

# A STUDY OF INVENTED SPELLING AND DEVELOPING ORTHOGRAPHIC CONCEPTS IN JAPANESE

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## Abstract

This study examines the developmental stages of spelling ability focusing on the learning process of the Japanese orthographic system for native speakers of Japanese. After first providing a basic explanation of the Japanese orthographic system, issues regarding the acquisition of Japanese spelling are discussed. Next, in order to clarify the acquisition of writing skills in the introductory stage of Japanese spelling, data from prior case studies and this investigation are examined. From these results, a new proposal for developmental stages of orthographic concepts is suggested. This study also examines strategies of invented spelling and the relationship between developmental stages and learning ages. Children had learned a considerable amount of hiragana spelling before entering first grade, and by the end of first grade (late March) had reached the point where they were mostly able to write phrases in both hiragana and katakana.

The developmental stages were as follows:

Stage1: Hiragana spelling not yet acquired

Stage2: Hiragana spelling acquisition (unvoiced, voiced, semi-voiced)

Stage3: Hiragana spelling acquisition (special syllable markers)

Stage4: Katakana spelling acquisition (unvoiced, voiced, semi-voiced)

Stage5: Katakana spelling acquisition (special syllable markers)

Stage6: Combined usage of hiragana and katakana acquisition

Stage7: Kanji spelling not yet acquired (includes kanji learning stages).

**Keywords:** Invented spelling, orthographic concepts, orthographic system, Japanese, developmental stage, first grader

## Abstract in Chinese

Translation S.K. Tse.

論文摘要：本研究試圖探討以日本語為母語的人士，在學習日語正確拼字系統的過程中，拼寫能力的發展階段。本文會先日本語的正確拼寫系統作基本的介紹，然後作者會討論和日語拼寫習得相關的一些問題。作者進行了一些個案研究和調查，以求清楚分析學習者於學習日本語拼寫的初期，寫作技能的習得情況。根據以上的研究結果，作者對日語作為母語的學習者發展正確拼寫概念的各個階段，提出了全新的建議。本研究還檢視了學習者自創拼寫的策略和學習階段、學習年

齡之間的關係。兒童入讀小一前，已學會了一定數量的平假名後。至小一結束時（三月下旬），大部份兒童可以寫一些平假名和片假名的短語。

發展過程如下：

第一階段：尚未習得平假名拼寫

第二階段：習得平假名拼寫（沒有聲音、有聲音、半聲音）

第三階段：習得平假名拼寫（特別的音節標記）

第四階段：習得片假名拼寫（沒有聲音、有聲音、半聲音）

第五階段：習得片假名拼寫（特別的音節標記）

第六階段：習得平假名和片假名混合使用

第七階段：尚未習得漢字拼寫（包括漢字學習階段）

關鍵詞：自創拼寫、正確拼寫概念、正確拼寫系統、日本語、發展階段、小一學生

Abstract in Dutch

**Samenvatting** (Translation Tanja Janssen).

Dit onderzoek richt zich op de ontwikkelingsstadia in spelvaardigheid, in het bijzonder op leerprocessen van Japanse moedertaalsprekers bij het verwerven van het Japanse orthografische systeem. Eerst wordt enige uitleg gegeven over het Japanse orthografische systeem, daarna worden kwesties inzake de verwerving van Japanse spelling besproken. Om de verwerving van schrijfvaardigheden in het beginstadium te verhelderen, worden data uit eerdere case studies en dit onderzoek besproken. Op basis van de resultaten wordt een nieuwe indeling in ontwikkelingsstadia van orthografische concepten voorgesteld. Het onderzoek richt zich ook op spellingstrategieën en de relatie tussen ontwikkelingsstadia en leeftijd. Alvorens zij naar de basisschool gaan, hebben kinderen al een aanzienlijke kennis opgedaan van de hiragana spelling. Aan het eind van het eerste leerjaar (eind maart) zijn de meeste kinderen in staat zinnen te schrijven, zowel in hiragana als in katakana.

De ontwikkelingsstadia waren als volgt:

Stadium 1: Hiragana spelling is nog niet verworven

Stadium 2: Verwerving van hiragana spelling (zonder uitspraak, met uitspraak)

Stadium 3: Verwerving van hiragana spelling (speciale lettergreep markeerders)

Stadium 4: Verwerving van katakana spelling (zonder uitspraak, met uitspraak)

Stadium 5: Verwerving van katakana spelling (speciale lettergreep markeerders)

Stadium 6: Gecombineerd gebruik van hiragana en katakana

Stadium 7: Kanji spelling is nog niet verworven (omvat kanji leerstadia).

Abstract in French

**Resumé** (Translation Laurence Pasa).

Cette étude examine les stades développementaux de l'évolution des compétences orthographiques sous l'angle de l'apprentissage du système orthographique japonais par des locuteurs natifs. Après quelques précisions sur le système orthographique japonais, la question de l'acquisition de l'écriture est discutée. Ensuite, afin de clarifier le problème de l'acquisition des compétences scripturales au tout début de l'enseignement formel de l'écrit, on examine des données d'études de cas antérieures ainsi que celles de la présente recherche. Ces résultats suggèrent une nouvelle approche des stades développementaux des concepts orthographiques. Cette étude examine également les stratégies utilisées en écriture inventée et le rapport entre les stades développementaux et l'âge des apprenants. Les enfants apprennent une quantité considérable de hiragana avant d'entrée en première année d'école primaire et, vers la fin de la première année (fin mars), ils sont capables le plus souvent d'écrire des phrases en hiragana et en katakana.

Les stades développementaux étaient les suivants:

Stade 1: Ecriture en hiragana pas encore acquise

Stade 2: Acquisition de l'écriture de hiragana (sourdes, voisées, semi-voisées)

Stade 3: Acquisition de l'écriture de hiragana (marqueurs spéciaux de syllabe)

Stade 4: Acquisition de l'écriture de katakana (sourdes, voisées, semi-voisées) Stade 5 : Acquisition de l'écriture de katakana (marqueurs spéciaux de syllabe)

Stade 6: Utilisation combinée de hiragana et de katakana

Stade 7: Ecriture de kanji pas encore acquise (stades d'apprentissage du kanji).

**Mots-clés.** Ecriture inventée, concepts orthographiques, système orthographique, Japonais, stades développementaux, première année d'école primaire

Abstract in German

**Zusammenfassung** (Translation Irene Pieper).

Diese Studie untersucht die Entwicklungsstufen des Schrifterwerbs mit Bezug auf den Prozess des Orthographierwerbs bei Muttersprachlern im Japanischen. Zunächst wird das japanische Orthographie-System knapp erläutert. Anschließend werden Fragestellungen im Zusammenhang mit dem Erwerb der Schrift diskutiert. Um den Erwerb von Schreibfähigkeiten im Einführungsstadium der japanischen Schrift zu klären, werden Daten früherer Fallstudien analysiert. Von diesen Ergebnissen her wird ein neuer Vorschlag zu Entwicklungsstufen im Orthographierwerb gemacht. Die Studie untersucht außerdem Strategien der Spontanschreibung und das Verhältnis zwischen Entwicklungsstufen und Lernalter.

Die Kinder hatten beträchtliche Kenntnisse in der Hiragana Schrift erworben, bevor sie das erste Schuljahr begannen, und am Ende des ersten Schuljahrs (Ende März) hatten sie den Punkt erreicht, wo sie meist sowohl in Hiragana als auch in Katakana Sätze schreiben konnten.

Die Entwicklungsstufen waren folgende:

- Stufe 1: Hiragana Rechtschreibung noch nicht erworben
- Stufe 2: Hiragana Rechtschreibung (stimmlos, stimmhaft, halb-stimmhaft)
- Stufe 3: Hiragana Rechtschreibung (spezielle Silbenmarkierungen)
- Stufe 4: Katakana Rechtschreibung (stimmlos, stimmhaft, halb-stimmhaft)
- Stufe 5: Katakana Rechtschreibung (spezielle Silbenmarkierungen)
- Stufe 6: Kombiniertes Erwerb von Hiragana und Katakana
- Stufe 7: Kanji Rechtschreibung noch nicht erworben (schließt Kanji Erwerbsstufen ein)

Abstract in Greek

**Metafrase.** Translation Panatoya Papoulia-Tzelepi

Η μελέτη αυτή εξετάζει τα αναπτυξιακά στάδια ικανότητας ορθογραφικής γραφής στη διαδικασία εκμάθησης του Ιαπωνικού ορθογραφικού συστήματος από παιδιά με μητρική γλώσσα τα Ιαπωνικά. Αφού παρουσιαστεί μια βασική ερμηνεία του Ιαπωνικού ορθογραφικού συστήματος, συζητούνται θέματα που αφορούν στην κατάκτηση της ορθογραφικής Ιαπωνικής γραφής. Στη συνέχεια, για να παρουσιαστεί η κατάκτηση δεξιοτήτων γραφής στο αρχικό στάδιο της Ιαπωνικής ορθογραφίας, εξετάζονται δεδομένα από προηγούμενες περιπτώσεις και από την έρευνα. Από τα αποτελέσματα αυτά προτείνεται ένα νέο σχήμα αναπτυξιακών σταδίων της ορθογραφικής εννοιοποίησης. Αυτή η μελέτη εξετάζει επίσης στρατηγικές «επινοημένης γραφής» και τη σχέση μεταξύ των αναπτυξιακών σταδίων και της ηλικίας της μάθησης. Τα παιδιά είχαν μάθει ένα σημαντικό ποσό «χιραγκάνα» πριν να πάνε στην πρώτη τάξη, με το τέλος της πρώτης τάξης (τέλος Μαρτίου) είχαν φτάσει στο σημείο όπου μπορούσαν να γράφουν προτάσεις και στη γραφή χιραγκάνα και στην κατακάνα. Τα αναπτυξιακά στάδια ήταν τα ακόλουθα:

1. Η γραφή χιραγκάνα δεν έχει αποκτηθεί.
2. Η γραφή χιραγκάνα αποκτάται (άφωνη, ημιφωνητική, φωνητική).
3. Η γραφή χιραγκάνα αποκτάται (ειδικοί συλλαβικοί δείκτες).
4. Η γραφή κατακάνα αποκτάται (άφωνη, ημιφωνητική, φωνητική).
5. Η γραφή κατακάνα αποκτάται (ειδικοί συλλαβικοί δείκτες).
6. Συνδυασμένη χρήση χιραγκάνα και κατακάνα αποκτάται.
7. Η γραφή κάνζι δεν έχει αποκτηθεί.

Abstract in Polish

**Streszczenie** [Translation Elżbieta Awramiuk]

Niniejszy artykuł traktuje o etapach rozwojowych umiejętności ortograficznego pisania, a koncentruje się na procesie uczenia się japońskiego systemu ortograficznego przez native speakerów języka japońskiego. Po wstępnych wyjaśnieniach na temat japońskiego systemu pisma omawiamy kwestie przyswajania japońskiej ortografii. Następnie, aby przybliżyć początkowy proces przyswajania pisowni japońskiej, relacjonujemy wyniki badań wcześniejszych oraz własnych w tym zakresie. W rezultacie przedstawiamy nową propozycję systematyzacji etapów rozwojowych ortograficznych pojęć. W pracy tej opisujemy także strategie pisania małych dzieci oraz relację między etapami rozwojowymi a wiekiem uczenia się. Dzieci przyswoiły sobie w znacznym zakresie pisownię hiragana przed rozpoczęciem klasy pierwszej, a na koniec klasy pierwszej osiągnęły etap, kiedy w większości potrafiły pisać frazy zarówno w hiragana, jak i katakana.

Proponowane etapy rozwojowe przedstawiają się następująco:

- Etap 1. Pisownia *hiragana* jeszcze nieopanowana
- Etap 2. Przyswajanie pisowni *hiragana* (bezdźwięczne, dźwięczne, półdźwięczne)
- Etap 3. Przyswajanie pisowni *hiragana* (specjalne oznaczenia sylaby)
- Etap 4. Przyswajanie pisowni *katakana* (bezdźwięczne, dźwięczne, półdźwięczne)
- Etap 5. Przyswajanie pisowni *katakana* (specjalne oznaczenia sylaby)
- Etap 6. Przyswajanie łącznej pisowni *hiragana* i *katakana*
- Etap 7. Pisownia *kanji* jeszcze nieopanowana (zawiera etapy uczenia się *kanji*).

**Słowa-klucze:** pismo małych dzieci, pojęcia ortograficzne, system ortograficzny, język japoński, etap rozwojowy, pierwszoklasista

Abstract in Portuguese

**Resumo:** [Translation Paulo Feytor Pinto].

Este estudo examina as etapas do desenvolvimento da competência ortográfica centrado-se nos processos de aprendizagem do sistema ortográfico japonês por falantes nativos da língua. Depois de uma breve apresentação deste sistema ortográfico, são analisadas questões relacionadas com a aquisição da ortografia japonesa. Em seguida, tendo em vista explicitar a aquisição de competências de escrita na fase inicial de aprendizagem da ortografia japonesa, são analisados os resultados deste e de anteriores estudos. Com base nestes resultados, é apresentada uma nova proposta de etapas no desenvolvimento de conceitos ortográficos. Este estudo também analisa estratégias de ortografia inventada e as relações entre as fases de desenvolvimento e as idades de aprendizagem. Antes do 1º ano de escolaridade, as crianças já tinham aprendido uma quantidade considerável da ortografia *hiragana* e no final desse ano conseguiam, de uma maneira geral, escrever frases tanto em *hiragana* como *katakana*.

As fases de desenvolvimento foram as seguintes:

- Fase 1: ortografia *hiragana* ainda não adquirida
- Fase 2: aquisição da ortografia *hiragana* (não-vocalizadas, vocalizadas, semi-vocalizadas)
- Fase 3: aquisição da ortografia *hiragana* (marcadores silábicos especiais)
- Fase 4: aquisição da ortografia *katakana* (não-vocalizadas, vocalizadas, semi-vocalizadas)
- Fase 5: aquisição da ortografia *katakana* (marcadores silábicos especiais)
- Fase 6: aquisição do uso combinado de *hiragana* e *katakana*
- Fase 7: ortografia *kanji* ainda não adquirida (inclui fases de aprendizagem de *kanji*)

**Palavras-chave:** ortografia inventada, conceitos ortográficos, sistema ortográfico, japonês, fase de desenvolvimento, aluno do primeiro ano.

## 1. INTRODUCTION

Primarily this study will examine the developmental stages for the ability to spell words focusing on the learning process of the Japanese orthographic system for native speakers of Japanese. Similar types of studies regarding English (Read,1971; Beers & Henderson,1977; Gentry,1978; Gentry,1982; Clark,1988; Bear & Templeton, 1998.) have a history of some thirty years, even if only limited to studies of invented spelling. There have been some studies on orthographic learning in Japanese in the area of reading, yet no prior literature on the subject of writing itself has been located. For that reason, this study of invented spelling in Japanese is a pilot study, and focuses on gathering, organizing and proposing developmental stages for case studies.

After first providing a basic explanation of the Japanese orthographic system, attention will be drawn to issues regarding the acquisition of the orthography (spelling) at the word level of the target language, Japanese. A review of the existing literature concerning reading skills in light of issues in acquiring orthographic ability

will be made, and employed as a criterion for considering developmental stages. Next, in order to clarify the acquisition of writing skills in the introductory stage of Japanese spelling, case studies will be examined based on both received data and the results of investigations, and a new proposal for developmental stages of orthographic concepts suggested. Further, consideration will be made of the abstracted spelling methodology and strategy based on this new proposal, and the features of invented spelling in Japanese discussed.

## 2. THE STRUCTURE OF JAPANESE ORTHOGRAPHIES

The orthographic system of Japanese contains four subsystems (hiragana, katakana, kanji (“Chinese” characters), and romanization). At a mature level, these are integrated in a complex and highly developed manner. In addition to these four subsystems, numerals and various symbols are also included. The Japanese orthographic system is accordingly rather complex.

The following examples represent the same meaning expressed in the various subsystems.

*Table 1. Spelling of ‘I went to school today’<sup>1</sup>*

Hiragana	わたしは	きょう	がっこうへ	いきました
Katakana	ワタシハ	キョウ	ガッコウへ	イキマシタ
Kanji	私	(は) 今日	学校	(へ) 行(きました)
Romanization	Watashi	wa kyō	Gakkō	e ikimashita

Hiragana and katakana are syllabaries each consisting of 46 characters (including the voiced, semi-voiced variants, and one nasal coda, bringing the total to 71 characters). The two systems follow nearly identical orthographic principles, and exist in a one-to-one correspondence. Japanese kanji are ideographs numbering in the thousands, and Romanization uses the 26 letters of the alphabet. Table A and B are Japanese syllabary charts.

<sup>1</sup> Table A and B are Japanese syllabary charts.

Table A : Japanese syllabary chart

simple sounds	Hiragana	Katakana
	/a/i/u/e/o/	/a/i/u/e/o/
	あいうえお	アイウエオ
/k/	かきくけこ	カキクケコ
/s/	さしすせそ	サシスセソ
/t/	たちつてと	タチツテト
/n/	なにぬねの	ナニヌネノ
/h/	はひふへほ	ハヒフヘホ
/m/	まみむめも	マミムメモ
/y/	やいゆえよ	ヤイユエヨ
/r/	らりるれろ	ラリルレロ
/w/	わうを	ワウヲ

The kana system contains two subsystems (hiragana and katakana). Table A indicates the Japanese syllabary chart for simple sounds of hiragana and katakana. The two sets of letters in horizontal columns have the same vowels and consonants. Each subsystem has the same number ( $5 \times 10 = 50$ ) of letters. It has 45 letters without shaded letters which are double counted.

In addition to Table A, the kana system also has 20 letters indicating voiced sounds and 5 letters indicating semi-voiced sounds. And it has contracted sounds indicated by small letters (ゃゅょ・ゅゃょ), syllabic nasal sounds by nasal coda (ん・ン), long consonant sounds by small letter (っ・ッ), and long vowel sounds by a sign (ー). All of them are in Table B.

Every kana letter except special signs (ん・ン, っ・ッ, ー) designates one syllable. Kana letters with such a sign also designate one syllable. Japanese syllables are ordinarily open (V, CV). The letters (あいうえお・アイウエオ) designate simple V syllables. Most of all other letters designate CV syllables. (See Akita & Hatano (1999), pp.215-217. and Koizumi(1978)).

Table B: Japanese syllabary chart<sup>2</sup>

	Hiragana	Katakana
Voiced sounds	がぎぐげご	ガギグゲゴ
	ざじずぜぞ	ザジズゼゾ
	だちづでど	ダヂヅデド
	ばびぶべぼ	バビブベボ
Semi-voiced sounds	ぱぴぷぺぽ	パピプペポ

Contracted sounds		
	Hiragana	Katakana
Simple sounds	きゃ きゅ きょ	キャ キュ キョ
	しゃ しゅ しょ	シャ シュ ショ
	ちゃ ちゅ ちょ	チャ チュ チョ
	にゃ にゅ ньо	ニャ ニュ ニョ
	ひゃ ひゅ ひょ	ヒャ ヒュ ヒョ
	みゃ みゅ みょ	ミャ ミュ ミョ
	りゃ りゅ りょ	リャ リュ リョ
	ぎゃ ぎゅ ぎょ	ギャ ギュ ギョ
Voiced sounds	じゃ じゅ じょ	ジャ ジュ ジョ
	ぢゃ ぢゅ ぢょ	ヂャ ヅ ヨ
	びゃ びゅ びょ	ビャ ビュ ビョ
	Semi-voiced sounds	ぴゃ ぴゅ ぴょ
ん ン/っ ッ/ー		

A standard sentence in Japanese is written with a combination of kanji and hiragana. Katakana is commonly used for writing foreign loan words and onomatopoeic words. Romanization is rarely used to write Japanese sentences. However, as the examples in Table 1 demonstrate, any one of the subsystems alone, other than kanji, can be used to fully write a Japanese sentence. For that reason, hiragana, considered the most basic subsystem, is beneficial as if it alone is mastered, nearly any Japanese sentences can be written. Furthermore, the letters and sounds of hiragana are in

<sup>2</sup> Japanese words are structured by one or more morphemes. The basic components of the combinations are the following: One kana letter as a syllabary can in some cases designate one word (ex. は/ha/(leaf)). More than one kana letter as phonographs can designate one morpheme or word (ex. やま/yama/(mountain)). One and more kanji letters as ideographs designate one word (ex. 葉/ha/(leaf), 万年筆/mannenhitsu/(fountain pen)). One kanji letter as a phonograph designates one syllable (ex. 査/sa/, 磁/ji/). Most Japanese words, as mentioned above, are designated by combinations of subsystems. The following example will be indicated to be designated in many cases. 白兔 (white rabbit) : しろうさぎ (hiragana)、シロウサギ (katakana)、白うさぎ (白=kanji + うさぎ=hiragana)、白ウサギ (白=kanji + ウサギ=katakana)、白兔 (kanji)

nearly complete correspondence, and so are easy to learn. On the other hand, however, all four subsystems can be used to write individual words, leading to the possibility of a combination of them in writing. There is wide latitude for choice in how they may be combined. Thus, many learning stages must be passed through to reach a mature stage. In consideration of the orthographic difficulty dictated by the complex usage of these subsystems, the usual learning process follows the sequence of hiragana, katakana, kanji, and last, Romanization<sup>3</sup>.

### 3. CHARACTERISTICS OF JAPANESE ORTHOGRAPHIES: ISSUES AND LEARNING

The introductory stage of learning Japanese orthography begins as a system in April of the first grade of elementary school (approx. age seven). Hiragana is taught first. However, in actuality, before students enter elementary school they have often been given exposure to writing in kindergartens and nursery schools, or even in the home. By the time they enter elementary school, a majority of students are already conversant with the fundamentals of reading and writing hiragana.

The acquisition of hiragana by young children begins at age four and continues through ages five to six. Six months before entering elementary school, in November, only 1.1% of children were completely unable to read the kana syllabaries, and conversely 63.9% of them were able to read over 60 letters.... Kana writing ability is not as advanced as reading ability in this stage. Of five-year-olds, 5.3% were unable to write even a single letter, and 56.7% were able to write 21 or more letters. However, only 3.6% were able to correctly write 60 or more letters. (Amano, 1986, p. 476)

As these figures show, learning to read the hiragana syllabary, with its nearly perfect correspondence between letter and sound, seems to be easy. However, it appears that a considerable amount of confusion remains in learning to write hiragana at the time of entering elementary school.

This study will examine writing ability in first year elementary school students at the introductory stage, and make inferences regarding developmental stages for spelling words. However, in this introductory stage, many of the children are not limited to learning hiragana alone, but are also simultaneously beginning to learn katakana and kanji. The learning of these three subsystems in actuality overlaps. In the textbooks of the latter part of first grade, words or sentences combining these subsystems begin to appear in lessons.

Data was collected including examples of combinations of these three subsystems, and invented spelling analyzed. Romanization was excluded from this study<sup>4</sup>. Compared with the difficulty of learning English spelling, learning hiragana letters

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<sup>3</sup> *The policy of the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) is that we need not teach Japanese letters in kindergarten, but should begin to teach hiragana from the beginning of first grade and katakana and kanji from the latter half of first grade in elementary school. The MEXT sets the goal of learning between 800 and 1000 kanji by the completion of an elementary school education. The kanji system is orthographically difficult, and at the introductory stage only a very limited number of kanji are taught.*

<sup>4</sup> *As a system, Romanization is learned in the fourth grade of elementary school. Romanization is normally not used for writing Japanese sentences.*



is quite problem-free and completed early on. For that reason, the difficulty in learning Japanese orthography is concentrated in the subsequent stage, where these subsystems are mixed.

However, the results of studies done so far on reading show that although hiragana, which is taught first, is easily acquired, special syllable markers (for long vowels, double consonants, contracted sounds, and contracted long vowels) are not readily learned. Amano's conclusion quoted below concerns reading; however, we may also assume a clear divide in the learning stages for writing hiragana as well:

Creating (indicating), through a combination of letters, a new sound that is not indicated in the values of the constituent letters is a necessary feature of languages that use alphabets, such as English, German, French, Russian, and so on. This has been called, somewhat figuratively, the blending of sounds... On the other hand, since kana are syllabic letters with one letter representing one sound in principle, there are not many cases in which such blending is necessitated. When dealing with special markers that do not take part in the "one letter, one sound" principle, it will be necessary that the blending occurs according to a fixed rule. This is the primary reason children have trouble with learning these special markers. (Amano, 1986, p. 290)

For the same reason, we may anticipate that for katakana similar difficulties will also be experienced. Learned after hiragana, there will be a certain difficulty experienced in learning special markers, although that may not be as pronounced as it was when beginning to learn.

Furthermore, while the forms of the hiragana and katakana letters are different, the number of letters is the same. They are in a one-to-one correspondence, and both follow nearly identical orthographic principles. It is, accordingly, assumed that once the principles of hiragana are learned, katakana will be easily acquirable. However, these two orthographic systems, due to circumstances of their origins, share the same letters for some syllables (ゑ[*he*], べ[*be*], ぺ[*pe*], り[*ri*]), or have similar appearing letters for the same syllables (こ/こ[*ko*], せ/せ[*se*], き/き[*ki*], etc.). This similarity greatly facilitates the learning of katakana, but is also the source of cognitive confusion. Additionally, learning difficult Japanese kanji exacerbates the problem.

This study examines the learning stages in hiragana and katakana with a focus on special syllable markers, made complex through their related phonetics and orthography. There is, however, no prior literature dealing with the development of spelling concepts indicating when and how the integration of these three subsystems is learned. By analyzing both newly received data and the results of investigations (discussed below), this study will attempt to describe the fundamental processes of developing orthographic concepts.

#### 4. SETTING THE DEVELOPMENTAL STAGES OF ORTHOGRAPHIC CONCEPTS AND DESCRIBING CASE STUDIES OF INVENTED SPELLING

As criteria for hypothesizing developmental stages, it is possible to make several distinctions based on form according to the sequence in which these three orthographies are taught. Formally, the following thirteen stages have been hypothesized:

(1) Hiragana letters learned; (2) hiragana spelling not yet acquired; (3) hiragana spelling acquired (unvoiced, voiced, semi-voiced); (4) hiragana spelling acquired (special syllable markers); (5) katakana letters learned; (6) katakana spelling not yet acquired; (7) katakana spelling acquired (unvoiced, voiced, semi-voiced); (8) katakana spelling acquired (special syllable markers); (9) spelling combining hiragana and katakana not yet acquired; (10) combined hiragana and katakana acquired; (11) kanji characters learned; (12) spelling with kanji not yet acquired (combination with hiragana not acquired); (13) spelling with kanji acquired (combination with hiragana acquired).

As the purpose of this study, however, is to discuss the developmental stages in learning Japanese spelling, seven stages were hypothesized based on word level spelling.

- Stage 1 hiragana spelling not yet acquired (1, 2)
- Stage 2 hiragana spelling acquired (unvoiced, voiced, semi-voiced) (3)
- Stage 3 hiragana spelling acquired (special syllable markers) (4)
- Stage 4 katakana spelling acquired (unvoiced, voiced, semi-voiced) (5, 6, 7)
- Stage 5 katakana spelling acquired (special syllable markers) (8)
- Stage 6 combined hiragana and katakana acquired (9, 10)
- Stage 7 spelling with kanji not yet acquired (combination with hiragana not acquired) (11, 12)

Both hiragana and kanji can at times represent one word with a single letter, therefore some blending of the letter level and word level occurs. Furthermore, as the orthographic principles of hiragana and katakana are nearly identical, both are frequently mixed in representing a single word at the stage when they are being concurrently learned. When kanji learning overlaps with these, the blending becomes further complicated. These three subsystems are taught in a staggered manner, so it may be assumed that as the learning phase of one comes to its end, it overlaps with the next<sup>5</sup>. Therefore, as shown in Table 2 below, the cases for each stage include at each level other learning processes.

Using the example of the spelling for ‘チューリップ畑’ [*chūrippubatake* (tulip field)] from the final seventh stage, typical examples for each stage are indicated. Some of these seven examples were actually collected, but some were created as examples. All other examples included in this study were actually collected for this research. Boldface is used for the katakana portions to make the difference with hiragana unambiguous. Lengthening of vowels with a horizontal line is indicated by a hyphen, lengthening of vowels by addition of a *u* is indicated with *u* added after vowel. Katakana is shown in bold, hiragana in plain italics, shaded italic portions are written in kanji. Each column is for each stage, including the name of the stage, typical example (actual word → subject answer), and actual words → subject answers with comments.

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<sup>5</sup> See Amana (1986), Amano(1988), Akita & Hatano(1999), and Fukuzawa & Ikeda(1996).

Table 2. Developmental stages: new proposal and cases

**Stage 1 Hiragana spelling not yet acquired**(チュール<sup>リ</sup>ップ畑 → ちりふ)*chu-rippubatake* → *chirifu*さる → さる (no response for underlined letter, or not yet learned)*saru* → *saru*いぬ → いぬ (no response for underlined letter, or not yet learned)*inu* → *inu***Stage 2 Hiragana spelling acquisition (unvoiced, voiced, semi-voiced)**(チュール<sup>リ</sup>ップ畑 → ちりふ<sup>ば</sup>たけ)*chu-rippubatake* → *chiripubatake*ゆきだるま → ゆきらるま (underlined letter written mistakenly)*yukidaruma* → *yukiraruma*きんぎょ → きんきょ (underlined letter given as unvoiced)*kingyo* → *kingyo*くじら → くじら (underlined letter reversed)*kujira* → *kujira*ぺんぎん → めんぎん (underlined letter is an invented letter

combining ‘め’ [me] and ‘ぺ’ [pe])

*pengin* → *engin***Stage 3 Hiragana spelling acquisition (special syllable markers)**(チュール<sup>リ</sup>ップ畑 → ちやり<sup>つ</sup>ふ<sup>ば</sup>たけ)*chu-rippubatake* → *charippubatake*すこっぶ → すこ□ぶ (square indicates special marker omitted)*sukoppu* → *suko□pu*

きんぎょ → きん□□ (square indicates special marker omitted)

*kingyo* → *kin□□*

おねえさん → おね□さん (square indicates long vowel marker omitted)

*oneesan* → *one□san*ひこうき → ひこおき (mistake in long vowel markers)*hikouki* → *hikooki***Stage 4 Katakana spelling acquisition (unvoiced, voiced, semi-voiced)**(チュール<sup>リ</sup>ップ畑 → ちゅうり<sup>ポ</sup>バ<sup>た</sup>け)*chu-rippubatake* → *chuuripobatake* (importation and mixing with ‘チュール<sup>リ</sup>ップ’ [*chu-rippu*])チュール<sup>リ</sup>ップ → ちゅうり<sup>ポ</sup> (importation and mixing with ‘チュール<sup>リ</sup>ップ’ [*chu-rippu*])*chu-rippu* → *chuuripo***Stage 5 Katakana spelling acquisition (special syllable markers)**(チュール<sup>リ</sup>ップ畑 → チュウ<sup>リ</sup>プ<sup>ば</sup>たけ)*chu-rippubatake* → *chu-ripubatake*ドッチ<sup>ボ</sup>ール → ド<sup>二</sup>チ<sup>ボ</sup>ール (mistaken long vowel marker)*dochibo-ru* → *do-chibo-ru*ロケット → ロケ<sup>ト</sup> (double consonant marker omitted)

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*roketto* → *roke* □ *to*

**Stage 6 Combined usage of hiragana and katakana acquisition**

(チュールリップ畑 → チュールリップばたけ)

*chu-rippubatake* → *chu-rippubatake*

バーベキュー → バーベきゅ、バーベきゅう (mixing of hiragana and katakana)

*ba-bekyu-* → *ba-bekyu*, *ba-bekyuu*

**Stage 7 Kanji spelling not yet acquired (includes kanji learning stage)**

(チュールリップ畑 → チュールリップ畑)

*chu-rippubatake* → *chu-rippubatake*

汽車 → き車 (partial use of kanji)

kisha → *kisha*

犬 → ◇ (invented kanji consisting of combinations of the kanji for dog and tree)

inu

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In the following, consideration will be made of the exact processes and ages at which the above stages are acquired.

## 5. ANALYSIS AND CONSIDERATION OF THE DEVELOPMENTAL STAGES

### 5.1 Study data and analytical methodology

The following data was received<sup>6</sup>:

Resource A: Kindergarten data. Data were collected for this study from kindergarten children (aged 5–6, three classes, n=71) in Joetsu City, Niigata Prefecture. This material uses a portion of the same test paper as Resources B and C, and was carried out in December 2004 with appropriate kindergarten students. The present analysis makes use of the data of 18 children who completed both pages one and four of the test paper. The test paper and the examples of subject answers appear at Appendix A.

Resource B: Data for first grade elementary school students (1). This is data collected for this study from first grade elementary school students (aged 6–7, two classes, n=57) in Joetsu City, Niigata Prefecture, conducted on 26 November 2004. The test paper was a four-page B4-size form. The fourth page was for free writing. Selected words, phrases, and sentences were read aloud by the tester, and the testee wrote them down. The test lasted 45 minutes. The testees were allowed to respond as they liked, but were encouraged to use katakana and kanji.

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Resource C: Data for first grade elementary school students (2). These are data collected from first grade elementary school students (aged 6–7, one class, n=11) in Takasaki-cho, Kitamorokata-gun, Miyazaki Prefecture. The same test materials were used as in Resource B with the same methodology. Testing was conducted on 11 January 2005.

Resource D: Successive individual data. These data are from a girl born on 24 August 1996, living in Tsukuba City, Ibaraki Prefecture, recorded from 5 June, 2000 through 24 October 2004 (age three years ten months through eight years two months). The material is recorded in a variety of styles and formats, but was not intentionally collected for studying invented spelling.

Cases were recorded primarily focusing on instances of invented spelling, and were studied in the following sequence. 1) Collected data were provisionally assigned to one of the hypothetical developmental stages, and conformity with the new proposal was examined. 2) Cases with a frequency and commonality representative of the sample were selected. 3) Based on the research materials (A, B, C), the stage each individual pertained to at the time of testing was judged, and the distribution examined. 4) Based on Research Material D, an individual's successive developmental processes were studied. 5) Based on steps 1–4 above, the developmental stages were given an overall consideration.

### 5.2.1 *The relationship between developmental stages and learning ages*

Materials used were Resources A, B, and C. Resource A consisted of 18 kindergarten children (approx. six years old), Resource B of 57 first grade elementary school children (approx. seven years old), and Resource C of eleven first grade elementary school children (approx. seven years old). The test period was in all cases from late December 2004 through early January 2005.

*Table 3: The relationship between developmental stages (1-7) and learning ages (Resource ABC)*

Resource	Stage							Nr of students	
	1	2	3	4	5	6	7		
A		2	2	7	6	1	0	0	18
B		1	0	1	10	9	9	27	57
C		1	2	1	2	1	2	2	11

The number of each column designates the sum of students who are at the stage. 94% of students in group A were in the 4th stage or below, while conversely, 96%

of students in group B were above the 4th stage. Results for C were distributed through all seven stages. A and B represent schools in the same district with progressive orthographic education, but C is in a rural school district with a lower academic level. By taking a look at the data from resource B, it can be seen that the children had learned a considerable amount of hiragana spelling before entering first grade, and by the end of first grade (late March) had reached the point where they were mostly able to write phrases in both hiragana and katakana.

### 5.2.2 Study of an individual case of development

Table 4: The relationship between developmental stages and learning ages. There are random samples of invented spelling (or mistakes) taken from Resource D

Stage	Example	Date
1	① (spelling with imperfect and/or reversed letters)	5 June 2000–16 Mar. 2001; age 3.9- age 4.7
	② おりかう (ありがとう) <i>orikau (arigatou)</i>	1 Dec. 2001; age 5.3
2	③ お <u>め</u> でとう <i>omedetou</i> (underlined letter is reversed)	8 Jan. 2002; age 5.4
	④ ゆうき <i>yuuki</i> (male names)	10 Sept. 2002; age 6.1
	⑤ ぱぱ まま <i>papa mama</i>	11 Apr. 2002; age 5.7
3	⑥ かっ <u>こ</u> う <u>ど</u> り <i>kakkoudori</i> (underlined letter is reversed)	6 July 2002; age 5.11
	⑦ えんち <u>ょう</u> <i>enchou</i>	9 Nov. 2002; age 6.2
4	⑧ <u>ス</u> パ <u>ま</u> ん <i>supaman</i> (first half only in katakana)	3 July 2001; age 4.10
	⑨ <u>パ</u> ラ <u>だ</u> い <u>す</u> <i>paradaisu</i> (first half only in katakana)	9 Nov. 2002; age 6.2
	⑩ <u>メ</u> リ <u>ー</u> ク <u>リ</u> ス <u>マ</u> ス <i>meri-kurumasu</i>	30 Nov. 2002; age 6.3
5	⑪ ふし <u>ぎ</u> な <u>コ</u> ッ <u>プ</u> <i>fushigina koppu</i> (underlined letter is reversed)	3 July 2003; age 6.11
	⑫ <u>ビ</u> ック <u>リ</u> <u>チ</u> ョ <u>コ</u> ッ <u>ピ</u> <i>bikkuri chokkopi</i>	3 Oct. 2004; age 8.1
6	⑬ <u>パ</u> パ <u>の</u> み <u>ず</u> ぎ <i>papanomizugi</i>	10 Sept. 2002; age 6.1
	⑭ <u>ハ</u> ナ <u>の</u> く <u>に</u> <i>hananokuni</i>	13 Feb. 2004; age 7.6
	⑮ <u>な</u> ま <u>ハ</u> ム <u>ト</u> マ <u>ト</u> と <u>チ</u> ー <u>ズ</u> <i>namahamu tomato to chi-zu</i>	9 Oct. 2004; age 8.1
7	⑯ <u>ア</u> ール <u>の</u> 大 <u>ぼ</u> う <u>け</u> ん <i>a-ru no daibouken</i>	11 Oct. 2003; age 7.2
	⑰ 日 <u>本</u> し <u>ん</u> ぶ <u>ん</u> <i>Nihon shinbun</i>	26 Dec. 2003; age 7.3
	⑱ <u>ス</u> ポ <u>ー</u> ツ <u>の</u> 秋 <i>supo-tsu no aki</i>	28 Oct. 2004; age 8.2

The material in table 4 is from Resource D. For each stage, a written example and date (age) are provided. Examples are of representative items selected for convenience. The handwritten examples can be found in Appendix B. Extrapolating from these data, the girl who wrote the above examples passed through each of the stages at the following ages: After completing Stage 1 at age four and several months by learning the shapes of hiragana, she went on to Stage 2 (by approx age 5.5); Stage 3 (by approx age six), Stage 4 (by approx age six), Stage 5 (by approx age 7.5), Stage 6 (by approx age eight), and Stage 7 (by approx age eight). Comparing this with the results in Table 3, this individual does not belong to the group that completed all seven stages earliest, but she did make better than average progress.

In the study of developmental stages of orthographic concepts above, the appearance of invented spelling varies greatly depending on the individual and there is room for fluctuation in each of the stages. Nevertheless, it was observed that learning advances according to this sequence.

Next, these seven stages will be compared with the developmental stages proposed for English (e.g. Gentry, 1982 offers five stages: Stage 1: Pre-communicative, Stage 2: Semi-phonetic, Stage 3: Phonetic, Stage 4: Transitional, Stage 5: Conventional). As Japanese and English have entirely different orthographic systems, a simple comparison is impossible. However, an application of the orthographic or systemic concepts used to distinguish these five stages can be applied to describe approximately five stages in the developmental process of learning to spell with hiragana and katakana<sup>7</sup>. If such developmental stages are hypothesized, the five stages can be subsumed into our proposed first three stages for hiragana, and all will probably be mastered by about the time the child becomes a second grader. However, this does not mean that an identical process will be repeated when learning katakana. This is because, as discussed above, the orthographic systems for hiragana and katakana are identical in principle. This is why katakana can be relatively quickly mastered after hiragana. As hiragana and katakana are syllabaries differing from single sound alphabetic orthographies, the phonetic strategy for learning English spelling cannot be directly abstracted and analyzed even by using a theoretic approach.

Phonetic analysis of the phoneme level has been the focus of European and American studies. They have demonstrated that it is generally very difficult for four- or five-year old children to analyze words phonetically. In consideration of this, a phonetic analysis of the syllable level (in Japanese) is much easier than that of the level of single sounds, and can be mastered at an early level of development. To make this clear it will be necessary to ask children to do phonetic analyses of both the syllabic and single-sound levels and compare their development (acquisition). Unfortunately, such a study remains to be done for Japanese. (Amano, 1988, p. 151)

Under these conditions, the present study refers to the relatively simplified four stages Ericson & Juliebo (1998) proposed (Stage 1; Pre-representational: no logical representation of sounds, Stage 2; Developmental: logical representation of some

<sup>7</sup> For example, Bear & Templeton (1998) gave a detailed representation of the features of English in the following six stages. However, it is difficult to apply these to Japanese. Stage 1: Prephonemic; Stage 2: Semiphonemic/early letter name; Stage 3: Letter name; Stage 4: Within-word pattern; Stage 5: Syllable juncture; Stage 6: Derivational constancy.

sounds, Stage 3; Representational: logical representation of most sounds, Stage 4; Conventional: logical representation of essentially all sounds) to analyze the fundamental stages of development in Japanese. As a result, it was judged that the above seven stages are appropriate. For reference, the term “sounds” in the above was changed to “syllables,” and the various stages are demonstrated below based on the example of ‘チューリップ畑’ [*chūrippubatake* (tulip field)].

**Example; Basic Stage**

Hiragana:

Stage 1 (かひ [*kahi*]),

Stage 2 (ちりふ [*chirifu*]),

Stage 3 (ちゅうりふ [*chuuripu*]),

Stage 4 (ちゅうりっふ [*chuurippu*])

Katakana:

Stage 1 (カヒ [*kahi*]),

Stage 2 (チリフ [*chirifu*]),

Stage 3 (チュウリップ [*chuuripu*]),

Stage 4 (チューリップ [*chu-rippu*])

↓

**Developed Stage**

Hiragana→Katakana→Kanji:

Stage 1 (ちりふ [*chirifu*]),

Stage 2 (ちりふばたけ [*chiripubatake*]),

Stage 3 (ちやりっふばたけ

[*charippubatake*]), →

Stage 4 (ちゅうり ちりふばたけ [*chuuripobatake*]),

Stage 5 (チュウリップばたけ [*chuuripubatake*]),

Stage 6 (チューリップばたけ [*chu-rippubatake*]), →

Stage 7 (チューリップ畑 [*chu-rippubatake*])

Next, the spelling strategies used in each developmental stage will be considered.

### 5.3 Examples and strategies of invented spelling

Examples representative of strategies unique to developmental stages will be provided, and related strategies commented on.

#### 5.3.1 Strategies used at early developmental stages

Example: substitution of abbreviation or lacuna

すこふ [*sukopu*] (= スコップ [*sukoppu*]) abbreviation of double consonant,

おね さん [*one□san*] (= おねえさん [*oneesan*]) substitution of a lacuna for long

vowel indication.



Fukuzawa & Ikeda (1996) note the following three types of errors appearing in young children's language:

- 1) Partial abbreviation (ビール [bi-ru] → ビ [bi])
- 2) Substitution with another sound (プール [pu-ru] → プーユ [pu-yu])
- 3) Transposed sequence (カラダ [karada] → カダラ [kadara])

These error types appear commonly in spelling in stages one through four. When looked at as strategies, 1 and 2 above may be due to an immature level of development of word consciousness, but are also used at a level of clear word awareness when the appropriate letter is uncertain. The examples above use strategy 1 for dealing with special syllable markers.

### 5.3.2 Strategies for spelling special syllable markers

Example: trial and error by copying syllables

きちゅーちゃん

きてイーい

きリイちゃん

きていちゃん

きていいちゃん

きテイちゃん

=キテイちゃん

(kichu-chan, kiti-i, kirichon, kitichan, kitiichan, kitichan [=kitichan])

In this example, the special syllables ‘テイ’ [ti/ti:] and ‘ちゃ’ [cha] are written with a number of phonetic values, including the mixing of katakana and hiragana. Within the present limited data, such examples appear frequently. It is clear from this point as well that the spelling of special syllables is a major hurdle.

### 5.3.3 Strategy of substituting the letters of a previously learned orthographic subsystem

Example: combining with kanji and employing numbers

(き車、かい車 (=会社)、2り (=二人))

(kisha, kaisha [‘車’ is incorrect], 2ri [futari])

In the above case of ‘き車’ [kisha] (steam train), the correct kanji for *ki* (汽: steam) was unknown and substituted with hiragana. The kanji given for *sha* (車: vehicle) is appropriate in meaning. However, when writing the word *kaisha* (会社: company), the same kanji used above for *sha* (車: vehicle) was incorrectly substituted here for *sha* (社: company), which has the same pronunciation but a different meaning.

The kanji *sha* (車) used in the incipient stage of kanji learning incorrectly for *sha* (社) in the above example suggests that it is being probably used as a syllabic letter.

At the same time, there is also some awareness of its function as an ideograph. Such examples are judged to be indicative of the preparatory stage for kanji learning.

When considering invented spelling and development of orthographic concepts, it is necessary to give thought to productive and unproductive aspects of spelling strategies from a pedagogical standpoint, and not only the linguistic one as in the above (IRA/NAEYC,1998).

It has been shown that the above three types of young children's mistakes are frequently found in invented spelling. It is difficult, however, to judge whether these are simple mistakes, or if they should be evaluated as instances of productive strategies. It is also critical for educators to differentiate if these stem from ingenuity or are simply accidental mistakes. For example, the case of '2 人' [2ri] above (for '二人' [futari] (two people) written with kanji meaning "two (二)" and "person (人)" is an example of ingenuity. The child attempted to write the single word *futari*, which is formed of two kanji, but was unable to do so. To represent the meaning, the numeral 2 was combined with hiragana to write the word *futari*. On the other hand, in the example 'ついになることば *tsui ni naru kotoba*' ("words that are paired") was mistakenly written as 'つみになることば *tsumi ni naru kotoba*' ("words that are sinful"), the shift of *tsui* → *tsumi* is probably a simple transcription error.

Considering that with Japanese it is necessary to teach special syllable markers purposefully to stimulate phonemic awareness, studies concerning such types of discernment will be needed in the future.

## 6. CONCLUSION

Inferring developmental stages in spelling Japanese from the analysis of the collected examples of invented spelling in this paper, a model consisting of seven stages was proposed. The ability to spell Japanese using hiragana, katakana, and kanji in combination is the standard of the mature level. Before reaching this level, a staggered progression in the acquisition of these three subsystems was considered. As Japanese orthography is fundamentally syllabic, it was assumed that there was no need for the phonetic awareness in learners to the degree found in the alphabetic orthography of English. However, at the difficult stage of learning spelling using special syllable markers along with hiragana and katakana, a phonetic awareness is called for. The barrier of that developmental stage was considered.

In the latter half of this paper, the acquisition of Japanese spelling knowledge based on the hypothesized seven-stage model was analyzed using test results on kindergarten and first grade students, and the appropriateness of the model confirmed. Representative spelling strategies used for each stage examined, the importance of the productive aspect of invented spelling discussed, and the need for further investigation into that aspect from a pedagogical stance was stated.

Proposing developmental stages was the focus of this paper, and was insufficient as an approach to a study of invented spelling. To analyze the multilayered features of Japanese spelling in detail, treatment of the unique qualities of kanji, which combine sound, form, and meaning, is needed (Bear & Templeton, 1998, p.238.), and a


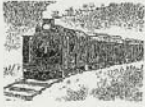







study made from the stance of orthographic depth of the several overlapping subsystems (Ellis et al., 2004).

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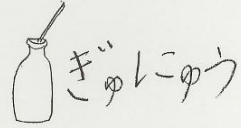
APPENDIX A WORKSHEETS FOR HANDWRITING, DICTATION, AND FREE WRITING

( )ねん ( )くみ なまえ

 <p>くま</p>	 <p>き車</p>
 <p>犬</p>	 <p>きんぎょ</p>
 <p>ねずみ</p>	 <p>ひこうき</p>
 <p>クジラ</p>	 <p>おじいさん</p>
 <p>ゆきだるま</p>	 <p>おねえさん</p>



とんぼ



ギョレにゆう



ペンギン



カエ'レ



ロケット



としかい



チューリップ



くつ下

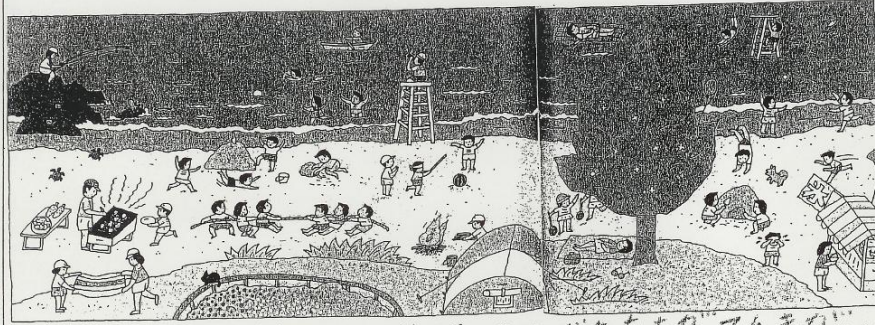


ちょうちよ



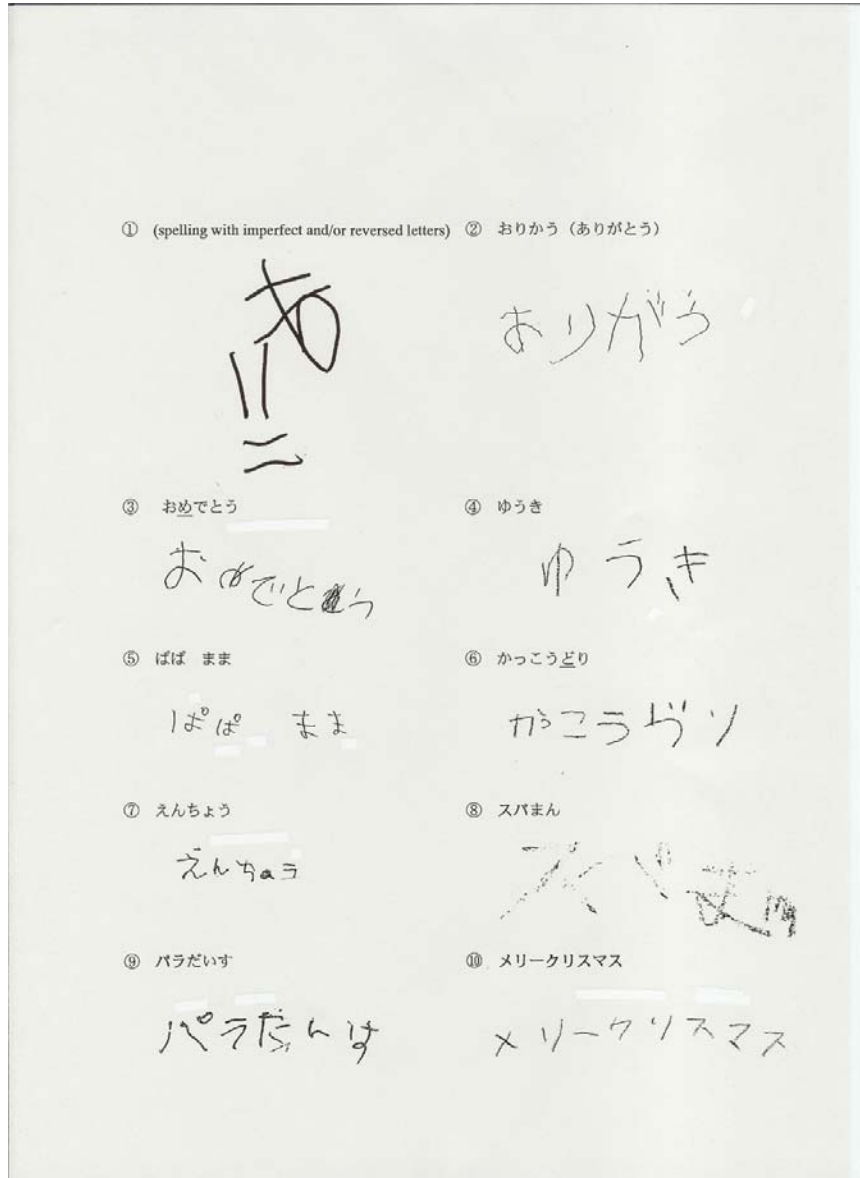
イノカの  
ジャンプ

1	しんかんせん 1ごう
2	ウルトラセブン
3	ゲームセンター
4	さくらんぼがりにようこぎ
5	うみのいえでウキワをかりました
6	クワパとアマガリルヤしにいきました
7	11つもーばんーとうしょう
8	テレビでしらゆきひめのおはなしをみました。
9	セブンイレブンでキーをかりました。
10	おとうさんはビールを飲んでいました。



ある日のことである4人がそくの子どもたちがてんきがい...  
 でちかくのうみにおそびにきました。アイスもかていし  
 としんがかてけなくてなしいきました。「あーんあーん  
 おかあちゃんかてよ」「ダメすぎるいでしょ」

APPENDIX B RANDOM SAMPLES FROM INDIVIDUAL DATA





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