	0	0	0	0	1	1
43	2885	0	0	0	0	0	1	1
46	2692	0	0	0	0	0	0	0
Total		1	1	30	14	15	42	103
Non-fit		0	0	19	4	16	1	40

ID	Mo_T	l7	j7	b7	f7	h7	d7	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
10	3231	1	0	1	1	1	1	5
19	2462	0	1	1	1	1	1	5
27	2231	1	1	0	1	1	1	5
44	2385	0	1	1	1	1	1	5
45	2308	1	0	1	1	1	1	5
47	2500	1	1	0	1	1	1	5
11	3000	0	0	1	1	1	1	4
16	1654	0	1	1	0	1	1	4
18	2038	0	0	1	1	1	1	4
22	2385	0	1	0	1	1	1	4
24	2769	0	1	0	1	1	1	4
29	2269	0	0	1	1	1	1	4
30	2000	0	1	0	1	1	1	4
34	2769	0	1	0	1	1	1	4
36	2731	0	1	0	1	1	1	4
39	2385	0	1	0	1	1	1	4
40	2385	0	1	0	1	1	1	4
41	2077	0	1	0	1	1	1	4
43	2885	0	1	1	1	1	1	4
13	2923	0	0	0	0	0	1	1
20	2192	0	0	0	0	1	0	1
23	1846	0	0	0	0	0	1	1
25	1308	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	0	0
Total		24	35	27	38	40	42	206
Non-fit		4	11	12	1	1	1	30

Appendix 6M-15. Scale for "express".   *Appendix 6M-16.* Scale for "famous".

Matrices for Study 4: Implicational scaling for target words (6M-17 and 6M-18)

ID	Mo_T	l8	j8	b8	f8	h8	d8	Total
4	2423	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
14	1731	1	1	1	0	1	1	5
26	1615	1	1	0	1	1	1	5
5	4231	0	1	1	1	1	1	4
9	3154	0	1	0	1	1	1	4
13	2923	0	1	0	1	1	1	4
17	2654	0	1	0	1	1	1	4
27	2231	0	1	0	1	1	1	4
30	2000	0	0	1	1	1	1	4
35	2038	0	1	0	1	1	1	4
37	2538	0	1	0	1	1	1	4
42	2731	1	1	1	0	0	1	4
43	2885	0	1	0	1	1	1	4
44	2385	0	0	1	1	1	1	4
45	2308	0	1	0	1	1	1	4
1	3462	0	1	0	1	1	0	3
7	3000	0	0	0	1	1	1	3
18	2038	0	0	0	1	1	1	3
19	2462	0	0	0	1	1	1	3
22	2385	0	0	0	1	1	1	3
24	2769	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
29	2269	0	1	0	1	0	1	3
32	2154	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
40	2385	0	0	0	1	1	1	3
33	1846	0	0	0	0	1	1	2
41	2077	0	0	0	0	1	1	2
46	2692	0	0	0	0	1	1	2
16	1654	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
Total		14	24	16	34	37	43	168
Non-fit		3	11	9	2	2	1	28

ID	Mo_T	l9	j9	b9	f9	h9	d9	Total
4	2423	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
1	3462	1	1	0	1	1	1	5
10	3231	1	0	1	1	1	1	5
11	3000	1	1	0	1	1	1	5
21	2231	1	1	0	1	1	1	5
27	2231	1	1	0	1	1	1	5
36	2731	1	1	0	1	1	1	5
37	2538	1	0	1	1	1	1	5
44	2385	1	0	1	1	1	1	5
9	3154	0	0	1	1	1	1	4
19	2462	1	1	0	0	1	1	4
29	2269	0	0	1	1	1	1	4
32	2154	1	0	0	1	1	1	4
38	1692	1	1	0	0	1	1	4
42	2731	1	1	0	1	0	1	4
5	4231	0	1	0	0	1	1	3
18	2038	0	0	0	1	1	1	3
31	2538	1	0	0	0	1	0	3
35	2038	0	1	0	0	1	1	3
43	2885	1	0	0	0	1	1	3
46	2692	0	0	0	1	1	1	3
13	2923	0	0	0	0	1	1	2
14	1731	0	0	0	0	1	1	2
15	2885	0	0	0	0	1	1	2
17	2654	0	0	0	0	1	1	2
23	1846	0	0	0	0	1	1	2
33	1846	0	0	0	0	1	1	2
40	2385	0	0	0	0	1	1	2
41	2077	0	0	0	0	1	1	2
45	2308	0	0	0	0	1	1	2
47	2500	1	0	0	0	0	1	2
16	1654	0	0	0	0	0	1	1
22	2385	0	0	0	0	0	1	1
25	1308	0	0	0	0	0	1	1
30	2000	0	0	0	0	0	1	1
34	2769	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	0	0
26	1615	0	0	0	0	0	0	0
Total		21	17	11	19	35	41	144
Non-fit		15	9	9	7	1	1	42

Appendix 6M-17. Scale for "finally".   *Appendix 6M-18.* Scale for "full".

Matrices for Study 4: Implicational scaling for target words (6M-19 and 6M-20)

ID	Mo_T	l30	j30	b30	f30	h30	d30	Total
1	3462	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
4	2423	0	1	1	1	1	1	5
6	3115	1	1	0	1	1	1	5
21	2231	1	0	1	1	1	1	5
30	2000	1	0	1	1	1	1	5
32	2154	0	1	1	1	1	1	5
36	2731	1	0	1	1	1	1	5
41	2077	1	0	1	1	1	1	5
42	2731	1	1	1	1	0	1	5
45	2308	1	0	1	1	1	1	5
13	2923	0	0	1	1	1	1	4
14	1731	1	0	0	1	1	1	4
15	2885	0	0	1	1	1	1	4
18	2038	0	0	1	1	1	1	4
19	2462	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
26	1615	0	0	1	1	1	1	4
46	2692	0	1	0	1	1	1	4
5	4231	0	0	1	1	0	1	3
24	2769	0	0	0	1	1	1	3
29	2269	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
16	1654	0	0	0	0	1	1	2
25	1308	0	0	1	0	0	1	2
38	1692	0	0	0	1	0	1	2
47	2500	0	0	0	0	1	1	2
23	1846	0	0	0	0	0	1	1
33	1846	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	0	0
Total		23	20	32	35	37	43	190
Non-fit		8	6	6	3	3	0	26

ID	Mo_T	l25	j25	b25	f25	h25	d25	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
6	3115	1	0	1	1	1	1	5
23	1846	1	1	0	1	1	1	5
44	2385	0	1	1	1	1	1	5
4	2423	0	1	0	1	1	1	4
9	3154	0	1	0	1	1	1	4
11	3000	0	1	0	1	1	1	4
13	2923	0	1	0	1	1	1	4
14	1731	0	1	0	1	1	1	4
15	2885	0	1	0	1	1	1	4
16	1654	1	1	0	0	1	1	4
17	2654	0	1	0	1	1	1	4
18	2038	0	1	0	1	1	1	4
22	2385	0	1	0	1	1	1	4
30	2000	0	1	0	1	1	1	4
31	2538	0	1	0	1	1	1	4
35	2038	0	1	0	1	1	1	4
36	2731	0	1	0	1	1	1	4
37	2538	0	1	0	1	1	1	4
38	1692	0	1	0	1	1	1	4
39	2385	0	1	0	1	1	1	4
40	2385	0	0	1	1	1	1	4
42	2731	0	1	0	1	1	1	4
43	2885	0	1	0	1	1	1	4
45	2308	0	1	0	1	1	1	4
46	2692	0	1	0	1	1	1	4
47	2500	0	1	0	1	1	1	4
20	2192	0	1	0	0	1	1	3
21	2231	0	0	0	1	1	1	3
24	2769	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
41	2077	0	0	0	0	1	1	2
Total		16	37	17	41	44	44	199
Non-fit		3	23	22	2	0	0	50

Appendix 6M-19. Scale for "happen".   *Appendix 6M-20.* Scale for "heart".

Matrices for Study 4: Implicational scaling for target words (6M-21 and 6M-22)

ID	Mo_T	l12	j12	b12	f12	h12	d12	Total
5	4231	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
17	2654	1	1	0	1	1	1	5
21	2231	1	1	0	1	1	1	5
27	2231	1	1	0	1	1	1	5
43	2885	0	1	1	1	1	1	5
10	3231	0	0	1	1	1	1	4
16	1654	0	0	1	1	1	1	4
18	2038	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
25	1308	0	0	1	1	1	1	4
26	1615	0	1	0	1	1	1	4
29	2269	1	0	1	1	1		4
30	2000	0	0	1	1	1	1	4
34	2769	0	0	1	1	1	1	4
35	2038	0	0	1	1	1	1	4
41	2077	0	1	0	1	1	1	4
4	2423	0	0	0	1	1	1	3
6	3115	0	0	0	1	1	1	3
14	1731	0	0	0	1	1	1	3
31	2538	0	0	0	1	1	1	3
33	1846	0	0	1	0	1	1	3
38	1692	0	1	0	0	1	1	3
39	2385	0	1	1	0	0	1	3
1	3462	0	0	0	0	1	1	2
40	2385	0	0	0	0	1	1	2
42	2731	0	0	0	0	1	1	2
47	2500	0	0	0	0	1	1	2
20	2192	0	0	0	0	0	1	1
45	2308	0	0	0	0	0	1	1
Total		20	24	27	35	41	44	191
Non-fit		4	4	8	3	1	0	20

Appendix 6M-21. Scale for "hope".

ID	Mo_T	l13	j13	b13	f13	h13	d13	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	0	1	1	1	1	5
12	2885	1	0	1	1	1	1	5
14	1731	0	1	1	1	1	1	5
20	2192	1	0	1	1	1	1	5
32	2154	1	0	1	1	1	1	5
36	2731	1	0	1	1	1	1	5
38	1692	1	1	0	1	1	1	5
9	3154	0	0	1	1	1	1	4
10	3231	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
16	1654	0	0	1	1	1	1	4
18	2038	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
23	1846	0	0	1	1	1	1	4
29	2269	0	0	1	1	1	1	4
30	2000	0	0	1	1	1	1	4
31	2538	0	0	1	1	1	1	4
35	2038	0	0	1	1	1	1	4
39	2385	0	0	1	1	1	1	4
44	2385	0	0	1	1	1	1	4
33	1846	0	0	1	1	0	1	3
40	2385	0	0	1	1	0	1	3
25	1308	0	0	1	0	0	1	2
46	2692	0	0	1	0	0	1	2
26	1615	0	0	0	0	1	0	1
Total		25	21	42	39	42	43	212
Non-fit		6	5	5	2	3	1	22

Appendix 6M-22. Scale for "inside".

Matrices for Study 4: Implicational scaling for target words (6M-23 and 6M-24)

ID	Mo_T	l14	j14	b14	f14	h14	d14	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
15	2885	1	0	1	1	1	1	5
23	1846	1	0	1	1	1	1	5
43	2885	1	0	1	1	1	1	5
19	2462	0	0	1	1	1	1	4
32	2154	0	0	1	1	1	1	4
36	2731	0	0	1	1	1	1	4
45	2308	0	0	1	1	1	1	4
46	2692	0	0	1	1	1	1	4
12	2885	0	0	0	1	1	1	3
13	2923	0	0	0	1	1	1	3
14	1731	0	0	0	1	1	1	3
17	2654	0	0	1	1	0	1	3
18	2038	0	0	1	0	1	1	3
21	2231	0	0	1	1	0	1	3
27	2231	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
37	2538	0	0	0	1	1	1	3
40	2385	0	0	0	1	1	1	3
1	3462	0	0	1	0	0	1	2
33	1846	0	0	1	0	0	1	2
42	2731	0	0	1	0	0	1	2
16	1654	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
22	2385	0	0	0	0	0	1	1
25	1308	0	0	0	0	0	1	1
29	2269	0	0	0	0	0	1	1
30	2000	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
41	2077	0	0	0	0	0	1	1
47	2500	0	0	0	0	0	1	1
26	1615	0	0	0	0	0	0	0
Total		15	12	26	29	28	43	153
Non-fit		3	3	6	1	5	0	18

Appendix 6M-23. Scale for "introduce".

ID	Mo_T	l10	j10	b10	f10	h10	d10	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
5	4231	1	0	1	1	1	1	5
16	1654	1	1	1	0	1	1	5
17	2654	1	1	0	1	1	1	5
19	2462	0	1	1	1	1	1	5
33	1846	1	1	0	1	1	1	5
35	2038	1	0	1	1	1	1	5
45	2308	1	1	0	1	1	1	5
20	2192	1	1	0	0	1	1	4
22	2385	0	0	1	1	1	1	4
23	1846	0	0	1	1	1	1	4
38	1692	1	0	0	1	1	1	4
40	2385	1	1	0	0	1	1	4
43	2885	0	1	1	0	1	1	4
47	2500	1	1	0	0	1	1	4
31	2538	0	0	0	1	1	1	3
Total		38	39	35	40	44	44	240
Non-fit		9	7	8	4	0	0	28

Appendix 6M-24. Scale for "letter".

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Matrices for Study 4: Implicational scaling for target words (6M-25 and 6M-26)

ID	Mo_T	l26	j26	b26	f26	h26	d26	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
16	1654	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
1	3462	1	0	1	1	1	1	5
20	2192	1	0	1	1	1	1	5
22	2385	0	1	1	1	1	1	5
25	1308	1	0	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
44	2385	1	0	1	1	1	1	5
6	3115	0	0	1	1	1	1	4
9	3154	0	0	1	1	1	1	4
12	2885	0	0	1	1	1	1	4
13	2923	0	0	1	1	1	1	4
14	1731	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
18	2038	0	0	1	1	1	1	4
19	2462	0	0	1	1	1	1	4
23	1846	0	0	1	1	1	1	4
26	1615	0	0	1	1	1	1	4
27	2231	0	0	1	1	1	1	4
30	2000	0	0	1	1	1	1	4
31	2538	0	0	1	1	1	1	4
32	2154	0	0	1	1	1	1	4
33	1846	0	0	1	1	1	1	4
37	2538	0	0	1	1	1	1	4
38	1692	0	0	1	1	1	1	4
39	2385	0	1	1	1	1	0	4
40	2385	0	0	1	1	1	1	4
41	2077	1	0	1	1	1	0	4
43	2885	0	0	1	1	1	1	4
45	2308	0	0	1	1	1	1	4
47	2500	0	0	1	1	1	1	4
Total		20	18	44	44	44	42	212
Non-fit		5	5	0	0	0	2	12

Appendix 6M-25. Scale for "look".

ID	Mo_T	l28	j28	b28	f28	h28	d28	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
33	1846	1	0	1	1	1	1	5
40	2385	1	1	1	0	1	1	5
4	2423	0	0	1	1	1	1	4
10	3231	1	0	1	0	1	1	4
12	2885	1	0	1	0	1	1	4
18	2038	1	0	1	1	1	0	4
21	2231	0	1	0	1	1	1	4
27	2231	1	0	1	0	1	1	4
31	2538	0	0	1	1	1	1	4
38	1692	0	1	0	1	1	1	4
43	2885	0	1	0	1	1	1	4
44	2385	1	0	1	1	1	0	4
15	2885	0	0	1	0	1	1	3
16	1654	0	0	0	1	1	1	3
20	2192	0	0	0	1	1	1	3
26	1615	0	0	0	1	1	1	3
30	2000	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
37	2538	0	0	0	1	1	1	3
45	2308	0	0	0	1	1	1	3
47	2500	0	1	0	1	1	0	3
23	1846	0	0	1	0	0	1	2
29	2269	0	0	0	0	1	1	2
39	2385	0	0	1	0	0	1	2
25	1308	0	0	0	0	0	1	1
35	2038	0	0	0	0	0	1	1
14	1731	0	0	0	0	0	0	0
Total		24	24	27	33	39	40	187
Non-fit		7	7	8	5	2	3	32

Appendix 6M-26. Scale for "poor".

Matrices for Study 4: Implicational scaling for target words (6M-27 and 6M-28)

ID	Mo_T	l27	j27	b27	f27	h27	d27	Total
1	3462	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
24	2769	1	1	1	0	1	1	5
9	3154	0	0	1	1	1	1	4
10	3231	0	0	1	1	1	1	4
15	2885	0	0	1	1	1	1	4
27	2231	0	0	1	1	1	1	4
6	3115	0	0	0	1	1	1	3
33	1846	0	0	0	1	1	1	3
42	2731	0	0	1	1	0	1	3
44	2385	0	0	0	1	1	1	3
4	2423	0	0	1	0	0	1	2
5	4231	0	0	0	0	1	1	2
7	3000	0	0	0	0	1	1	2
12	2885	0	0	0	0	1	1	2
14	1731	0	0	1	0	0	1	2
21	2231	0	0	0	0	1	1	2
25	1308	0	0	1	0	0	1	2
26	1615	0	0	0	0	1	1	2
29	2269	0	0	1	0	0	1	2
35	2038	0	0	1	0	0	1	2
43	2885	0	0	1	0	0	1	2
47	2500	0	0	0	0	1	1	2
13	2923	0	0	0	0	0	1	1
16	1654	0	0	0	0	0	1	1
17	2654	0	0	0	0	0	1	1
18	2038	0	0	0	0	0	1	1
19	2462	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
22	2385	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	1	1
30	2000	0	0	0	0	0	1	1
31	2538	0	0	0	0	0	1	1
32	2154	0	0	0	0	0	1	1
34	2769	0	0	0	0	0	1	1
36	2731	0	0	0	0	0	1	1
37	2538	0	0	0	0	0	1	1
38	1692	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
40	2385	0	0	0	0	0	1	1
41	2077	0	0	0	0	0	1	1
45	2308	0	0	0	0	0	1	1
46	2692	0	0	0	0	0	1	1
Total		4	4	15	11	17	44	95
Non-fit		1	0	7	1	7	0	16

Appendix 6M-27. Scale for "reach".

ID	Mo_T	l32	j32	b32	f32	h32	d32	Total
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
44	2385	0	1	1	1	1	1	5
5	4231	0	1	0	1	1	1	4
16	1654	0	0	1	1	1	1	4
29	2269	1	0	1	0	1	1	4
31	2538	1	0	0	1	1	1	4
36	2731	0	1	0	1	1	1	4
38	1692	0	1	0	1	1	1	4
40	2385	0	1	0	1	1	1	4
45	2308	0	1	0	1	1	1	4
1	3462	0	0	0	1	1	1	3
4	2423	0	0	0	1	1	1	3
7	3000	0	0	0	1	1	1	3
9	3154	0	0	0	1	1	1	3
12	2885	0	0	0	1	1	1	3
13	2923	0	0	0	1	1	1	3
15	2885	0	0	0	1	1	1	3
17	2654	0	0	0	1	1	1	3
18	2038	0	0	0	1	1	1	3
19	2462	0	0	0	1	1	1	3
21	2231	0	0	0	1	1	1	3
24	2769	0	0	0	1	1	1	3
25	1308	0	0	0	1	1	1	3
30	2000	0	0	0	1	1	1	3
32	2154	0	0	0	1	1	1	3
37	2538	0	0	0	1	1	1	3
41	2077	0	0	0	1	1	1	3
42	2731	0	0	0	1	1	1	3
43	2885	0	0	0	1	1	1	3
46	2692	0	0	0	1	1	1	3
11	3000	0	0	0	1	1	0	2
27	2231	0	0	0	0	1	1	2
39	2385	0	1	0	0	0	1	2
14	1731	0	0	0	0	0	1	1
20	2192	0	0	0	0	0	1	1
22	2385	0	0	0	0	0	1	1
26	1615	0	0	0	0	1	0	1
35	2038	0	0	0	0	0	1	1
47	2500	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	0	0
33	1846	0	0	0	0	0	0	0
34	2769	0	0	0	0	0	0	0
Total		4	11	5	33	35	39	127
Non-fit		1	7	7	1	2	2	20

Appendix 6M-28. Scale for "receive".

Matrices for Study 4: Implicational scaling for target words (6M-29 and 6M-30)

ID	Mo_T	l15	j15	b15	f15	h15	d15	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
1	3462	1	0	1	1	1	1	5
16	1654	1	0	1	1	1	1	5
21	2231	0	0	1	1	1	1	4
27	2231	0	0	1	1	1	1	4
30	2000	1	0	1	1	0	1	4
32	2154	0	0	1	1	1	1	4
34	2769	0	0	1	1	1	1	4
36	2731	1	1	1	0	0	1	4
22	2385	0	0	0	1	1	1	3
26	1615	0	1	0	0	1	0	2
41	2077	0	0	0	0	1	1	2
47	2500	0	0	0	0	1	1	2
14	1731	0	0	0	0	1	0	1
20	2192	0	0	0	0	0	1	1
23	1846	0	0	0	0	0	1	1
29	2269	0	0	0	0	1	0	1
35	2038	0	0	0	0	0	1	1
39	2385	0	0	0	0	0	1	1
18	2038	0	0	0	0	0	0	0
38	1692	0	0	0	0	0	0	0
46	2692	0	0	0	0	0	0	0
Total		27	25	31	31	35	38	187
Non-fit		4	4	0	1	4	3	16

ID	Mo_T	l19	j19	b19	f19	h19	d19	Total
4	2423	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
1	3462	0	1	1	1	1	1	5
5	4231	0	1	1	1	1	1	5
9	3154	1	0	1	1	1	1	5
11	3000	0	1	1	1	1	1	5
16	1654	1	0	1	1	1	1	5
17	2654	0	1	1	1	1	1	5
19	2462	0	1	1	1	1	1	5
23	1846	0	1	1	1	1	1	5
32	2154	1	0	1	1	1	1	5
36	2731	1	0	1	1	1	1	5
40	2385	1	0	1	1	1	1	5
42	2731	1	0	1	1	1	1	5
43	2885	0	1	1	1	1	1	5
45	2308	1	1	1	1	1	1	5
14	1731	0	1	0	1	1	1	4
15	2885	0	0	1	1	1	1	4
20	2192	0	1	0	1	1	1	4
22	2385	0	1	0	1	1	1	4
24	2769	0	1	0	1	1	1	4
26	1615	0	1	0	1	1	1	4
29	2269	0	1	0	1	1	1	4
33	1846	0	1	0	1	1	1	4
37	2538	0	0	1	1	1	1	4
41	2077	0	1	0	1	1	1	4
13	2923	0	0	0	1	1	1	3
18	2038	0	0	0	1	1	1	3
34	2769	0	0	0	1	1	1	3
38	1692	0	0	0	1	1	1	3
46	2692	0	0	0	1	1	1	3
47	2500	0	0	0	1	1	1	3
25	1308	0	0	0	0	1	1	2
30	2000	0	0	1	0	0	1	2
39	2385	0	0	0	1	1	0	2
Total		17	27	28	43	43	42	200
Non-fit		6	14	9	2	1	2	34

Appendix 6M-29. Scale for "same".   *Appendix 6M-30.* Scale for "surprise".

Appendix 6N

Matrices for Study 4: Implicational scaling for target words (6N-1 and 6N-2)

ID	Mo_T	e1	k1	g1	i1	c1	a1	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
38	1692	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
13	2923	1	0	1	1	1	1	5
14	1731	1	0	1	1	1	1	5
16	1654	0	1	1	1	1	1	5
21	2231	1	0	1	1	1	1	5
25	1308	1	0	1	1	1	1	5
29	2269	1	0	1	1	1	1	5
31	2538	1	0	1	1	1	1	5
32	2154	0	1	1	1	1	1	5
33	1846	0	1	1	1	1	1	5
34	2769	1	0	1	1	1	1	5
37	2538	1	0	1	1	1	1	5
39	2385	0	1	1	1	1	1	5
26	1615	0	0	0	1	1	1	3
35	2038	0	0	0	1	1	1	3
Total		38	34	42	44	44	44	246
Non-fit		8	8	0	0	0	0	16

ID	Mo_T	e2	k2	g2	i2	c2	a2	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
16	1654	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
8	3962	1	0	1	1	1	1	5
9	3154	1	0	1	1	1	1	5
10	3231	1	1	1	1	1	1	5
20	2192	1	1	0	1	1	1	5
23	1846	0	1	1	1	1	1	5
39	2385	1	1	0	1	1	1	5
41	2077	1	1	0	1	1	1	5
42	2731	0	1	1	1	1	1	5
1	3462	0	1	0	1	1	1	4
7	3000	0	1	1	1	0	1	4
14	1731	0	1	0	1	1	1	4
19	2462	0	1	0	1	1	1	4
33	1846	0	1	0	1	1	1	4
38	1692	0	1	0	1	1	1	4
40	2385	0	1	1	1	0	1	4
47	2500	0	1	0	1	1	0	2
Total		33	42	35	44	42	44	240
Non-fit		5	10	9	0	2	0	26

Appendix 6N-1. Scale for "across".   *Appendix 6N-2.* Scale for "actually".

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Matrices for Study 4: Implicational scaling for target words (6N-3 and 6N-4)

ID	Mo_T	e11	k11	g11	i11	c11	a11	Total
8	3962	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
1	3462	1	1	1	0	1	1	5
6	3115	1	1	1	0	1	1	5
11	3000	1	1	1	0	1	1	5
13	2923	1	1	1	0	1	1	5
14	1731	1	1	1	1	0	1	5
19	2462	1	1	1	1	0	1	5
23	1846	1	1	1	1	0	1	5
25	1308	1	1	1	1	0	1	5
26	1615	1	1	1	1	0	1	5
27	2231	1	1	1	0	1	1	5
31	2538	1	1	1	0	1	1	5
33	1846	0	1	1	1	1	1	5
34	2769	1	1	1	0	1	1	5
35	2038	1	1	1	1	0	1	5
38	1692	1	0	1	1	1	1	5
41	2077	1	1	1	0	1	1	5
42	2731	1	1	1	1	0	1	5
43	2885	1	1	1	0	1	1	5
44	2385	1	1	1	0	1	1	5
45	2308	1	1	1	0	1	1	5
47	2500	1	1	1	1	0	1	5
4	2423	1	1	1	0	0	1	4
5	4231	1	1	1	0	0	1	4
7	3000	1	1	1	0	0	1	4
9	3154	1	1	1	0	0	1	4
10	3231	0	1	1	1	0	1	4
16	1654	1	1	0	0	0	1	4
18	2038	1	1	1	0	0	1	4
20	2192	1	1	0	1	1	0	4
29	2269	1	1	1	0	0	1	4
39	2385	1	1	1	0	0	1	4
40	2385	1	1	1	0	0	0	4
Total		41	43	42	25	26	44	221
Non-fit		29	12	2	18	18	0	80

ID	Mo_T	e31	k31	g31	i31	c31	a31	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
1	3462	1	0	1	1	1	1	5
7	3000	1	1	1	0	1	1	5
9	3154	1	0	1	1	1	1	5
10	3231	0	1	1	1	1	1	5
17	2654	1	0	1	1	1	1	5
18	2038	1	0	1	1	1	1	5
20	2192	1	0	1	1	1	1	5
21	2231	1	0	1	1	1	1	5
23	1846	0	1	1	1	1	1	5
26	1615	1	0	1	1	1	1	5
31	2538	1	0	1	1	1	1	5
32	2154	1	0	1	1	1	1	5
33	1846	1	0	1	1	1	1	5
41	2077	1	0	1	1	1	1	5
43	2885	0	1	1	1	1	1	5
16	1654	1	0	0	1	1	1	4
25	1308	1	0	0	1	1	1	4
35	2038	0	0	1	1	1	1	4
38	1692	0	1	1	0	1	1	4
42	2731	0	1	1	0	1	1	4
Total		37	31	41	42	44	44	239
Non-fit		13	12	3	2	0	0	30

Appendix 6N-3. Scale for "alone".　　　　*Appendix 6N-4.* Scale for "believe".

Matrices for Study 4: Implicational scaling for target words (6N-5 and 6N-6)

ID	Mo_T	e20	k20	g20	i20	c20	a20	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	1	1	1	0	1	5
10	3231	0	1	1	1	1	1	5
22	2385	1	0	1	1	1	1	5
23	1846	0	1	1	1	1	1	5
26	1615	0	1	1	1	1	1	5
37	2538	0	1	1	1	1	1	5
40	2385	0	1	1	1	1	1	5
42	2731	1	0	1	1	1	1	5
14	1731	0	1	0	1	1	1	4
16	1654	0	1	0	1	1	1	4
20	2192	0	1	0	1	1	1	4
38	1692	0	1	0	1	1	1	4
39	2385	0	1	0	1	1	1	4
33	1846	0	0	0	1	1	1	3
Total		33	41	38	44	43	44	243
Non-fit		3	7	5	0	1	0	16

ID	Mo_T	e21	k21	g21	i21	c21	a21	Total
5	4231	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
38	1692	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
1	3462	1	1	1	0	1	1	5
4	2423	1	1	1	0	1	1	5
6	3115	1	1	1	1	1	0	5
8	3962	1	1	1	0	1	1	5
15	2885	1	1	1	0	1	1	5
16	1654	0	1	1	1	1	1	5
18	2038	0	1	1	1	1	1	5
20	2192	1	1	1	0	1	1	5
26	1615	1	1	1	0	1	1	5
34	2769	1	1	1	1	0	1	5
35	2038	1	1	1	0	1	1	5
39	2385	1	1	1	0	1	1	5
40	2385	1	1	1	1	0	1	5
9	3154	1	1	1	0	0	1	4
10	3231	1	1	1	0	0	1	4
14	1731	0	1	0	1	1	1	4
19	2462	1	1	1	0	1	0	4
23	1846	0	1	1	0	1	1	4
30	2000	0	1	1	0	1	1	4
41	2077	1	1	1	0	0	1	4
47	2500	0	1	1	0	1	1	4
Total		39	44	42	30	38	42	235
Non-fit		16	8	2	14	6	2	48

Appendix 6N-5. Scale for "between".　　　　*Appendix 6N-6.* Scale for "break".

Matrices for Study 4: Implicational scaling for target words (6N-7 and 6N-8)

ID	Mo_T	e4	k4	g4	i4	c4	a4	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
1	3462	1	1	1	1	0	1	5
6	3115	1	1	1	0	1	1	5
8	3962	1	1	1	0	1	1	5
10	3231	1	1	1	0	1	1	5
19	2462	0	1	1	1	1	1	5
22	2385	1	0	1	1	1	1	5
25	1308	1	1	0	1	1	1	5
26	1615	1	1	1	0	1	1	5
27	2231	1	1	1	0	1	1	5
29	2269	1	1	1	0	1	1	5
30	2000	1	1	1	0	1	1	5
31	2538	1	0	1	1	1	1	5
33	1846	0	1	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
39	2385	1	1	1	1	0	1	5
47	2500	1	0	1	1	1	1	5
7	3000	1	1	1	0	0	1	4
9	3154	1	0	1	0	1	1	4
16	1654	0	1	0	1	1	1	4
20	2192	1	0	1	0	1	1	4
23	1846	1	1	1	0	0	1	4
38	1692	0	1	0	0	1	1	3
Total		39	39	41	32	40	44	235
Non-fit		17	7	2	12	4	0	42

ID	Mo_T	e29	k29	g29	i29	c29	a29	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
38	1692	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	1	0	1	1	1	5
9	3154	1	0	1	1	1	1	5
14	1731	0	1	1	1	1	1	5
16	1654	1	1	0	1	1	1	5
26	1615	1	0	1	1	1	1	5
34	2769	1	0	1	1	1	1	5
35	2038	1	1	1	1	0	1	5
40	2385	1	1	0	1	1	1	5
20	2192	0	1	0	1	1	1	4
23	1846	0	1	0	1	1	1	4
Total		41	41	39	44	43	44	252
Non-fit		7	5	5	0	1	0	18

Appendix 6N-7. Scale for "build".   *Appendix 6N-8.* Scale for "carry".

Matrices for Study 4: Implicational scaling for target words (6N-9 and 6N-10)

ID	Mo_T	e16	k16	g16	i16	c16	a16	Total
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
9	3154	1	0	1	1	1	1	5
13	2923	1	0	1	1	1	1	5
17	2654	1	1	0	1	1	1	5
24	2769	1	1	0	1	1	1	5
27	2231	1	1	1	0	1	1	5
34	2769	1	0	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
45	2308	0	1	1	1	1	1	5
47	2500	1	1	0	1	1	1	5
1	3462	0	1	0	1	1	1	4
4	2423	0	1	0	1	1	1	4
7	3000	0	1	1	0	1	1	4
18	2038	1	1	1	0	0	1	4
19	2462	0	1	1	1	1	0	4
21	2231	1	1	0	0	1	1	4
29	2269	0	1	1	0	1	1	4
31	2538	0	1	0	1	1	1	4
32	2154	0	1	0	1	1	1	4
38	1692	0	1	0	1	1	1	4
40	2385	1	1	1	0	1	0	4
42	2731	0	0	1	1	1	1	4
14	1731	0	0	0	1	1	1	3
16	1654	0	0	0	1	1	1	3
22	2385	0	1	0	0	1	1	3
25	1308	0	0	0	1	1	1	3
26	1615	0	1	0	0	1	1	3
30	2000	0	1	0	0	1	1	3
33	1846	0	0	0	0	1	1	3
20	2192	0	0	0	0	1	1	2
23	1846	0	0	0	1	1	0	2
41	2077	0	0	0	0	1	1	2
39	2385	0	0	0	0	0	1	1
43	2885	0	0	0	0	0	1	1
46	2692	0	0	0	0	0	0	1
Total		20	31	22	30	38	41	182
Non-fit		10	18	9	10	3	2	52

ID	Mo_T	e22	k22	g22	i22	c22	a22	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	1	0	1	1	1	5
8	3962	1	0	1	1	1	1	5
24	2769	1	1	1	0	1	1	5
25	1308	1	1	0	1	1	1	5
30	2000	1	0	1	1	1	1	5
31	2538	1	1	1	1	0	1	5
44	2385	1	1	1	0	1	1	5
13	2923	0	1	1	0	1	1	4
39	2385	0	1	1	0	1	1	4
40	2385	1	0	0	1	1	1	4
42	2731	0	1	1	0	1	1	4
46	2692	1	1	1	0	0	1	4
16	1654	0	1	0	0	1	1	3
20	2192	0	0	1	0	1	1	3
33	1846	0	0	0	0	1	1	2
38	1692	0	0	0	0	0	1	2
26	1615	0	0	0	0	0	1	1
Total		36	37	37	32	42	44	228
Non-fit		9	9	4	9	1	0	32

Appendix 6N-9. Scale for "cause".   *Appendix 6N-10.* Scale for "choose".

Matrices for Study 4: Implicational scaling for target words (6N-11 and 6N-12)

ID	Mo_T	e23	k23	g23	i23	c23	a23	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	0	1	1	1	1	5
9	3154	1	1	1	1	0	1	5
14	1731	1	1	1	1	0	1	5
16	1654	1	1	0	1	1	1	5
17	2654	1	1	1	0	1	1	5
20	2192	1	1	1	1	1	0	5
25	1308	1	1	1	1	0	1	5
27	2231	1	1	1	1	0	1	5
30	2000	1	1	1	1	0	1	5
33	1846	0	1	1	1	1	1	5
34	2769	1	1	1	0	1	1	5
35	2038	1	1	1	1	0	1	5
38	1692	1	1	1	1	0	1	5
42	2731	1	1	1	1	0	1	5
10	3231	0	1	1	0	1	1	4
11	3000	1	0	1	1	0	1	4
26	1615	1	0	1	1	0	1	4
29	2269	1	1	1	0	0	1	4
31	2538	1	1	1	0	0	1	4
36	2731	1	0	1	1	0	1	4
41	2077	1	1	1	0	0	1	4
46	2692	0	0	1	1	0	1	3
Total		41	39	43	38	29	43	233
Non-fit		19	5	2	6	15	1	48

Appendix 6N-11. Scale for "clean".

ID	Mo_T	e17	k17	g17	i17	c17	a17	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	0	5
16	1654	1	1	0	1	1	1	5
37	2538	1	0	1	1	1	1	5
39	2385	1	0	1	1	1	1	5
41	2077	1	0	1	1	1	1	5
44	2385	1	1	1	0	1	1	5
45	2308	1	0	1	1	1	1	5
38	1692	1	0	0	1	1	1	4
Total		44	39	42	43	44	43	255
Non-fit		8	4	2	1	0	1	16

Appendix 6N-12. Scale for "close".

Matrices for Study 4: Implicational scaling for target words (6N-13 and 6N-14)

ID	Mo_T	e24	k24	g24	i24	c24	a24	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
38	1692	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
4	2423	1	0	1	1	1	1	5
46	2692	0	1	1	1	1	1	5
16	1654	1	0	0	1	0	1	3
Total		43	42	43	44	43	44	259
Non-fit		2	1	0	0	1	0	4

Appendix 6N-13. Scale for "deep".

ID	Mo_T	e5	k5	g5	i5	c5	a5	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
16	1654	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
18	2038	1	1	1	0	1	1	5
24	2769	1	1	1	0	1	1	5
34	2769	1	1	0	1	1	1	5
35	2038	1	1	0	1	1	1	5
43	2885	1	0	1	1	1	1	5
46	2692	1	1	1	1	0	1	5
47	2500	1	1	1	1	0	1	5
7	3000	1	0	1	1	0	1	4
33	1846	0	1	1	1	0	1	4
38	1692	0	1	0	0	1	1	3
Total		41	43	40	41	41	44	250
Non-fit		7	4	3	3	3	0	20

Appendix 6N-14. Scale for "difficult".

Matrices for Study 4: Implicational scaling for target words (6N-15 and 6N-16)

ID	Mo_T	e6	k6	g6	i6	c6	a6	Total
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
1	3462	0	1	1	1	1	1	5
4	2423	1	1	1	0	1	1	5
7	3000	0	1	1	1	1	1	5
15	2885	0	1	1	1	1	1	5
23	1846	0	1	1	1	1	1	5
24	2769	1	1	1	1	0	1	5
32	2154	1	1	0	1	1	1	5
41	2077	1	0	1	1	1	1	5
45	2308	0	1	1	1	1	1	5
14	1731	0	1	0	1	1	1	4
16	1654	0	1	0	1	1	1	4
18	2038	0	1	0	1	1	1	4
20	2192	0	1	0	1	1	1	4
22	2385	0	1	0	1	1	1	4
26	1615	0	1	0	1	1	1	4
27	2231	0	1	0	1	1	1	4
29	2269	0	1	0	1	1	1	4
30	2000	0	1	0	1	1	1	4
33	1846	0	1	0	1	1	1	4
37	2538	0	0	1	1	1	1	4
38	1692	0	1	0	1	1	1	4
39	2385	0	1	0	1	1	1	4
40	2385	0	1	0	1	1	1	4
42	2731	0	1	0	1	1	1	4
43	2885	0	1	0	1	1	1	4
47	2500	0	1	0	1	1	1	4
17	2654	0	1	0	0	1	1	3
19	2462	0	1	0	0	1	1	3
31	2538	0	0	0	1	1	1	3
35	2038	0	0	0	1	1	1	3
46	2692	0	1	0	1	0	1	3
Total		17	40	22	41	42	44	206
Non-fit		4	20	17	3	2	0	46

Appendix 6N-15. Scale for "express".

ID	Mo_T	e7	k7	g7	i7	c7	a7	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
11	3000	1	0	1	1	1	1	5
19	2462	0	1	1	1	1	1	5
20	2192	0	1	1	1	1	1	5
24	2769	1	0	1	1	1	1	5
32	2154	1	0	1	1	1	1	5
33	1846	0	1	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
36	2731	1	0	1	1	1	1	5
40	2385	1	0	1	1	1	1	5
7	3000	0	1	1	1	0	1	4
38	1692	1	0	0	1	1	1	4
16	1654	0	0	0	1	1	1	3
Total		38	37	42	44	43	44	248
Non-fit		6	8	1	0	1	0	16

Appendix 6N-16. Scale for "famous".

Matrices for Study 4: Implicational scaling for target words (6N-17 and 6N-18)

ID	Mo_T	e8	k8	g8	i8	c8	a8	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
4	2423	1	1	0	1	1	1	5
7	3000	1	0	1	1	1	1	5
9	3154	1	0	1	1	1	1	5
10	3231	1	0	1	1	1	1	5
17	2654	1	0	1	1	1	1	5
18	2038	1	0	1	1	1	1	5
23	1846	1	0	1	1	1	1	5
24	2769	1	0	1	1	1	1	5
25	1308	1	0	1	1	1	1	5
26	1615	1	0	1	1	1	1	5
33	1846	1	1	1	1	1	0	5
34	2769	1	0	1	1	1	1	5
35	2038	1	0	1	1	1	1	5
36	2731	1	0	1	1	1	1	5
39	2385	1	0	1	1	1	1	5
40	2385	1	0	1	1	1	1	5
16	1654	1	0	1	1	1	0	4
20	2192	1	0	0	1	1	1	4
38	1692	0	0	1	1	1	1	4
Total		43	27	42	44	44	42	242
Non-fit		18	14	2	0	0	2	36

Appendix 6N-17. Scale for "finally".

ID	Mo_T	e9	k9	g9	i9	c9	a9	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
35	2038	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
4	2423	0	1	1	1	1	1	5
11	3000	1	1	1	0	1	1	5
13	2923	0	1	1	1	1	1	5
15	2885	1	1	1	0	1	1	5
18	2038	1	1	1	0	1	1	5
19	2462	1	1	1	1	1	0	5
22	2385	1	1	1	0	1	1	5
33	1846	0	1	1	1	1	1	5
38	1692	0	1	1	1	1	1	5
40	2385	0	1	1	1	1	1	5
41	2077	1	1	0	1	1	1	5
45	2308	0	1	1	1	1	1	5
46	2692	0	1	1	1	1	1	5
47	2500	0	1	1	1	1	1	5
16	1654	0	1	0	1	1	1	4
23	1846	0	1	1	1	0	1	4
24	2769	0	1	1	1	0	1	4
26	1615	0	1	1	0	1	1	4
29	2269	0	1	1	0	1	1	4
30	2000	0	1	1	0	1	1	4
39	2385	0	1	0	1	1	1	4
43	2885	0	1	1	1	1	0	4
14	1731	0	1	0	1	1	0	3
20	2192	0	0	0	1	1	1	3
25	1308	0	1	0	0	1	1	3
Total		25	43	38	36	42	41	225
Non-fit		6	10	3	8	2	3	32

Appendix 6N-18. Scale for "full".

Matrices for Study 4: Implicational scaling for target words (6N-19 and 6N-20)

ID	Mo_T	e30	k30	g30	i30	c30	a30	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
4	2423	1	1	0	1	1	1	5
19	2462	0	1	1	1	1	1	5
20	2192	1	0	1	1	1	1	5
24	2769	1	1	0	1	1	1	5
29	2269	0	1	1	1	1	1	5
41	2077	1	1	0	1	1	1	5
45	2308	0	1	1	1	1	1	5
46	2692	1	1	0	1	1	1	5
7	3000	0	1	1	1	0	1	4
14	1731	0	1	0	1	1	1	4
16	1654	0	1	0	1	1	1	4
23	1846	0	1	0	1	1	1	4
25	1308	1	0	0	1	1	1	4
35	2038	1	1	0	1	0	1	4
38	1692	1	0	0	1	1	1	4
42	2731	0	1	0	1	1	1	4
47	2500	0	1	0	1	1	1	4
39	2385	0	1	0	1	0	1	3
Total		34	41	31	44	41	44	235
Non-fit		8	9	12	0	3	0	32

ID	Mo_T	e25	k25	g25	i25	c25	a25	Total
1	3462	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
4	2423	1	1	1	1	0	1	5
5	4231	1	1	1	1	0	1	5
6	3115	1	1	1	1	1	0	5
7	3000	0	1	1	1	1	1	5
9	3154	1	1	1	1	0	1	5
11	3000	1	1	1	1	0	1	5
12	2885	0	1	1	1	1	1	5
13	2923	1	1	1	0	1	1	5
15	2885	1	1	1	1	0	1	5
17	2654	1	1	1	1	0	1	5
19	2462	1	1	1	1	0	1	5
24	2769	1	1	1	1	0	1	5
25	1308	1	1	1	0	1	1	5
26	1615	1	1	1	1	0	1	5
27	2231	1	1	1	1	0	1	5
29	2269	1	1	1	0	1	1	5
30	2000	1	1	1	1	0	1	5
34	2769	1	1	1	1	0	1	5
37	2538	1	1	1	1	0	1	5
39	2385	1	1	1	1	0	1	5
40	2385	1	1	1	1	0	1	5
45	2308	1	1	1	1	0	1	5
46	2692	1	1	1	1	0	1	5
16	1654	1	1	1	0	0	1	4
20	2192	1	1	1	0	0	1	4
23	1846	0	1	1	1	0	1	4
31	2538	1	1	1	0	0	1	4
32	2154	1	1	1	0	0	1	4
33	1846	1	1	1	0	0	1	4
35	2038	1	1	1	0	0	1	4
36	2731	1	1	1	0	0	1	4
38	1692	1	1	1	0	0	1	4
47	2500	1	0	1	1	0	1	4
14	1731	0	1	1	0	0	1	3
Total		40	43	44	32	16	43	218
Non-fit		30	10	1	12	28	1	82

Appendix 6N-19. Scale for "happen".   *Appendix 6N-20.* Scale for "heart".

Matrices for Study 4: Implicational scaling for target words (6N-21 and 6N-22)

ID	Mo_T	e12	k12	g12	i12	c12	a12	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	0	5
16	1654	0	1	1	1	1	1	5
17	2654	1	1	1	1	0	1	5
21	2231	0	1	1	1	1	1	5
25	1308	1	1	0	1	1	1	5
26	1615	0	1	1	1	1	1	5
31	2538	0	1	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
36	2731	1	1	1	1	1	0	5
38	1692	1	0	1	1	1	1	5
42	2731	0	1	1	1	1	1	5
47	2500	0	1	1	1	1	1	5
18	2038	0	1	1	1	1	0	4
20	2192	0	1	0	1	1	1	4
33	1846	0	1	0	1	1	1	4
40	2385	0	1	0	1	1	1	4
Total		33	43	40	44	44	40	244
Non-fit		5	5	4	0	0	4	18

ID	Mo_T	e13	k13	g13	i13	c13	a13	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
38	1692	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
13	2923	1	0	1	1	1	1	5
26	1615	1	0	1	1	1	1	5
33	1846	0	1	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
39	2385	1	1	1	1	0	1	5
41	2077	1	0	1	1	1	1	5
43	2885	1	1	1	1	0	1	5
16	1654	1	0	0	1	0	1	4
40	2385	0	0	1	1	1	1	4
46	2692	1	1	0	1	0	0	4
Total		41	39	44	43	40	44	251
Non-fit		7	4	0	1	4	0	16

Appendix 6N-21. Scale for "hope".   *Appendix 6N-22.* Scale for "inside".

Matrices for Study 4: Implicational scaling for target words (6N-23 and 6N-24)

ID	Mo_T	e14	k14	g14	i14	c14	a14	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
7	3000	0	1	1	1	1	1	5
13	2923	1	0	1	1	1	1	5
14	1731	1	0	1	1	1	1	5
17	2654	1	0	1	1	1	1	5
21	2231	1	1	0	1	1	1	5
25	1308	1	0	1	1	1	1	5
30	2000	1	0	1	1	1	1	5
32	2154	1	0	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
36	2731	1	1	1	0	1	1	5
40	2385	1	0	1	1	1	1	5
41	2077	1	1	0	1	1	1	5
20	2192	0	0	1	1	1	1	4
22	2385	0	0	1	1	1	1	4
33	1846	0	1	0	1	1	1	4
37	2538	0	0	1	1	1	1	4
39	2385	0	1	0	1	1	1	4
16	1654	0	0	0	1	1	1	3
26	1615	0	0	0	1	1	1	3
29	2269	0	0	0	1	1	1	3
38	1692	0	0	0	1	1	1	3
47	2500	0	1	0	1	0	1	3
Total		32	30	35	43	43	44	227
Non-fit		10	10	4	1	1	0	26

ID	Mo_T	e10	k10	g10	i10	c10	a10	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
1	3462	1	1	1	0	1	1	5
10	3231	1	1	1	1	0	1	5
13	2923	1	1	1	0	1	1	5
14	1731	1	1	1	1	0	1	5
16	1654	0	1	1	1	1	1	5
21	2231	1	1	1	1	1	0	5
22	2385	1	1	1	1	1	0	5
24	2769	1	1	1	0	1	1	5
25	1308	1	0	1	1	1	1	5
29	2269	1	1	1	1	0	1	5
32	2154	1	1	1	0	1	1	5
33	1846	1	1	1	1	1	0	5
35	2038	1	1	1	0	1	1	5
37	2538	1	1	1	1	1	0	5
41	2077	1	1	1	1	1	0	5
47	2500	1	1	1	0	1	1	5
7	3000	0	1	1	0	1	1	4
9	3154	1	0	1	0	1	1	4
17	2654	1	1	1	1	0	0	4
20	2192	1	0	1	0	1	1	4
26	1615	1	1	1	0	0	1	4
27	2231	1	0	1	0	1	1	4
38	1692	1	0	1	1	1	0	4
39	2385	1	0	1	1	1	0	4
40	2385	1	0	0	0	1	1	3
Total		42	38	44	33	36	36	229
Non-fit		23	5	1	11	8	8	56

Appendix 6N-23. Scale for "introduce".

Appendix 6N-24. Scale for "letter".

Matrices for Study 4: Implicational scaling for target words (6N-25 and 6N-26)

ID	Mo_T	e26	k26	g26	i26	c26	a26	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
16	1654	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
38	1692	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	1	1	1	1	0	5
29	2269	1	0	1	1	1	1	5
35	2038	0	1	1	1	1	1	5
41	2077	1	0	1	1	1	1	5
Total		43	42	44	44	44	43	260
Non-fit		3	2	0	0	0	1	6

ID	Mo_T	e28	k28	g28	i28	c28	a28	Total
1	3462	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
46	2692	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
4	2423	0	1	1	1	1	1	5
7	3000	1	1	1	1	0	1	5
10	3231	0	1	1	1	1	1	5
12	2885	1	1	1	0	1	1	5
16	1654	1	0	1	1	1	1	5
20	2192	1	1	1	1	1	0	5
24	2769	0	1	1	1	1	1	5
25	1308	0	1	1	1	1	1	5
29	2269	0	1	1	1	1	1	5
30	2000	0	1	1	1	1	1	5
33	1846	0	1	1	1	1	1	5
39	2385	0	1	1	1	1	1	5
42	2731	0	1	1	1	1	1	5
35	2038	1	0	1	1	1	0	4
38	1692	1	0	1	1	1	0	4
14	1731	0	0	0	1	1	1	3
Total		33	41	42	43	43	42	244
Non-fit		5	2	1	1	1	2	12

Appendix 6N-25. Scale for "look".

Appendix 6N-26. Scale for "poor".

Matrices for Study 4: Implicational scaling for target words (6N-27 and 6N-28)

ID	Mo_T	e27	k27	g27	i27	c27	a27	Total
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
1	3462	1	1	1	0	1	1	5
8	3962	1	1	1	0	1	1	5
13	2923	1	1	1	0	1	1	5
22	2385	1	1	1	0	1	1	5
25	1308	1	1	0	1	1	1	5
30	2000	1	1	1	1	0	1	5
33	1846	1	1	0	1	1	1	5
35	2038	1	1	0	1	1	1	5
42	2731	1	0	1	1	1	1	5
44	2385	1	1	1	1	0	1	5
45	2308	1	1	1	1	0	1	5
4	2423	0	0	1	1	1	1	4
9	3154	0	1	1	0	1	1	4
23	1846	1	1	1	0	0	1	4
29	2269	0	1	0	1	1	1	4
36	2731	1	1	1	0	0	1	4
40	2385	1	1	0	1	0	1	4
41	2077	1	1	1	0	0	1	4
46	2692	1	0	1	1	0	1	4
47	2500	1	1	1	0	0	1	4
16	1654	0	0	0	1	1	1	3
31	2538	0	1	0	1	0	1	3
32	2154	0	1	0	1	0	1	3
38	1692	0	1	1	0	0	1	3
43	2885	1	0	1	0	0	1	3
14	1731	0	0	0	1	0	1	2
26	1615	0	1	0	0	1	0	2
39	2385	0	1	0	0	0	1	2
7	3000	0	1	0	0	0	0	1
20	2192	0	0	0	0	0	0	0
Total		32	37	31	29	27	41	197
Non-fit		18	14	7	12	15	2	68

ID	Mo_T	e32	k32	g32	i32	c32	a32	Total
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
26	1615	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
1	3462	0	1	1	1	1	1	5
7	3000	1	0	1	1	1	1	5
13	2923	1	0	1	1	1	1	5
17	2654	1	0	1	1	1	1	5
18	2038	1	0	1	1	1	1	5
21	2231	1	0	1	1	1	1	5
22	2385	1	0	1	1	1	1	5
24	2769	1	0	1	1	1	1	5
25	1308	1	0	1	1	1	1	5
27	2231	1	0	1	1	1	1	5
29	2269	1	0	1	1	1	1	5
32	2154	1	0	1	1	1	1	5
38	1692	1	0	1	1	1	1	5
42	2731	1	0	1	1	1	1	5
44	2385	1	0	1	1	1	1	5
46	2692	1	0	1	1	1	1	5
16	1654	1	0	0	1	1	1	4
33	1846	0	1	0	1	1	1	4
35	2038	0	1	0	1	1	1	4
47	2500	0	1	0	1	1	1	4
23	1846	0	0	0	1	1	1	3
39	2385	1	0	0	0	1	1	3
20	2192	0	0	0	0	1	1	2
Total		38	25	37	42	44	44	230
Non-fit		17	18	4	1	0	0	40

Appendix 6N-27. Scale for "reach".   *Appendix 6N-28.* Scale for "receive".

Matrices for Study 4: Implicational scaling for target words (6N-29 and 6N-30)

ID	Mo_T	e15	k15	g15	i15	c15	a15	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
16	1654	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
19	2462	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
24	2769	1	1	1	1	1	1	6
25	1308	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
30	2000	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
43	2885	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	1	1	0	1	1	5
20	2192	1	0	1	1	1	1	5
26	1615	0	1	1	1	1	1	5
29	2269	1	1	0	1	1	1	5
35	2038	1	1	0	1	1	1	5
14	1731	0	1	0	1	1	1	4
18	2038	0	1	0	1	1	1	4
23	1846	0	1	1	0	1	1	4
38	1692	0	0	0	1	1	1	3
39	2385	0	1	0	0	1	1	3
46	2692	0	1	0	1	0	1	3
Total		37	42	36	42	43	44	244
Non-fit		4	6	5	2	1	0	18

ID	Mo_T	e19	k19	g19	i19	c19	a19	Total
1	3462	1	1	1	1	1	1	6
4	2423	1	1	1	1	1	1	6
5	4231	1	1	1	1	1	1	6
6	3115	1	1	1	1	1	1	6
8	3962	1	1	1	1	1	1	6
9	3154	1	1	1	1	1	1	6
10	3231	1	1	1	1	1	1	6
11	3000	1	1	1	1	1	1	6
12	2885	1	1	1	1	1	1	6
13	2923	1	1	1	1	1	1	6
14	1731	1	1	1	1	1	1	6
15	2885	1	1	1	1	1	1	6
17	2654	1	1	1	1	1	1	6
18	2038	1	1	1	1	1	1	6
20	2192	1	1	1	1	1	1	6
21	2231	1	1	1	1	1	1	6
22	2385	1	1	1	1	1	1	6
23	1846	1	1	1	1	1	1	6
27	2231	1	1	1	1	1	1	6
29	2269	1	1	1	1	1	1	6
31	2538	1	1	1	1	1	1	6
32	2154	1	1	1	1	1	1	6
33	1846	1	1	1	1	1	1	6
34	2769	1	1	1	1	1	1	6
36	2731	1	1	1	1	1	1	6
37	2538	1	1	1	1	1	1	6
39	2385	1	1	1	1	1	1	6
40	2385	1	1	1	1	1	1	6
41	2077	1	1	1	1	1	1	6
42	2731	1	1	1	1	1	1	6
44	2385	1	1	1	1	1	1	6
45	2308	1	1	1	1	1	1	6
47	2500	1	1	1	1	1	1	6
7	3000	1	1	0	1	1	1	5
16	1654	1	1	0	1	1	1	5
19	2462	1	0	1	1	1	1	5
24	2769	1	0	1	1	1	1	5
25	1308	1	0	1	1	1	1	5
26	1615	1	0	1	1	1	1	5
30	2000	1	0	1	1	1	1	5
35	2038	1	0	1	1	1	1	5
38	1692	1	0	1	1	1	1	5
43	2885	1	1	1	1	0	1	5
46	2692	1	1	1	1	0	1	5
Total		44	36	42	44	43	44	253
Non-fit		11	8	2	0	1	0	22

Appendix 6N-29. Scale for "same".   *Appendix 6N-30.* Scale for "surprise".

Appendix 7A

Test Items used in Study 5: (J)-1 [recall]

■ 1 ～ 33 の日本語を英語にして，正しく発音しなさい。
■発音は録音します。以下の手順で吹き込みなさい。
① 学籍番号
② 名前
③ 「始めます」→ 1 ・・・，・・・，33 ・・・。 →「終了します」。

1	dream	21	thought
2	forget	22	back
3	bring	23	already
4	measure	24	boat
5	drink	25	manual
6	enjoy	26	hour
7	put	27	culture
8	fire	28	point
9	love	29	ask
10	brother	30	casual
11	true	31	popular
12	however	32	travel
13	during	33	mouth
14	with		
15	tire		
16	another		
17	flower		
18	sure		
19	thing		
20	foot		

Appendix 7B

Test Items used in Study 5: (L)-2 [recall]

■ 1 〜 33 の日本語に対応する英単語の綴りを書きなさい。

1	確信して，きっと〜だと思う	**sure**	21	しかしながら、けれども	**however**
2	(小型の)船　※ship以外	**boat**	22	〔人などの〕口	**mouth**
3	〜を持ってくる，〜を持って行く	**bring**	23	背中，後ろ	**back**
4	〜の間，〜の期間に	**during**	24	タイヤ	**tire**
5	文化，様式	**culture**	25	もう一つ，もう一人，別の	**another**
6	楽しむ，楽しく過ごす	**enjoy**	26	花	**flower**
7	尋ねる，質問する，聞く	**ask**	27	説明書，マニュアル	**manual**
8	足（単数）	**foot**	28	愛，愛情，愛する	**love**
9	すでに	**already**	29	忘れる，思い出せない	**forget**
10	(物を)置く	**put**	30	飲み物，飲料，飲む	**drink**
11	夢，理想	**dream**	31	普段着の，ざっくばらんな	**casual**
12	旅，旅行，長期旅行，旅行する	**travel**	32	火，炎，火事，火災	**fire**
13	1時間，時，時間	**hour**	33	〜と一緒に，〜しながら，〜を持って	**with**
14	人気がある，評判が良い	**popular**			
15	兄弟，兄，弟	**brother**			
16	論点，要点，ポイント	**point**			
17	物，物体	**thing**			
18	真実の，本当の	**true**			
19	思考，考えること，思想	**thought**			
20	測定，測定器，計量	**measure**			

Appendix 7C

<u>Test Items used in Study 5: (B)-3 [recall]</u>

■発音される単語のつづりを書き取りなさい。[1]
■単語は全部で 33 語です。<u>それぞれ 2 回ずつ発音されます。</u>
■分からないところがあっても，音から予測をして書きなさい。

1	measure	21	hour
2	back	22	during
3	foot	23	culture
4	love	24	bring
5	enjoy	25	mouth
6	dream	26	fire
7	true	27	thought
8	already	28	casual
9	put	29	thing
10	drink	30	travel
11	ask	31	tire
12	with	32	another
13	brother	33	flower

14	manual
15	however
16	sure
17	point
18	popular
19	boat
20	forget

Appendix 7D

Test Items used in Study 5: (F)-4 [recall]

■これから 33 個の英単語が発音されます。<u>単語はそれぞれ 2 回ずつ発音されます。</u>
■聞こえてくる英単語の意味を日本語で書きなさい。

1	測定，測定器，計量	21	1 時間，時，時間
2	背中，後ろ	22	～の間，～の期間に
3	足（単数）	23	文化，様式
4	愛，愛情，愛する	24	～を持ってくる，～を持って行く
5	楽しむ，楽しく過ごす	25	〔人などの〕口
6	夢，理想	26	火，炎，火事，火災
7	真実の，本当の	27	思考，考えること，思想
8	すでに	28	普段着の，ざっくばらんな
9	(物を)置く	29	物，物体
10	飲み物，飲料，飲む	30	旅，旅行，長期旅行，旅行する
11	尋ねる，質問する，聞く	31	タイヤ
12	～と一緒に，～しながら，～を持って	32	もう一つ，もう一人，別の
13	兄弟，兄，弟	33	花
14	説明書，マニュアル		
15	しかしながら、けれども		
16	確信して，きっと～だと思う		
17	論点，要点，ポイント		
18	人気がある，評判が良い		
19	(小型の)船　　※ship 以外		
20	忘れる，思い出せない		

Appendix 7E

Test Items used in Study 5: (D)-5 [recall]

■ 1 〜 33 までの単語を全て発音しなさい。
■読み方が分からないものがあっても，予測して発音しなさい。
■発音は録音します。以下の手順で吹き込みなさい。
① 学籍番号
② 名前
③ 「始めます」➔ 1 ···, ···, 33 ···。 ➔「終了します」。

1	thought	21	bring
2	manual	22	brother
3	another	23	culture
4	fire	24	dream
5	however	25	boat
6	foot	26	ask
7	measure	27	already
8	put	28	mouth
9	love	29	back
10	thing	30	true
11	forget	31	drink
12	during	32	tire
13	sure	33	hour
14	enjoy		
15	popular		
16	with		
17	point		
18	flower		
19	casual		
20	travel		

Appendix 7F

Test Items used in Study 5: (H)-6 [recall]

■ 1 ～ 33 までの単語を日本語に訳しなさい。

1	with	～と一緒に，～しながら，～を持って	21	true	真実の，本当の
2	culture	文化，様式	22	travel	旅，旅行，長期旅行，旅行する
3	ask	尋ねる，質問する，聞く	23	tire	タイヤ
4	foot	足（単数）	24	thing	物，物体
5	however	しかしながら、けれども	25	mouth	〔人などの〕口
6	hour	1時間，時，時間	26	manual	説明書，マニュアル
7	sure	確信して，きっと～だと思う	27	point	論点，要点，ポイント
8	back	背中，後ろ	28	forget	忘れる，思い出せない
9	drink	飲み物，飲料，飲む	29	casual	普段着の，ざっくばらんな
10	dream	夢，理想	30	love	愛，愛情，愛する
11	enjoy	楽しむ，楽しく過ごす	31	popular	人気がある，評判が良い
12	another	もう一つ，もう一人，別の	32	brother	兄弟，兄，弟
13	measure	測定，測定器，計量	33	put	(物を)置く
14	during	～の間，～の期間に			
15	thought	思考，考えること，思想			
16	flower	花			
17	already	すでに			
18	boat	(小型の)船　　※ship以外			
19	fire	火，炎，火事，火災			
20	bring	～を持ってくる，～を持って行く			

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Appendix 7G

Test Items used in Study 5: (K)-7 [recognition]

■ 1 〜 33 をよく見なさい。
■4つの中から正しい英単語の綴りを 1 つだけ選び，○をつけなさい。

1	alredy	already	arleady	allready
2	anothar	anather	another	anathar
3	asc	ask	asku	usk
4	batck	back	bak	bagk
5	bort	bourt	boto	boat
6	buring	brin	bring	buling
7	brothar	brother	brather	brathar
8	cajual	casualu	cajuaru	casual
9	cultuer	calture	culture	calter
10	draem	dream	dlaem	dleam
11	dlink	drink	dlingk	dringk
12	during	doring	duling	douling
13	injoy	enjoi	injoi	enjoy
14	fire	faiae	fiar	faier
15	flowr	floer	flower	frawer
16	fot	foot	futu	fut
17	fogeto	foget	fooget	forget
18	huor	awer	hour	arwer
19	howevar	howeva	however	howeber
20	lov	love	lav	luve

21	manual	manuall	manial	manyual
22	mesure	mejure	measure	meajor
23	mauth	mouth	mausu	mause
24	point	pointo	pouint	pouinto
25	popurar	popura	popular	popuraer
26	puut	put	puutu	putu
27	shur	suar	sure	shua
28	theng	seng	thing	shing
29	thought	touht	thout	thot
30	tiya	taiya	tire	tyer
31	travl	trabel	traberu	travel
32	ture	tru	true	trou
33	weth	wes	wis	with

<div style="text-align: right">（以上）</div>

Test Items used in Study 5: (E)-8 [recognition]

■これから 33 個の英単語が発音されます。単語はそれぞれ 2 回ずつ発音されます。
■発音された単語の意味として正しいものを，選択肢から 1 つ選び記号を書きなさい。
※選択肢は 40 個あります。当てはまらないものが 7 つあります。注意しなさい。

1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14			
15			
16			
17			
18			
19			
20			

(1)	思考，考えること，思想	(21)	～を持ってくる，～を持って行く
(2)	説明書，マニュアル	(22)	球体
(3)	もう一つ，もう一人，別の	(23)	文化，様式
(4)	火，炎，火事，火災	(24)	夢，理想
(5)	しかしながら、けれども	(25)	(小型の)船　※ship 以外
(6)	足（単数）	(26)	尋ねる，質問する，聞く
(7)	測定，測定器，計量	(27)	すでに
(8)	(物を)置く	(28)	〔人などの〕口
(9)	愛，愛情，愛する	(29)	背中，後ろ
(10)	物，物体	(30)	真実の，本当の
(11)	兄弟，兄，弟	(31)	飲み物，飲料，飲む
(12)	～の間，～の期間に	(32)	タイヤ
(13)	確信して，きっと～だと思う	(33)	1 時間，時，時間
(14)	楽しむ，楽しく過ごす	(34)	動物
(15)	姉妹，姉，妹	(35)	論点，要点，ポイント
(16)	～と一緒に，～しながら，～を持って	(36)	忘れる，思い出せない
(17)	生活	(37)	～の前に
(18)	花	(38)	植物
(19)	普段着の，ざっくばらんな	(39)	特別な
(20)	旅，旅行，長期旅行，旅行する	(40)	人気がある，評判が良い

Test Items used in Study 5: (G)-9 [recognition]

■ 1 〜 33 までの単語の意味として適切なものを，選択肢から 1 つ選び数字を書きなさい。
※選択肢は 40 個あります。当てはまらないものが 8 つあります。注意しなさい。

No.	Word		No.	Word	
1	enjoy		21	thing	
2	TRUE		22	fire	
3	hour		23	another	
4	already		24	foot	
5	with		25	however	
6	love		26	drink	
7	put		27	travel	
8	bring		28	mouth	
9	casual		29	forget	
10	manual		30	brother	
11	popular		31	during	
12	culture		32	ask	
13	measure		33	point	
14	thought				
15	flower				
16	dream				
17	tire				
18	sure				
19	back				
20	boat				

No.	意味	No.	意味
-1	思考，考えること，思想	-21	〜を持ってくる，〜を持って行く
-2	説明書，マニュアル	-22	球体
-3	もう一つ，もう一人，別の	-23	文化，様式
-4	火，炎，火事，火災	-24	夢，理想
-5	しかしながら、けれども	-25	(小型の)船 ※ship以外
-6	足（単数）	-26	尋ねる，質問する，聞く
-7	測定，測定器，計量	-27	すでに
-8	(物を)置く	-28	〔人などの〕口
-9	愛，愛情，愛する	-29	背中，後ろ
-10	物，物体	-30	真実の，本当の
-11	兄弟，兄，弟	-31	飲み物，飲料，飲む
-12	〜の間，〜の期間に	-32	タイヤ
-13	確信して，きっと〜だと思う	-33	1 時間，時，時間
-14	楽しむ，楽しく過ごす	-34	動物
-15	姉妹，姉，妹	-35	論点，要点，ポイント
-16	〜と一緒に，〜しながら，〜を持って	-36	忘れる，思い出せない
-17	生活	-37	〜の前に
-18	花	-38	植物
-19	普段着の，ざっくばらんな	-39	特別な
-20	旅，旅行，長期旅行，旅行する	-40	人気がある，評判が良い

Appendix 7J

Test Items used in Study 5: (OP)-10 [recognition]

■ 1 ～ 33 をよく見なさい。
■綴りが読み上げられた順に番号を振りなさい。
※単語はアルファベット順に表記されています。

	already			manual	
	another			measure	
	ask			mouth	
	back			point	
	boat			popular	
	bring			put	
	brother			sure	
	casual			thing	
	culture			thought	
	dream			tire	
	drink			travel	
	during			true	
	enjoy			with	
	fire				
	flower				
	foot				
	forget				
	hour				
	however				
	love				

Appendix 7K

Matrices for Study 5: Implicational scaling for target words (7K-1 and 7K-2)

ID	Mo_T	j1r	l1r	b1r	f1r	h1r	d1r	Total
7	2269	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
3	2423	1	0	1	1	1	1	5
4	2538	0	1	1	1	1	1	5
5	2692	0	1	1	1	1	1	5
20	1615	1	1	1	1	0	1	5
27	2577	0	1	1	1	1	1	5
40	2769	0	1	1	1	1	1	5
10	2154	0	0	1	1	1	1	4
11	1654	0	0	1	1	1	1	4
25	1577	0	0	1	1	1	1	4
29	1615	0	0	1	1	1	1	4
30	2308	0	0	1	1	1	1	4
1	3423	0	0	0	1	1	1	3
6	2654	0	0	0	1	1	1	3
34	1692	0	0	0	1	1	1	3
13	1923	0	0	0	0	1	1	2
9	1500	0	0	0	0	0	1	1
12	1615	0	0	0	0	0	1	1
14	2077	0	0	0	0	0	1	1
15	2115	0	0	0	0	0	1	1
16	2808	0	0	0	0	0	1	1
22	2231	0	0	0	0	0	1	1
24	1500	0	0	0	0	0	1	1
Total		14	17	23	26	26	34	140
Non-fit		2	1	0	0	1	0	4

ID	Mo_T	j2r	l2r	b2r	f2r	h2r	d2r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
9	1500	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
11	1654	1	0	1	1	1	1	5
19	2000	0	1	1	1	1	1	5
24	1500	0	1	1	1	1	1	5
15	2115	1	0	0	1	1	1	4
17	2500	0	0	1	1	1	1	4
34	1692	1	0	0	1	1	1	4
12	1615	0	0	0	1	1	1	3
16	2808	0	0	0	1	1	1	3
20	1615	0	0	1	0	1	1	3
22	2231	0	0	0	0	1	1	2
Total		27	26	30	32	33	34	182
Non-fit		3	1	4	1	1	0	10

Appendix 7K-1. Scale for "already".

Appendix 7K-2. Scale for "another".

Matrices for Study 5: Implicational scaling for target words (7K-3 and 7K-4)

ID	Mo_T	j3r	l3r	b3r	f3r	h3r	d3r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
12	1615	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
6	2654	0	1	1	1	1	1	5
22	2231	0	1	1	1	1	1	5
24	1500	0	1	1	1	1	1	5
27	2577	0	1	1	1	1	1	5
30	2308	0	1	1	1	1	1	5
7	2269	0	0	1	1	1	1	4
13	1923	0	0	1	1	1	1	4
14	2077	0	1	1	0	1	1	4
15	2115	0	0	1	1	1	1	4
19	2000	0	0	1	1	1	1	4
25	1577	0	0	1	1	1	1	4
34	1692	0	0	1	1	1	1	4
36	2308	0	0	1	1	1	1	4
11	1654	0	0	1	0	1	1	3
9	1500	0	0	1	0	0	1	2
16	2808	0	0	1	0	0	1	2
8	1462	0	0	0	0	0	1	1
Total		17	23	33	29	31	34	167
Non-fit		0	1	3	2	2	0	8

ID	Mo_T	j4r	l4r	b4r	f4r	h4r	d4r	Total
1	3423	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
3	2423	1	1	0	1	1	1	5
8	1462	1	1	1	0	1	1	5
10	2154	1	1	0	1	1	1	5
14	2077	0	1	1	1	1	1	5
17	2500	0	1	1	1	1	1	5
24	1500	0	1	1	1	1	1	5
27	2577	0	1	1	1	1	1	5
31	2308	1	1	0	1	1	1	5
41	3000	0	1	1	1	1	1	5
4	2538	0	0	1	1	1	1	4
25	1577	0	0	1	1	1	1	4
9	1500	0	0	0	1	1	1	3
11	1654	0	0	1	0	1	1	3
15	2115	0	0	0	0	1	1	2
19	2000	0	0	0	0	1	1	2
12	1615	0	0	0	0	0	1	1
Total		22	27	27	29	33	34	172
Non-fit		4	0	4	2	0	0	10

Appendix 7K-3. Scale for "ask".

Appendix 7K-4. Scale for "back".

Matrices for Study 5: Implicational scaling for target words (7K-5 and 7K-6)

ID	Mo_T	j5r	l5r	b5r	f5r	h5r	d5r	Total
3	2423	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
10	2154	1	0	1	1	1	1	5
16	2808	1	0	1	1	1	1	5
24	1500	0	1	1	1	1	1	5
29	1615	0	1	1	1	1	1	5
34	1692	1	0	1	1	1	1	5
39	3692	0	1	1	1	1	1	5
40	2769	0	1	1	1	1	1	5
1	3423	1	0	0	1	1	1	4
4	2538	0	0	1	1	1	1	4
5	2692	1	0	0	1	1	1	4
9	1500	0	0	1	1	1	1	4
14	2077	1	0	0	1	1	1	4
17	2500	1	0	0	1	1	1	4
25	1577	0	0	1	1	1	1	4
28	3269	0	0	1	1	1	1	4
36	2308	0	0	1	1	1	1	4
6	2654	0	0	0	1	1	1	3
12	1615	0	0	0	1	1	1	3
20	1615	0	0	0	1	1	1	3
31	2308	0	0	0	1	1	1	3
11	1654	0	0	0	0	1	1	2
15	2115	0	0	0	0	1	1	2
22	2231	0	0	0	0	1	1	2
Total		18	15	23	31	34	34	155
Non-fit		7	3	4	0	0	0	14

ID	Mo_T	j6r	l6r	b6r	f6r	h6r	d6r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
20	1615	1	0	1	1	1	1	5
31	2308	0	1	1	1	1	1	5
15	2115	0	1	1	1	0	1	4
17	2500	1	1	0	0	1	1	4
23	1462	0	0	1	1	1	1	4
24	1500	0	0	1	1	1	1	4
29	1615	0	0	1	1	1	1	4
36	2308	0	0	1	1	1	1	4
1	3423	0	0	1	0	1	1	3
8	1462	0	0	1	0	1	1	3
13	1923	1	0	1	0	0	1	3
16	2808	0	0	1	0	0	1	2
25	1577	0	0	1	0	0	1	2
30	2308	0	0	0	0	1	1	2
12	1615	0	0	0	0	0	1	1
9	1500	0	0	0	0	0	0	0
Total		21	21	30	25	28	33	158
Non-fit		3	3	6	4	4	0	20

Appendix 7K-5. Scale for "boat".   *Appendix 7K-6.* Scale for "bring".

Matrices for Study 5: Implicational scaling for target words (7K-7 and 7K-8)

ID	Mo_T	j7r	l7r	b7r	f7r	h7r	d7r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
9	1500	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
16	2808	1	0	1	1	1	1	5
1	3423	1	0	0	1	1	1	4
12	1615	1	0	0	1	1	1	4
22	2231	1	0	0	1	1	1	4
Total		34	30	31	34	34	34	197
Non-fit		4	1	3	0	0	0	8

ID	Mo_T	j8r	l8r	b8r	f8r	h8r	d8r	Total
3	2423	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
1	3423	1	1	0	1	1	1	5
28	3269	0	1	1	1	1	1	5
41	3000	0	1	1	1	1	1	5
4	2538	0	0	1	1	1	1	4
5	2692	0	0	1	1	1	1	4
6	2654	0	0	1	1	1	1	4
7	2269	1	0	0	1	1	1	4
8	1462	0	0	1	1	1	1	4
16	2808	0	0	1	1	1	1	4
17	2500	0	0	1	1	1	1	4
19	2000	0	0	1	1	1	1	4
23	1462	1	0	0	1	1	1	4
27	2577	0	0	1	1	1	1	4
37	3577	0	0	1	1	1	1	4
39	3692	0	0	1	1	1	1	4
10	2154	0	0	0	1	1	1	3
11	1654	0	0	0	1	1	1	3
12	1615	0	0	0	1	1	1	3
20	1615	0	0	0	1	1	1	3
22	2231	0	0	0	1	1	1	3
24	1500	0	0	0	1	1	1	3
30	2308	0	0	0	1	1	1	3
31	2308	0	0	0	1	1	1	3
36	2308	0	0	1	0	1	1	3
40	2769	0	0	1	0	1	1	3
29	1615	0	0	0	0	1	1	2
34	1692	0	0	0	0	1	1	2
9	1500	0	0	0	0	0	1	1
13	1923	0	0	0	0	0	1	1
15	2115	0	0	0	0	0	1	1
25	1577	0	0	0	0	0	1	1
Total		6	6	17	26	30	34	119
Non-fit		3	0	5	2	0	0	10

Appendix 7K-7. Scale for "brother".   *Appendix 7K-8.* Scale for "casual".

Matrices for Study 5: Implicational scaling for target words (7K-9 and 7K-10)

ID	Mo_T	j9r	l9r	b9r	f9r	h9r	d9r	Total
1	3423	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
9	1500	1	1	0	1	1	1	5
10	2154	0	1	1	1	1	1	5
20	1615	1	0	1	1	1	1	5
27	2577	0	1	1	1	1	1	5
31	2308	0	1	1	1	1	1	5
3	2423	1	0	0	1	1	1	4
4	2538	0	1	0	1	1	1	4
6	2654	0	0	1	1	1	1	4
7	2269	1	0	0	1	1	1	4
8	1462	1	0	0	1	1	1	4
11	1654	1	0	0	1	1	1	4
12	1615	1	0	0	1	1	1	4
15	2115	1	0	0	1	1	1	4
16	2808	1	0	0	1	1	1	4
23	1462	1	0	0	1	1	1	4
24	1500	1	0	0	1	1	1	4
30	2308	1	0	0	1	1	1	4
17	2500	0	0	0	1	1	1	3
19	2000	0	0	0	1	1	1	3
25	1577	0	0	0	1	1	1	3
34	1692	0	0	0	1	1	1	3
22	2231	0	0	0	0	1	1	2
13	1923	0	0	0	0	0	1	1
14	2077	0	0	0	0	0	1	1
Total		22	15	15	31	32	34	149
Non-fit		12	2	12	0	0	0	26

Appendix 7K-9. Scale for "culture".

ID	Mo_T	j10r	l10r	b10r	f10r	h10r	d10r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
9	1500	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
29	1615	1	1	0	1	1	1	5
12	1615	1	0	0	1	1	1	4
14	2077	0	0	1	1	1	1	4
22	2231	1	0	0	1	1	1	4
8	1462	0	0	0	1	1	1	3
Total		32	30	30	34	34	34	194
Non-fit		3	0	3	0	0	0	6

Appendix 7K-10. Scale for "dream".

Matrices for Study 5: Implicational scaling for target words (7K-11 and 7K-12)

ID	Mo_T	j11r	l11r	b11r	f11r	h11r	d11r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
9	1500	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
12	1615	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
1	3423	1	0	1	1	1	1	5
8	1462	1	1	0	1	1	1	5
29	1615	1	0	1	1	1	1	5
31	2308	1	0	1	1	1	1	5
41	3000	1	0	1	1	1	1	5
Total		34	30	33	34	34	34	199
Non-fit		5	4	1	0	0	0	10

Appendix 7K-11. Scale for "drink".

ID	Mo_T	j12r	l12r	b12r	f12r	h12r	d12r	Total
29	1615	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
31	2308	1	1	1	1	0	1	5
40	2769	1	1	1	1	1	0	5
4	2538	0	0	1	1	1	1	4
7	2269	0	0	1	1	1	1	4
20	1615	0	0	1	1	1	1	4
34	1692	1	0	0	1	1	1	4
36	2308	0	0	1	1	1	1	4
10	2154	0	0	0	1	1	1	3
28	3269	0	0	0	1	1	1	3
5	2692	0	0	0	0	1	1	2
11	1654	0	0	1	0	0	1	2
17	2500	0	0	0	0	1	1	2
27	2577	0	0	0	0	1	1	2
1	3423	0	0	0	0	1	0	1
6	2654	0	0	0	0	0	1	1
8	1462	0	0	0	0	1	0	1
9	1500	0	0	0	0	0	1	1
14	2077	0	0	0	0	0	1	1
16	2808	0	0	0	0	0	1	1
19	2000	0	0	0	0	0	1	1
23	1462	0	0	0	0	0	1	1
24	1500	0	0	0	1	0	0	1
3	2423	0	0	0	0	0	0	0
12	1615	0	0	0	0	0	0	0
13	1923	0	0	0	0	0	0	0
15	2115	0	0	0	0	0	0	0
22	2231	0	0	0	0	0	0	0
25	1577	0	0	0	0	0	0	0
30	2308	0	0	0	0	0	0	0
Total		8	7	12	15	18	23	83
Non-fit		3	0	2	1	4	4	14

Appendix 7K-12. Scale for "during".

Matrices for Study 5: Implicational scaling for target words (7K-13 and 7K-14)

ID	Mo_T	j13r	l13r	b13r	f13r	h13r	d13r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
12	1615	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	0	5
16	2808	1	1	1	0	1	1	5
1	3423	0	0	1	1	1	1	4
20	1615	0	0	1	1	1	1	4
23	1462	0	0	1	1	1	1	4
25	1577	0	0	1	1	1	1	4
30	2308	0	1	1	1	1	0	4
36	2308	1	1	0	0	1	1	4
9	1500	0	0	0	0	1	1	2
Total		28	29	32	31	34	32	186
Non-fit		3	2	1	2	0	2	10

ID	Mo_T	j14r	l14r	b14r	f14r	h14r	d14r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
9	1500	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
5	2692	0	1	1	1	1	1	5
8	1462	1	1	0	1	1	1	5
20	1615	1	0	1	1	1	1	5
30	2308	1	1	1	1	1	0	5
34	1692	1	0	1	1	1	1	5
36	2308	1	1	0	1	1	1	5
12	1615	1	0	0	1	1	1	4
16	2808	0	0	1	1	1	1	4
22	2231	1	0	0	1	1	1	4
31	2308	1	1	0	0	1	1	4
Total		32	29	29	33	34	33	190
Non-fit		8	3	5	1	0	1	18

Appendix 7K-13. Scale for "enjoy".   *Appendix 7K-14.* Scale for "fire".

Matrices for Study 5: Implicational scaling for target words (7K-15 and 7K-16)

ID	Mo_T	j15r	l15r	b15r	f15r	h15r	d15r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
1	3423	1	1	0	1	1	1	5
11	1654	1	1	0	1	1	1	5
9	1500	1	0	0	1	1	1	4
12	1615	1	0	0	1	1	1	4
16	2808	1	0	0	1	1	1	4
22	2231	1	0	0	1	1	1	4
34	1692	1	0	0	1	1	1	4
Total		34	29	27	34	34	34	192
Non-fit		7	0	7	0	0	0	14

ID	Mo_T	j16r	l16r	b16r	f16r	h16r	d16r	Total
10	2154	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
20	1615	1	1	1	0	1	1	5
34	1692	1	1	1	0	1	1	5
3	2423	1	1	0	0	1	1	4
16	2808	1	0	0	1	1	1	4
28	3269	1	1	0	0	1	1	4
29	1615	1	1	0	0	1	1	4
31	2308	1	1	0	0	1	1	4
33	3000	1	1	0	0	1	1	4
36	2308	1	1	0	0	1	1	4
37	3577	1	1	0	0	1	1	4
39	3692	1	1	0	0	1	1	4
5	2692	1	0	0	0	1	1	3
12	1615	1	0	0	0	1	1	3
30	2308	0	0	1	0	1	1	3
1	3423	0	0	0	0	1	1	2
4	2538	0	0	0	0	1	1	2
6	2654	0	0	0	0	1	1	2
7	2269	0	0	0	0	1	1	2
11	1654	0	0	0	0	1	1	2
13	1923	0	0	0	0	1	1	2
14	2077	0	0	0	0	1	1	2
15	2115	0	0	0	0	1	1	2
17	2500	0	0	0	0	1	1	2
19	2000	0	0	0	0	1	1	2
22	2231	0	0	0	0	1	1	2
23	1462	0	0	0	0	1	1	2
25	1577	0	0	0	0	1	1	2
27	2577	0	0	0	0	1	1	2
40	2769	0	0	0	0	1	1	2
8	1462	0	0	0	0	0	1	1
9	1500	0	0	0	0	0	1	1
24	1500	0	0	0	0	0	1	1
Total		15	12	5	3	31	34	100
Non-fit		13	8	10	13	0	0	44

Appendix 7K-1. Scale for "flower".   *Appendix 7K-2.* Scale for "foot".

Matrices for Study 5: Implicational scaling for target words (7K-17 and 7K-18)

ID	Mo_T	j17r	ll7r	b17r	f17r	h17r	d17r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
9	1500	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
8	1462	0	1	1	1	1	1	5
25	1577	1	1	1	0	1	1	5
27	2577	0	1	1	1	1	1	5
34	1692	0	1	1	1	1	1	5
1	3423	1	1	0	1	1	0	4
14	2077	0	0	1	1	1	1	4
17	2500	0	0	1	1	1	1	4
31	2308	0	0	1	1	1	1	4
12	1615	0	0	1	0	1	1	3
24	1500	0	0	1	1	0	1	3
11	1654	0	0	1	0	0	1	2
15	2115	0	0	0	0	1	1	2
22	2231	0	0	1	0	0	1	2
Total		23	26	32	29	31	33	174
Non-fit		2	1	5	2	3	1	14

ID	Mo_T	j18r	l18r	b18r	f18r	h18r	d18r	Total
5	2692	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
1	3423	0	1	1	1	1	1	5
4	2538	1	0	1	1	1	1	5
7	2269	0	1	1	1	1	1	5
8	1462	0	1	1	1	1	1	5
16	2808	1	1	0	1	1	1	5
25	1577	1	1	1	0	1	1	5
34	1692	0	1	1	1	1	1	5
3	2423	1	1	0	0	1	1	4
9	1500	0	0	1	1	1	1	4
10	2154	0	0	0	1	1	1	3
19	2000	1	1	0	0	1	0	3
6	2654	0	1	0	0	1	0	2
15	2115	0	0	0	0	1	1	2
13	1923	0	0	0	0	1	0	1
14	2077	0	0	0	0	1	0	1
17	2500	0	0	0	0	1	0	1
22	2231	0	0	0	0	1	0	1
24	1500	0	0	0	1	0	0	1
11	1654	0	0	0	0	0	0	0
12	1615	0	0	0	0	0	0	0
Total		19	23	21	23	31	25	142
Non-fit		5	4	2	4	4	7	26

Appendix 7K-17. Scale for "forget".　　*Appendix 7K-18.* Scale for "hour".

Matrices for Study 5: Implicational scaling for target words (7K-19 and 7K-20)

ID	Mo_T	j19r	l19r	b19r	f19r	h19r	d19r	Total
10	2154	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
3	2423	1	0	1	1	1	1	5
30	2308	0	1	1	1	1	1	5
37	3577	0	1	1	1	1	1	5
1	3423	0	0	1	1	1	1	4
5	2692	0	0	1	1	1	1	4
8	1462	0	0	1	1	1	1	4
12	1615	1	0	0	1	1	1	4
36	2308	0	0	1	1	1	1	4
39	3692	0	0	1	1	1	1	4
6	2654	0	0	1	1	1	0	3
7	2269	0	0	1	0	1	1	3
15	2115	0	0	1	0	1	1	3
17	2500	0	0	0	1	1	1	3
19	2000	0	0	0	1	1	1	3
4	2538	0	0	1	0	0	1	2
9	1500	0	0	1	0	0	1	2
13	1923	0	0	1	0	0	1	2
16	2808	0	0	1	0	0	1	2
20	1615	0	0	1	0	0	1	2
22	2231	0	0	1	0	0	1	2
11	1654	0	0	0	0	0	1	1
24	1500	0	0	0	0	0	1	1
25	1577	0	0	0	0	0	1	1
Total		13	13	28	23	25	33	135
Non-fit		2	1	10	2	6	1	22

ID	Mo_T	j20r	l20r	b20r	f20r	h20r	d20r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
12	1615	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
8	1462	1	1	0	1	1	1	5
15	2115	1	1	0	1	1	1	5
24	1500	1	1	0	1	1	1	5
30	2308	1	1	0	1	1	1	5
9	1500	1	0	0	0	1	1	4
Total		34	34	29	33	34	34	198
Non-fit		5	1	5	1	0	0	12

Appendix 7K-19. Scale for "however".　　*Appendix 7K-20.* Scale for "love".

Matrices for Study 5: Implicational scaling for target words (7K-21 and 7K-22)

ID	Mo_T	j21r	l21r	b21r	f21r	h21r	d21r	Total
3	2423	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
5	2692	0	1	1	1	1	1	5
6	2654	1	0	1	1	1	1	5
10	2154	1	0	1	1	1	1	5
20	1615	0	1	1	1	1	1	5
24	1500	1	1	0	1	1	1	5
27	2577	0	1	1	1	1	1	5
29	1615	1	0	1	1	1	1	5
36	2308	0	1	1	1	1	1	5
4	2538	0	0	1	1	1	1	4
7	2269	1	0	0	1	1	1	4
11	1654	1	0	0	1	1	1	4
15	2115	1	0	0	1	1	1	4
16	2808	1	0	0	1	1	1	4
23	1462	1	0	0	1	1	1	4
25	1577	1	0	0	1	1	1	4
28	3269	0	0	1	1	1	1	4
31	2308	0	0	1	1	1	1	4
37	3577	0	0	1	1	1	1	4
40	2769	1	0	0	1	1	1	4
41	3000	0	0	1	1	1	1	4
1	3423	0	0	0	1	1	1	3
13	1923	1	0	0	0	1	1	3
14	2077	0	0	0	1	1	1	3
34	1692	0	0	0	1	1	1	3
12	1615	0	0	0	1	0	1	2
22	2231	0	0	0	0	1	1	2
9	1500	0	0	0	0	0	1	1
Total		19	12	19	31	32	34	147
Non-fit		12	3	8	2	1	0	26

Appendix 7K-21. Scale for "manual".

ID	Mo_T	j22r	l22r	b22r	f22r	h22r	d22r	Total
36	2308	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
3	2423	1	0	0	1	1	1	4
4	2538	1	0	0	1	1	1	4
28	3269	0	0	1	1	1	1	4
29	1615	1	0	0	1	1	1	4
40	2769	1	0	0	1	1	1	4
1	3423	0	0	0	1	1	1	3
5	2692	0	0	0	1	1	1	3
7	2269	0	0	0	1	1	1	3
10	2154	0	0	0	1	1	1	3
13	1923	0	0	0	1	1	1	3
20	1615	0	0	0	1	1	1	3
23	1462	0	0	0	1	1	1	3
30	2308	0	0	0	1	1	1	3
33	3000	0	0	0	1	1	1	3
37	3577	0	0	0	1	1	1	3
12	1615	0	0	0	1	1	0	2
31	2308	0	0	0	0	1	1	2
6	2654	0	0	0	0	0	1	1
8	1462	0	0	0	0	0	1	1
9	1500	0	0	0	0	0	1	1
11	1654	0	0	0	0	0	1	1
14	2077	0	0	0	0	0	1	1
15	2115	0	0	0	0	0	1	1
16	2808	0	0	0	0	0	1	1
19	2000	0	0	0	0	0	1	1
24	1500	0	0	0	0	0	1	1
25	1577	0	0	0	0	0	1	1
34	1692	0	0	0	0	0	1	1
17	2500	0	0	0	0	0	0	0
22	2231	0	0	0	0	0	0	0
27	2577	0	0	0	0	0	0	0
Total		7	3	4	19	20	30	83
Non-fit		4	0	4	1	0	1	10

Appendix 7K-22. Scale for "measure".

Matrices for Study 5: Implicational scaling for target words (7K-23 and 7K-24)

ID	Mo_T	j23r	l23r	b23r	f23r	h23r	d23r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
4	2538	1	1	0	1	1	1	5
5	2692	1	1	0	1	1	1	5
6	2654	1	1	1	0	1	1	5
9	1500	1	1	0	1	1	1	5
10	2154	1	0	1	1	1	1	5
31	2308	1	1	0	1	1	1	5
11	1654	1	0	0	1	1	1	4
15	2115	1	0	0	1	1	1	4
16	2808	1	0	0	1	1	1	4
19	2000	1	1	0	0	1	1	4
20	1615	1	0	0	1	1	1	4
17	2500	1	0	0	0	1	1	3
22	2231	0	0	0	1	1	1	3
24	1500	1	0	0	1	1	0	3
8	1462	0	0	0	0	1	1	2
25	1577	1	0	0	0	1	0	2
12	1615	0	0	0	0	0	1	1
Total		31	23	19	28	33	32	166
Non-fit		14	2	9	3	0	2	30

Appendix 7K-23. Scale for "mouth".

ID	Mo_T	j24r	l24r	b24r	f24r	h24r	d24r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
25	1577	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
7	2269	1	0	1	1	1	1	5
12	1615	0	1	1	1	1	1	5
14	2077	0	1	1	1	1	1	5
17	2500	0	1	1	1	1	1	5
22	2231	0	1	1	1	1	1	5
24	1500	0	1	1	1	1	1	5
28	3269	0	1	1	1	1	1	5
36	2308	0	1	1	1	1	1	5
40	2769	0	1	1	1	1	1	5
4	2538	0	0	1	1	1	1	4
9	1500	0	0	1	1	1	1	4
29	1615	0	0	1	1	1	1	4
31	2308	0	0	1	1	1	1	4
37	3577	0	0	1	1	1	1	4
Total		21	28	34	34	34	34	185
Non-fit		1	1	0	0	0	0	2

Appendix 7K-24. Scale for "point".

Matrices for Study 5: Implicational scaling for target words (7K-25 and 7K-26)

ID	Mo_T	j25r	l25r	b25r	f25r	h25r	d25r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
8	1462	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
15	2115	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
7	2269	0	1	1	1	1	1	5
10	2154	0	1	1	1	1	1	5
11	1654	1	0	1	1	1	1	5
28	3269	1	1	1	0	1	1	5
30	2308	1	1	0	1	1	1	5
33	3000	0	1	1	1	1	1	5
34	1692	1	0	1	1	1	1	5
1	3423	1	0	0	1	1	1	4
9	1500	0	0	1	1	1	1	4
16	2808	1	0	0	1	1	1	4
17	2500	1	0	0	1	1	1	4
22	2231	1	0	0	1	1	1	4
25	1577	1	0	1	0	1	1	4
12	1615	0	0	0	1	1	1	3
19	2000	0	0	0	1	1	1	3
24	1500	0	0	0	1	1	1	3
Total		27	23	26	32	34	34	176
Non-fit		9	2	5	2	0	0	18

Appendix 7K-25. Scale for "popular".

ID	Mo_T	j26r	l26r	b26r	f26r	h26r	d26r	Total
1	3423	1	1	1	1	1	1	6
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
11	1654	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
24	1500	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
30	2308	1	1	1	1	1	1	6
31	2308	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
6	2654	1	1	1	0	1	1	5
20	1615	1	1	1	0	1	1	5
12	1615	0	0	1	1	1	1	4
8	1462	0	0	0	1	1	1	3
9	1500	0	0	1	0	0	1	2
15	2115	0	0	1	0	0	1	2
25	1577	0	0	1	0	0	1	2
Total		29	29	33	29	31	34	185
Non-fit		2	0	3	2	3	0	10

Appendix 7K-26. Scale for "put".

Matrices for Study 5: Implicational scaling for target words (7K-27 and 7K-28)

ID	Mo_T	j27r	l27r	b27r	f27r	h27r	d27r	Total
10	2154	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
3	2423	1	0	1	1	1	1	5
5	2692	0	0	1	1	1	1	4
17	2500	0	0	1	1	1	1	4
27	2577	0	0	1	1	1	1	4
30	2308	0	0	1	1	1	1	4
36	2308	0	0	1	1	1	1	4
8	1462	0	0	1	0	1	1	3
13	1923	0	0	1	0	1	1	3
19	2000	0	0	1	0	1	1	3
1	3423	0	0	0	0	1	1	2
4	2538	0	0	1	0	0	1	2
6	2654	0	0	1	0	0	1	2
14	2077	0	0	1	0	0	1	2
16	2808	0	0	1	0	0	1	2
20	1615	0	0	1	0	0	1	2
22	2231	0	0	1	0	0	1	2
23	1462	0	0	1	0	0	1	2
24	1500	0	0	1	0	0	1	2
25	1577	0	0	1	0	0	1	2
34	1692	0	0	1	0	0	1	2
7	2269	0	0	0	0	0	1	1
9	1500	0	0	0	0	0	1	1
11	1654	0	0	1	0	0	0	1
12	1615	0	0	0	0	0	1	1
15	2115	0	0	0	0	0	1	1
29	1615	0	0	0	0	0	1	1
31	2308	0	0	0	0	0	1	1
Total		8	7	27	13	17	33	105
Non-fit		1	1	14	3	10	1	30

Appendix 7K-27. Scale for "sure".

ID	Mo_T	j28r	l28r	b28r	f28r	h28r	d28r	Total
7	2269	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
25	1577	1	1	1	0	1	1	5
33	3000	1	1	1	0	1	1	5
36	2308	0	1	1	1	1	1	5
5	2692	1	1	0	0	1	1	4
29	1615	1	1	0	0	1	1	4
37	3577	0	0	1	1	1	1	4
41	3000	1	1	0	0	1	1	4
3	2423	0	0	1	1	0	1	3
4	2538	0	0	1	0	1	1	3
23	1462	0	0	1	0	1	1	3
24	1500	0	0	1	1	0	1	3
39	3692	0	0	1	0	1	1	3
1	3423	0	0	1	0	0	1	2
6	2654	0	0	1	0	0	1	2
14	2077	0	0	0	0	1	1	2
17	2500	0	0	0	0	1	1	2
19	2000	0	0	0	0	1	1	2
20	1615	0	0	0	0	1	1	2
27	2577	0	0	0	0	1	1	2
31	2308	0	0	0	0	1	1	2
34	1692	0	0	1	0	0	1	2
8	1462	0	0	0	0	0	1	1
9	1500	0	0	0	0	0	1	1
11	1654	0	0	0	0	0	1	1
12	1615	0	0	0	0	0	1	1
13	1923	0	0	0	0	0	1	1
15	2115	0	0	0	0	0	1	1
16	2808	0	0	0	0	0	1	1
30	2308	0	0	0	0	0	1	1
40	2769	0	0	0	0	0	1	1
10	2154	0	0	0	0	0	0	0
22	2231	0	0	0	0	0	0	0
Total		7	8	14	6	18	32	85
Non-fit		5	3	11	8	5	0	32

Appendix 7K-28. Scale for "thing".

Matrices for Study 5: Implicational scaling for target words (7K-29 and 7K-30)

ID	Mo_T	j29r	l29r	b29r	f29r	h29r	d29r	Total
33	3000	1	1	0	0	1	1	4
41	3000	1	1	0	0	1	1	4
24	1500	1	0	0	1	0	1	3
37	3577	0	0	1	1	1	0	3
1	3423	0	0	0	0	1	1	2
5	2692	0	0	0	0	1	1	2
13	1923	0	0	0	0	1	1	2
23	1462	0	0	0	0	1	1	2
30	2308	0	0	0	0	1	1	2
31	2308	0	0	0	0	1	1	2
36	2308	0	0	0	0	1	1	2
39	3692	0	0	0	0	1	1	2
3	2423	1	0	0	0	0	0	1
4	2538	0	0	0	0	0	1	1
7	2269	0	0	0	0	0	1	1
14	2077	0	0	0	0	0	1	1
17	2500	0	0	0	0	0	1	1
19	2000	0	0	0	0	0	1	1
27	2577	0	0	0	0	1	0	1
28	3269	0	0	0	0	1	0	1
29	1615	0	0	0	0	0	1	1
34	1692	0	0	0	0	1	0	1
40	2769	0	0	0	0	0	1	1
6	2654	0	0	0	0	0	0	0
8	1462	0	0	0	0	0	0	0
9	1500	0	0	0	0	0	0	0
10	2154	0	0	0	0	0	0	0
11	1654	0	0	0	0	0	0	0
12	1615	0	0	0	0	0	0	0
15	2115	0	0	0	0	0	0	0
16	2808	0	0	0	0	0	0	0
20	1615	0	0	0	0	0	0	0
22	2231	0	0	0	0	0	0	0
25	1577	0	0	0	0	0	0	0
Total		4	2	1	2	14	18	41
Non-fit		4	2	3	2	4	5	20

ID	Mo_T	j30r	l30r	b30r	f30r	h30r	d30r	Total
8	1462	1	1	1	1	1	1	6
19	2000	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
16	2808	1	0	1	1	1	1	5
25	1577	1	0	1	1	1	1	5
29	1615	1	0	1	1	1	1	5
39	3692	0	1	1	1	1	1	5
41	3000	0	1	1	1	1	1	5
1	3423	1	0	0	1	1	1	4
4	2538	1	0	0	1	1	1	4
5	2692	0	0	1	1	1	1	4
6	2654	0	0	1	1	1	1	4
7	2269	1	0	0	1	1	1	4
10	2154	1	0	1	1	0	1	4
24	1500	0	0	1	1	1	1	4
28	3269	0	0	1	1	1	1	4
31	2308	0	0	1	1	1	1	4
3	2423	1	0	0	1	0	1	3
11	1654	1	0	0	1	0	1	3
13	1923	0	0	0	1	1	1	3
14	2077	0	0	1	1	0	1	3
34	1692	1	0	0	1	0	1	3
9	1500	1	0	0	1	0	0	2
15	2115	0	0	0	1	0	1	2
27	2577	0	0	0	1	1	0	2
30	2308	0	0	1	0	0	1	2
12	1615	0	0	0	1	0	0	1
20	1615	0	0	0	0	0	1	1
22	2231	0	0	0	0	1	0	1
17	2500	0	0	0	0	0	0	0
Total		18	9	20	30	23	29	129
Non-fit		11	3	5	4	9	4	36

Appendix 7K-29. Scale for "thought".   *Appendix 7K-30.* Scale for "tire".

Matrices for Study 5: Implicational scaling for target words (7K-31 and 7K-32)

ID	Mo_T	j31r	l31r	b31r	f31r	h31r	d31r	Total
1	3423	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
16	2808	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
3	2423	1	0	1	1	1	1	5
10	2154	0	1	1	1	1	1	5
14	2077	0	1	1	1	1	1	5
19	2000	0	1	1	1	1	1	5
29	1615	0	1	1	1	1	1	5
30	2308	0	1	1	1	1	1	5
33	3000	0	1	1	1	1	1	5
37	3577	0	1	1	1	1	1	5
4	2538	0	0	1	1	1	1	4
7	2269	0	0	1	1	1	1	4
8	1462	1	1	0	0	1	1	4
11	1654	1	0	0	1	1	1	4
20	1615	0	0	1	1	1	1	4
23	1462	0	0	1	1	1	1	4
24	1500	0	0	1	1	1	1	4
25	1577	0	0	1	1	1	1	4
28	3269	0	0	1	1	1	1	4
31	2308	0	0	1	1	1	1	4
34	1692	1	0	0	1	1	1	4
40	2769	0	0	1	1	1	1	4
41	3000	1	1	0	0	1	1	4
6	2654	0	0	1	0	1	1	3
12	1615	0	0	0	1	1	1	3
13	1923	1	0	0	0	1	1	3
15	2115	0	0	0	1	1	1	3
17	2500	0	0	1	0	1	1	3
22	2231	0	0	1	0	1	1	3
9	1500	0	0	0	0	1	1	2
36	2308	0	0	0	0	1	1	2
Total		11	14	25	26	34	34	144
Non-fit		6	3	7	6	0	0	22

ID	Mo_T	j32r	l32r	b32r	f32r	h32r	d32r	Total
3	2423	1	1	1	1	1	1	6
4	2538	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
20	1615	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
5	2692	1	0	1	1	1	1	5
10	2154	1	0	0	1	1	1	4
16	2808	0	0	1	1	1	1	4
17	2500	0	0	1	1	1	1	4
19	2000	0	0	1	1	1	1	4
23	1462	0	0	1	1	1	1	4
30	2308	1	0	0	1	1	1	4
31	2308	0	0	1	1	1	1	4
36	2308	0	0	1	1	1	1	4
40	2769	0	0	1	1	1	1	4
41	3000	0	0	1	1	1	1	4
1	3423	0	0	0	1	1	1	3
6	2654	0	0	0	1	1	1	3
12	1615	0	0	0	1	1	1	3
14	2077	0	0	1	1	0	1	3
24	1500	0	0	0	1	1	1	3
8	1462	0	0	1	0	0	1	2
9	1500	0	0	1	0	0	1	2
11	1654	0	0	1	0	0	1	2
15	2115	0	0	0	0	1	1	2
25	1577	0	0	1	0	0	1	2
22	2231	0	0	0	0	0	1	1
Total		15	12	26	28	28	34	143
Non-fit		3	1	7	0	5	0	16

Appendix 7K-31. Scale for "travel".   *Appendix 7K-32.* Scale for "true".

Matrices for Study 5: Implicational scaling for target words (7K-33 and 7K-34)

ID	Mo_T	j33r	l33r	b33r	f33r	h33r	d33r	Total
3	2423	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
6	2654	1	1	1	1	1	1	6
13	1923	1	1	1	1	1	1	6
14	2077	1	1	1	1	1	1	6
17	2500	1	1	1	1	1	1	6
22	2231	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
34	1692	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
7	2269	1	0	1	1	1	1	5
16	2808	0	1	1	1	1	1	5
24	1500	0	1	1	1	1	1	5
27	2577	1	1	0	1	1	1	5
31	2308	0	1	1	1	1	1	5
4	2538	0	0	1	1	1	1	4
10	2154	0	0	1	1	1	1	4
19	2000	0	0	1	1	1	1	4
30	2308	0	0	1	1	1	1	4
39	3692	0	0	1	1	1	1	4
25	1577	0	0	1	0	1	1	3
1	3423	0	0	0	0	1	1	2
8	1462	0	0	0	0	1	1	2
12	1615	0	0	0	0	1	1	2
15	2115	0	0	0	0	1	1	2
20	1615	0	0	0	0	1	1	2
9	1500	0	0	0	0	0	1	1
11	1654	0	0	0	0	0	1	1
Total		18	20	26	26	32	34	156
Non-fit		2	1	2	1	0	0	6

Appendix 7K-33. Scale for "travel".

ID	Mo_T	jtotal	ltotal	btotal	ftotal	htotal	dtotal	Total
3	2423	1	1	1	1	1	1	6
5	2692	1	1	1	1	1	1	6
7	2269	1	1	1	1	1	1	6
10	2154	1	1	1	1	1	1	6
23	1462	1	1	1	1	1	1	6
27	2577	1	1	1	1	1	1	6
28	3269	1	1	1	1	1	1	6
29	1615	1	1	1	1	1	1	6
33	3000	1	1	1	1	1	1	6
36	2308	1	1	1	1	1	1	6
37	3577	1	1	1	1	1	1	6
39	3692	1	1	1	1	1	1	6
40	2769	1	1	1	1	1	1	6
41	3000	1	1	1	1	1	1	6
13	1923	1	0	1	1	1	1	5
16	2808	1	0	1	1	1	1	5
19	2000	0	1	1	1	1	1	5
20	1615	1	0	1	1	1	1	5
30	2308	0	1	1	1	1	1	5
31	2308	0	1	1	1	1	1	5
34	1692	1	0	1	1	1	1	5
1	3423	1	0	0	1	1	1	4
4	2538	0	0	1	1	1	1	4
6	2654	0	0	1	1	1	1	4
8	1462	0	0	1	1	1	1	4
14	2077	0	0	1	1	1	1	4
17	2500	0	0	1	1	1	1	4
24	1500	0	0	1	1	1	1	4
11	1654	0	0	0	1	1	1	3
12	1615	0	0	0	1	1	1	3
25	1577	0	0	1	0	1	1	3
15	2115	0	0	0	0	1	1	2
22	2231	0	0	0	0	1	1	2
9	1500	0	0	0	0	0	1	1
Total		19	17	28	30	33	34	161
Non-fit		5	4	2	1	0	0	12

Appendix 7K-34. Scale for all words.

Appendix 7L

Matrices for Study 5: Implicational scaling for target words (7L-1 and 7L-2)

ID	Mo_T	e1mc	g1mc	k1mc	op1mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
23	1462	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	1	1	0	3
5	2692	1	1	0	1	3
6	2654	1	1	0	1	3
10	2154	0	1	1	1	3
14	2077	0	1	1	1	3
16	2808	0	1	1	1	3
17	2500	1	1	0	1	3
19	2000	1	1	0	1	3
20	1615	0	1	1	1	3
22	2231	0	1	1	1	3
30	2308	1	1	0	1	3
33	3000	1	1	0	1	3
11	1654	0	0	1	1	2
13	1923	0	0	1	1	2
15	2115	0	1	0	1	2
12	1615	0	0	0	1	1
24	1500	0	0	0	1	1
Correct		24	30	25	33	112
Incorrect		7	1	7	1	16

Appendix 7L-1. Scale for "already".

ID	Mo_T	e2mc	g2mc	k2mc	op2mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
22	2231	1	1	1	1	4
24	1500	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
6	2654	1	1	0	1	3
16	2808	1	1	0	1	3
23	1462	0	1	1	1	3
25	1577	0	1	1	1	3
30	2308	1	0	1	1	3
41	3000	1	1	0	1	3
20	1615	0	0	1	1	2
Correct		31	32	31	34	128
Incorrect		4	1	3	0	8

Appendix 7L-2. Scale for "another".

Matrices for Study 5: Implicational scaling for target words (7L-3 and 7L-4)

ID	Mo_T	e3mc	g3mc	k3mc	op3mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
30	2308	1	1	1	1	4
31	2308	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	0	1	1	3
12	1615	0	1	1	1	3
33	3000	1	0	1	1	3
8	1462	0	0	1	1	2
9	1500	0	0	1	1	2
Correct		31	30	34	34	129
Incorrect		2	2	0	0	4

Appendix 7L-3. Scale for "ask".

ID	Mo_T	e4mc	g4mc	k4mc	op4mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
9	1500	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
8	1462	0	1	1	1	3
10	2154	1	0	1	1	3
11	1654	0	1	1	1	3
12	1615	0	1	1	1	3
19	2000	0	1	1	1	3
30	2308	1	0	1	1	3
Correct		30	32	34	34	130
Incorrect		2	2	0	0	4

Appendix 7L-4. Scale for "back".

Matrices for Study 5: Implicational scaling for target words (7L-5 and 7L-6)

ID	Mo_T	e5mc	g5mc	k5mc	op5mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
33	3000	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
9	1500	0	1	1	1	3
12	1615	1	1	0	1	3
23	1462	0	1	1	1	3
30	2308	1	0	1	1	3
31	2308	1	1	0	1	3
34	1692	1	1	0	1	3
10	2154	0	0	1	1	2
11	1654	0	0	1	1	2
22	2231	0	1	0	1	2
Correct		29	31	30	34	124
Incorrect		4	2	4	0	10

Appendix 7L-5. Scale for "boat".

ID	Mo_T	e6mc	g6mc	k6mc	op6mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
14	2077	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
17	2500	0	1	1	1	3
22	2231	0	1	1	1	3
23	1462	0	1	1	1	3
27	2577	0	1	1	1	3
34	1692	1	1	0	1	3
6	2654	0	1	0	1	2
13	1923	0	0	1	1	2
16	2808	0	1	0	1	2
24	1500	0	0	1	1	2
25	1577	0	0	1	1	2
1	3423	0	1	0	0	1
15	2115	0	0	0	1	1
30	2308	0	0	0	1	1
9	1500	0	0	0	0	0
12	1615	0	0	0	0	0
Correct		20	27	26	31	104
Incorrect		1	3	3	1	8

Appendix 7L-6. Scale for "bring".

Matrices for Study 5: Implicational scaling for target words (7L-7 and 7L-8)

ID	Mo_T	e7mc	g7mc	k7mc	op7mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
30	2308	1	1	1	1	4
31	2308	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
8	1462	0	1	1	1	3
12	1615	0	1	1	1	3
20	1615	1	1	0	1	3
33	3000	1	0	1	1	3
Correct		32	33	33	34	132
Incorrect		2	1	1	0	4

Appendix 7L-7. Scale for "brother".

ID	Mo_T	e8mc	g8mc	k8mc	op8mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
30	2308	1	0	1	1	3
9	1500	0	0	1	1	2
Correct		33	32	34	34	133
Incorrect		1	1	0	0	2

Appendix 7L-8. Scale for "casual".

Matrices for Study 5: Implicational scaling for target words (7L-9 and 7L-10)

ID	Mo_T	e9mc	g9mc	k9mc	op9mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
12	1615	1	1	1	1	4
15	2115	1	1	1	1	4
19	2000	1	1	1	1	4
24	1500	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
30	2308	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
39	3692	1	1	1	1	4
41	3000	1	1	1	1	4
4	2538	1	1	0	1	3
6	2654	1	1	0	1	3
10	2154	1	1	0	1	3
11	1654	1	1	0	1	3
14	2077	0	1	1	1	3
16	2808	1	1	0	1	3
17	2500	0	1	1	1	3
20	1615	1	1	0	1	3
22	2231	1	1	0	1	3
23	1462	0	1	1	1	3
37	3577	1	1	0	1	3
40	2769	1	1	0	1	3
25	1577	1	0	0	1	2
13	1923	0	0	0	1	1
Correct		30	32	23	34	119
Incorrect		10	0	10	0	20

Appendix 7L-9. Scale for "culture".

ID	Mo_T	e10mc	g10mc	k10mc	op10mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
9	1500	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
30	2308	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	1	1	0	3
8	1462	0	1	1	1	3
10	2154	1	0	1	1	3
20	1615	0	1	1	1	3
36	2308	1	1	0	1	3
Correct		32	33	33	33	131
Incorrect		3	1	1	1	6

Appendix 7L-10. Scale for "dream".

Matrices for Study 5: Implicational scaling for target words (7L-11 and 7L-12)

ID	Mo_T	e11mc	g11mc	k11mc	op11mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
13	1923	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
22	2231	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
8	1462	0	1	1	1	3
11	1654	0	1	1	1	3
12	1615	0	1	1	1	3
14	2077	1	1	0	1	3
20	1615	1	1	1	0	3
23	1462	0	1	1	1	3
27	2577	0	1	1	1	3
30	2308	1	0	1	1	3
33	3000	1	0	1	1	3
Correct		29	32	33	33	127
Incorrect		4	2	1	1	8

Appendix 7L-11. Scale for "drink".

ID	Mo_T	e12mc	g12mc	k12mc	op12mc	Total
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
10	2154	1	1	1	1	4
17	2500	1	1	1	1	4
20	1615	1	1	1	1	4
23	1462	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
6	2654	1	0	1	1	3
8	1462	0	1	1	1	3
15	2115	0	1	1	1	3
16	2808	0	1	1	1	3
19	2000	0	1	1	1	3
30	2308	1	0	1	1	3
33	3000	1	0	1	1	3
34	1692	1	1	0	1	3
1	3423	1	0	1	0	2
3	2423	0	0	1	1	2
11	1654	0	0	1	1	2
13	1923	0	0	1	1	2
14	2077	0	0	1	1	2
25	1577	0	0	1	1	2
9	1500	0	0	1	0	1
12	1615	0	0	1	0	1
22	2231	0	0	0	1	1
24	1500	0	0	0	1	1
Correct		21	21	31	31	104
Incorrect		5	3	3	3	14

Appendix 7L-12. Scale for "during".

Matrices for Study 5: Implicational scaling for target words (7L-13 and 7L-14)

ID	Mo_T	e13mc	g13mc	k13mc	op13mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
10	2154	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
30	2308	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
11	1654	0	1	1	1	3
36	2308	0	1	1	1	3
9	1500	0	1	1	0	2
Correct		31	34	34	33	132
Incorrect		0	1	0	1	2

Appendix 7L-13. Scale for "enjoy".

ID	Mo_T	e14mc	g14mc	k14mc	op14mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
9	1500	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
10	2154	0	1	1	1	3
36	2308	1	0	1	1	3
8	1462	0	1	1	0	2
30	2308	0	0	0	1	1
Correct		32	32	33	33	130
Incorrect		2	2	1	1	6

Appendix 7L-14. Scale for "fire".

Matrices for Study 5: Implicational scaling for target words (7L-15 and 7L-16)

ID	Mo_T	e15mc	g15mc	k15mc	op15mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	1	0	1	3
30	2308	1	0	1	1	3
Correct		34	33	33	34	134
Incorrect		2	1	1	0	4

Appendix 7L-1. Scale for "flower".

ID	Mo_T	e16mc	g16mc	k16mc	op16mc	Total
5	2692	1	1	1	1	4
16	2808	1	1	1	1	4
37	3577	1	1	1	1	4
41	3000	1	1	1	1	4
6	2654	0	1	1	1	3
10	2154	0	1	1	1	3
14	2077	1	1	0	1	3
17	2500	0	1	1	1	3
19	2000	0	1	1	1	3
20	1615	0	1	1	1	3
22	2231	0	1	1	1	3
23	1462	0	1	1	1	3
25	1577	0	1	1	1	3
28	3269	0	1	1	1	3
29	1615	0	1	1	1	3
33	3000	1	0	1	1	3
40	2769	1	1	1	0	3
1	3423	0	1	1	0	2
3	2423	0	1	1	0	2
4	2538	0	1	1	0	2
7	2269	0	1	1	0	2
12	1615	0	1	1	0	2
15	2115	0	1	1	0	2
27	2577	0	1	1	0	2
31	2308	0	1	1	0	2
34	1692	0	1	1	0	2
36	2308	0	1	1	0	2
39	3692	0	1	1	0	2
8	1462	0	0	1	0	1
11	1654	0	0	1	0	1
24	1500	0	1	0	0	1
30	2308	0	0	1	0	1
9	1500	0	0	0	0	0
13	1923	0	0	0	0	0
Correct		7	28	30	16	81
Incorrect		3	13	4	16	36

Appendix 7L-2. Scale for "foot".

Matrices for Study 5: Implicational scaling for target words (7L-17 and 7L-18)

ID	Mo_T	e17mc	g17mc	k17mc	op17mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
34	1692	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
6	2654	1	1	0	1	3
15	2115	0	1	1	1	3
17	2500	1	1	0	1	3
23	1462	0	1	1	1	3
30	2308	1	0	1	1	3
31	2308	0	1	1	1	3
33	3000	1	0	1	1	3
36	2308	1	1	0	1	3
11	1654	0	0	1	1	2
22	2231	0	0	1	1	2
24	1500	0	0	1	1	2
Correct		28	29	31	34	122
Incorrect		5	2	3	0	10

Appendix 7L-17. Scale for "forget".

ID	Mo_T	e18mc	g18mc	k18mc	op18mc	Total
1	3423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
30	2308	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
3	2423	0	1	1	1	3
13	1923	0	1	1	1	3
15	2115	0	1	1	1	3
24	1500	0	1	1	1	3
11	1654	0	0	1	1	2
12	1615	0	0	0	1	1
Correct		28	32	33	34	127
Incorrect		0	0	0	0	0

Appendix 7L-18. Scale for "hour".

Matrices for Study 5: Implicational scaling for target words (7L-19 and 7L-20)

ID	Mo_T	e19mc	g19mc	k19mc	op19mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
10	2154	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	1	1	0	3
9	1500	0	1	1	1	3
20	1615	1	0	1	1	3
23	1462	0	1	1	1	3
30	2308	1	0	1	1	3
33	3000	1	0	1	1	3
11	1654	0	1	0	1	2
12	1615	0	1	0	1	2
22	2231	0	0	1	1	2
24	1500	0	0	1	1	2
25	1577	0	0	1	1	2
16	2808	0	0	0	1	1
Correct		26	27	31	33	117
Incorrect		4	5	2	1	12

Appendix 7L-19. Scale for "however".

ID	Mo_T	e20mc	g20mc	k20mc	op20mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
9	1500	0	1	1	1	3
10	2154	0	1	1	1	3
11	1654	0	1	1	1	3
30	2308	0	1	1	1	3
Correct		30	34	34	34	132
Incorrect		0	0	0	0	0

Appendix 7L-20. Scale for "love".

Matrices for Study 5: Implicational scaling for target words (7L-21 and 7L-22)

ID	Mo_T	e21mc	g21mc	k21mc	op21mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	1	1	0	3
12	1615	0	1	1	1	3
22	2231	0	1	1	1	3
23	1462	0	1	1	1	3
30	2308	1	1	0	1	3
9	1500	0	0	1	1	2
Correct		30	33	33	33	129
Incorrect		2	0	1	1	4

Appendix 7L-21. Scale for "manual".

ID	Mo_T	e22mc	g22mc	k22mc	op22mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
28	3269	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	1	0	1	3
5	2692	1	1	0	1	3
6	2654	1	1	0	1	3
7	2269	1	1	0	1	3
9	1500	1	1	0	1	3
10	2154	1	1	0	1	3
12	1615	1	1	0	1	3
13	1923	1	1	0	1	3
14	2077	0	1	1	1	3
16	2808	1	1	0	1	3
17	2500	0	1	1	1	3
20	1615	1	1	0	1	3
22	2231	1	1	0	1	3
23	1462	1	1	0	1	3
24	1500	1	1	0	1	3
27	2577	0	1	1	1	3
29	1615	0	1	1	1	3
34	1692	0	1	1	1	3
8	1462	0	0	1	1	2
15	2115	0	0	1	1	2
25	1577	0	0	1	1	2
30	2308	1	0	0	1	2
11	1654	0	0	0	1	1
19	2000	0	0	0	1	1
Correct		24	28	18	34	104
Incorrect		14	0	14	0	28

Appendix 7L-22. Scale for "measure".

Matrices for Study 5: Implicational scaling for target words (7L-23 and 7L-24)

ID	Mo_T	e23mc	g23mc	k23mc	op23mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
41	3000	1	1	1	1	4
17	2500	0	1	1	1	3
27	2577	0	1	1	1	3
33	3000	1	0	1	1	3
40	2769	1	1	0	1	3
11	1654	0	0	1	1	2
12	1615	0	0	1	1	2
30	2308	1	0	0	1	2
Correct		30	30	32	34	126
Incorrect		3	1	2	0	6

ID	Mo_T	e24mc	g24mc	k24mc	op24mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
34	1692	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	1	0	1	1	3
7	2269	1	1	1	0	3
12	1615	1	1	1	0	3
23	1462	0	1	1	1	3
30	2308	1	1	0	1	3
31	2308	0	1	1	1	3
33	3000	1	0	1	1	3
36	2308	1	1	1	0	3
Correct		32	32	33	31	128
Incorrect		6	2	1	3	12

Appendix 7L-23. Scale for "mouth".

Appendix 7L-24. Scale for "point".

Matrices for Study 5: Implicational scaling for target words (7L-25 and 7L-26)

ID	Mo_T	e25mc	g25mc	k25mc	op25mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
15	2115	1	1	0	1	3
34	1692	1	1	0	1	3
30	2308	1	0	0	1	2
Correct		34	33	31	34	132
Incorrect		3	0	3	0	6

ID	Mo_T	e26mc	g26mc	k26mc	op26mc	Total
3	2423	1	1	1	1	4
5	2692	1	1	1	1	4
10	2154	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
22	2231	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
41	3000	1	1	1	1	4
6	2654	0	1	1	1	3
7	2269	1	1	1	0	3
8	1462	0	1	1	1	3
11	1654	0	1	1	1	3
12	1615	0	1	1	1	3
20	1615	0	1	1	1	3
23	1462	0	1	1	1	3
24	1500	1	1	1	0	3
30	2308	1	1	0	1	3
39	3692	1	1	1	0	3
40	2769	1	1	1	0	3
1	3423	1	1	0	0	2
4	2538	0	1	1	0	2
9	1500	0	1	1	0	2
15	2115	1	0	1	0	2
Correct		26	33	32	26	117
Incorrect		7	3	2	8	20

Appendix 7L-25. Scale for "popular".

Appendix 7L-26. Scale for "put".

Matrices for Study 5: Implicational scaling for target words (7L-27 and 7L-28)

ID	Mo_T	e27mc	g27mc	k27mc	op27mc	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
17	2500	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
4	2538	0	1	1	1	3
6	2654	1	0	1	1	3
10	2154	1	0	1	1	3
12	1615	0	1	1	1	3
13	1923	0	1	1	1	3
14	2077	0	1	1	1	3
16	2808	1	0	1	1	3
20	1615	0	1	1	1	3
36	2308	1	1	1	0	3
8	1462	0	0	1	1	2
9	1500	0	0	1	1	2
11	1654	0	0	1	1	2
15	2115	0	0	1	1	2
19	2000	0	0	1	1	2
22	2231	0	0	1	1	2
23	1462	0	0	1	1	2
24	1500	0	0	1	1	2
25	1577	0	0	1	1	2
30	2308	1	0	0	1	2
34	1692	0	0	1	1	2
Correct		19	20	33	33	105
Incorrect		5	3	1	1	10

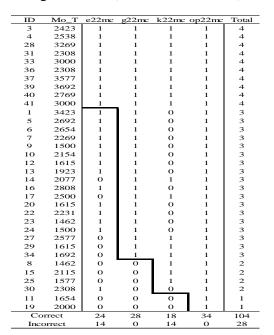| ID	Mo_T	e28mc	g28mc	k28mc	op28mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
7	2269	1	1	1	1	4
16	2808	1	1	1	1	4
23	1462	1	1	1	1	4
27	2577	1	1	1	1	4
29	1615	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
14	2077	1	0	1	1	3
17	2500	0	1	1	1	3
28	3269	0	1	1	1	3
31	2308	0	1	1	1	3
41	3000	0	1	1	1	3
1	3423	0	0	1	1	2
6	2654	0	0	1	1	2
8	1462	0	0	1	1	2
9	1500	0	0	1	1	2
10	2154	0	0	1	1	2
11	1654	0	0	1	1	2
12	1615	0	0	1	1	2
13	1923	0	0	1	1	2
15	2115	0	0	1	1	2
19	2000	0	0	1	1	2
20	1615	0	0	1	1	2
22	2231	0	0	1	1	2
24	1500	0	0	1	1	2
25	1577	0	0	1	1	2
33	3000	0	0	1	1	2
34	1692	0	0	1	1	2
40	2769	0	0	1	1	2
30	2308	0	0	0	1	1
Correct		12	15	33	34	94
Incorrect		1	1	0	0	2

Appendix 7L-27. Scale for "sure".　　　*Appendix 7L-28.* Scale for "thing".

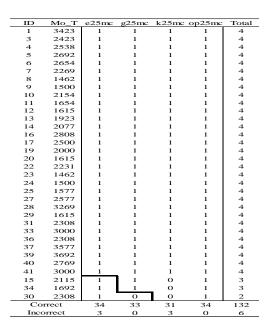Matrices for Study 5: Implicational scaling for target words (7L-29 and 7L-30)

ID	Mo_T	e29mc	g29mc	k29mc	op29mc	Total
5	2692	1	1	1	1	4
37	3577	1	1	1	1	4
41	3000	1	1	1	1	4
4	2538	0	1	1	1	3
16	2808	0	1	1	1	3
17	2500	0	1	1	1	3
19	2000	0	1	1	1	3
23	1462	0	1	1	1	3
28	3269	0	1	1	1	3
33	3000	0	1	1	1	3
39	3692	0	1	1	1	3
40	2769	0	1	1	1	3
1	3423	0	1	1	0	2
3	2423	0	1	1	0	2
8	1462	0	1	1	0	2
9	1500	0	0	1	1	2
10	2154	0	0	1	1	2
12	1615	0	0	1	1	2
13	1923	0	1	1	0	2
14	2077	0	0	1	1	2
15	2115	0	0	1	1	2
22	2231	0	0	1	1	2
24	1500	0	0	1	1	2
25	1577	0	0	1	1	2
27	2577	0	1	1	0	2
29	1615	0	1	1	0	2
31	2308	0	1	1	0	2
36	2308	0	1	1	0	2
6	2654	0	0	1	0	1
7	2269	0	0	1	0	1
11	1654	0	0	1	0	1
20	1615	0	0	1	0	1
34	1692	0	0	1	0	1
30	2308	0	0	0	0	0
Correct		3	20	33	20	76
Incorrect		0	8	5	13	26

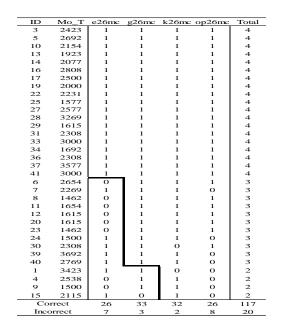| ID	Mo_T	e30mc	g30mc	k30mc	op30mc	Total
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
8	1462	1	1	1	1	4
11	1654	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
28	3269	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	0	1	1	1	3
3	2423	1	1	0	1	3
4	2538	1	1	0	1	3
10	2154	1	0	1	1	3
12	1615	1	1	0	1	3
13	1923	1	1	0	1	3
17	2500	0	1	1	1	3
27	2577	1	1	0	1	3
29	1615	1	1	0	1	3
9	1500	1	0	0	1	2
30	2308	0	0	0	1	1
Correct		31	31	26	34	122
Incorrect		8	1	7	0	16

Appendix 7L-29. Scale for "thought".　　　*Appendix 7L-30.* Scale for "tire".

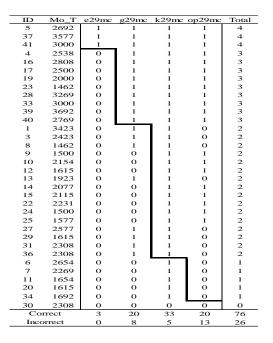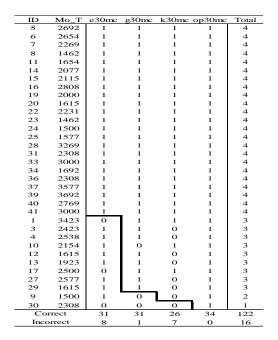Matrices for Study 5: Implicational scaling for target words (7L-31 and 7L-32)

ID	Mo_T	e31mc	g31mc	k31mc	op31mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
9	1500	1	1	1	1	4
10	2154	1	1	1	1	4
11	1654	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
34	1692	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
15	2115	0	1	1	1	3
17	2500	0	1	1	1	3
31	2308	1	1	0	1	3
33	3000	1	0	1	1	3
36	2308	1	1	0	1	3
1	3423	0	1	0	1	2
30	2308	1	0	0	1	2
8	1462	0	1	0	0	1
Correct		30	32	29	33	124
Incorrect		4	3	4	1	12

Appendix 7L-31. Scale for "travel".

ID	Mo_T	e32mc	g32mc	k32mc	op32mc	Total
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
12	1615	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
19	2000	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
6	2654	1	1	0	1	3
7	2269	1	1	0	1	3
11	1654	0	1	1	1	3
15	2115	1	1	0	1	3
17	2500	1	1	0	1	3
20	1615	0	1	1	1	3
30	2308	1	1	0	1	3
31	2308	1	1	0	1	3
1	3423	1	1	0	0	2
9	1500	0	0	1	1	2
10	2154	0	1	0	1	2
22	2231	0	0	1	1	2
25	1577	0	0	1	1	2
8	1462	0	0	0	1	1
Correct		27	30	25	33	115
Incorrect		7	2	8	1	18

Appendix 7L-32. Scale for "true".

Matrices for Study 5: Implicational scaling for target words (7L-33 and 7L-34)

ID	Mo_T	e33mc	g33mc	k33mc	op33mc	Total
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
10	2154	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
1	3423	0	1	1	1	3
3	2423	0	1	1	1	3
9	1500	0	1	1	1	3
12	1615	0	1	1	1	3
20	1615	0	1	1	1	3
27	2577	1	1	1	0	3
30	2308	1	1	0	1	3
8	1462	0	1	1	0	2
11	1654	0	0	1	1	2
15	2115	0	1	1	0	2
Correct		26	33	33	31	123
Incorrect		2	2	1	3	8

Appendix 7L-33. Scale for "travel".

ID	Mo_T	etotal	gtotal	ktotal	optotal	Total
1	3423	1	1	1	1	4
3	2423	1	1	1	1	4
4	2538	1	1	1	1	4
5	2692	1	1	1	1	4
6	2654	1	1	1	1	4
7	2269	1	1	1	1	4
10	2154	1	1	1	1	4
13	1923	1	1	1	1	4
14	2077	1	1	1	1	4
15	2115	1	1	1	1	4
16	2808	1	1	1	1	4
17	2500	1	1	1	1	4
19	2000	1	1	1	1	4
20	1615	1	1	1	1	4
22	2231	1	1	1	1	4
23	1462	1	1	1	1	4
24	1500	1	1	1	1	4
25	1577	1	1	1	1	4
27	2577	1	1	1	1	4
28	3269	1	1	1	1	4
29	1615	1	1	1	1	4
31	2308	1	1	1	1	4
33	3000	1	1	1	1	4
34	1692	1	1	1	1	4
36	2308	1	1	1	1	4
37	3577	1	1	1	1	4
39	3692	1	1	1	1	4
40	2769	1	1	1	1	4
41	3000	1	1	1	1	4
8	1462	0	1	1	1	3
9	1500	0	1	1	1	3
11	1654	0	1	1	1	3
12	1615	0	1	1	1	3
30	2308	1	0	0	1	2
Correct		30	33	33	34	130
Incorrect		1	0	1	0	2

Appendix 7L-34. Scale for all words.