A Study of the Effects of English Learning on Cognition in Japanese Learners of English from a Multi-Competence Perspective

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Declaration of Originality

The material presented in this thesis is the original work of the candidate except as otherwise acknowledged. It has not been submitted previously, in part or whole, for any award, at any university, at any other time.

Yoshiko Murahata

Abstract

This study investigated whether there were any effects of English learning on cognition in Japanese learners of English (JLEs), based on the concept of multi-competence. The study first verified that there were language effects on cognition in JLEs through an experiment using the taxonomic-thematic triads (i.e., *monkey-panda-banana*) conducted with 84 Japanese native speakers (JNSs) (mean age 33, age range 18-57; male 31, female 53) and 21 English native speakers (ENSs) (mean age 27, age range 22-38; male 10, female 11). The study was based on the so-called West-East Paradigm originally found in social psychology, which claims that Westerners tend to pay more attention to salient objects and their properties independently from the context, and that East Asians tend to pay more attention to relationships among objects by taking the context into consideration. The results showed that ENSs tend to relate categorically-related objects (i.e., *monkey-panda*) more strongly than JNSs and that JLEs came to relate them more strongly as they acquired higher proficiency in English. The cognitive shift found among JLEs was considered to be the effects of language because they were learning English almost solely at school in Japan, where English is not used for daily communication.

The next experiment examined which part of grammatical features of the languages were relevant to the different cognitive behaviours found in taxonomic categorisation using 66 JNSs (mean age 20.5, age range 18-38; male 26, female 40) and 26 ENSs (mean age 21.1, age range 18-30; male 12, female 14). It showed that JNSs and ENSs interpreted generic nouns differently because of the different noun forms

between English and Japanese. Furthermore JLEs with higher proficiency in English behaved in-between the two groups.

The third experiment was originally designed and conducted on 84 JNSs (mean age 22.7, age range 19-38; male 15, female 33) and 26 ENSs (mean age 21.0, age range 19-24; male 12, female 14) to explore whether they would behave differently in the task of categorisation of objects as a consequence of acquiring different number marking patterns in their languages. Again parallel results were found between the noun forms and object categorisation behaviours. Thus the three experiments brought forward evidence to show that JLEs shift part of their cognition as a consequence of learning English as an L2. The study contributes to multi-competence research, verifying the multi-competent mind of JLEs, which is different from that of monolingual speakers of Japanese and English. The findings suggest a new perspective from which the field of English education in Japan can view JLEs as unique individuals with more than one language in their minds.

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Abbreviations used to explain Chinese and Japanese linguistic forms in Chapter 3

Chinese

CL = classifier marker

CRS = Currently Relevant State

EXP = experiential aspect

NOM = nominalizaion

PFV = perfective aspect

3sg = third person singular pronoun (Li & Thompson, 1981)

Japanese

ACC = accusative marker

CL = classifier marker

DAT = dative marker

GEN = genitive marker

INT = interjection marker

LOC = locative marker

NOM = nominative marker

PL = plural marker

Q = question marker

TOP = topic marker (Mizuguchi, 2004)

Introduction

This study aims at investigating ‘multi-competence’ of Japanese learners of English (JLEs); that is, whether JLEs shift any part of their cognitive aspect as a consequence of learning English. The ideas of multi-competence first appeared in Cook (1991) in the field of second language acquisition (SLA) research. SLA researchers and bilingual researchers have investigated cognitive aspects of L2 users or bilinguals since then, providing positive results and the idea is now rapidly spreading. As multi-competence is related to ‘mind’ of L2 users, the notions naturally evoke the linguistic relativity hypothesis, which claims the relationship between language and cognition.

This thesis consists of eight chapters. The first three chapters introduce relevant backgrounds of this research. The next three chapters describe three experiments conducted on JLEs and English native speakers (ENSs) to investigate multi-competence of JLEs. Then the discussion chapter and the conclusion chapter follow.

Chapter 1 first describes the beginning, decline, and revival of the Sapir-Whorf Hypothesis by briefly describing major studies on the hypothesis from the 1950s to the early 2000s. Then it introduces the fundamental notions of ‘multi-competence’. A number of studies with supporting evidence are introduced, which show in what ways and in what areas of cognition L2 users possibly become different from monolingual L1 speakers and L2 speakers as a consequence of learning an L2.

Chapter 2 explores the West-East Paradigm, which was originally developed in the field of social psychology and indicates different cognitive patterns between Westerners (i.e., English speakers) and East Asians (i.e., Chinese, Korean and Japanese speakers). The present study is based on the findings on this paradigm. Studies on differences between western societies and eastern societies derived from the demographically complex situation in North America were developed in the field of social psychology. The present research narrows down the focus on taxonomic vs. thematic object categorisation, and deals with how differently ENSs and JLEs may categorise objects. Similar studies using taxonomic-thematic triads are also found in research on cognitive development of infants in the field of cognitive psychology. Those studies are introduced here in order to better understand how such different cognitive patterns possibly appear between English speakers and East Asian language speakers. The studies show that language can play an important role in concept formation among infants. Then if so, different languages may well affect the way speakers of different languages look at objects in some way or other.

Thus the present study goes on to investigate different noun forms across languages, especially generic noun forms as they are the most relevant to differences in object categorisation patterns at issue in this research. Chapter 3 describes generic noun forms in English, Chinese and Japanese.

Chapter 4, 5 and 6 describe three experiments respectively. Experiment 1 described in Chapter 4 is a taxonomic-thematic relationship judgment test, which is a similar experiment done by Ji, Zhang and Nisbett (2004) using taxonomic-thematic triads. The experiment was conducted first on JLEs at different proficiency levels in English and ENSs, then Chinese learners of Japanese, and also Japanese high school

students. Experiment 2 in Chapter 5 was a replication of one of the experiments in Gelman and Tardif (1998) and investigated how ENSs and JLEs would interpret generic nouns. Experiment 3 in Chapter 6 was designed by the present author by following the process of using generic plural nouns. It investigated how differently ENSs and JNSs would categorise the same/similar objects. A discussion on the results of each experiment is provided at the end of each chapter.

Chapter 7 summarises the new findings of the present research, and further discusses effects of language on cognition. The chapter also discusses implications of multi-competence research for the English education in Japan. Chapter 8 is the concluding chapter in which chief outcomes of the research are highlighted and avenues for further study are suggested.

Chapter 1. What is 'Multi-Competence'?

1 .1 Before 'Multi-Competence'

1.1.1 *Introduction*

The term 'multi-competence' was coined by Cook (1991) to present a new overall framework of the L2 user and it was originally defined as "the compound state of a mind with two languages" (Cook 1991, p. 112). It was later redefined as "the knowledge of two languages in one mind" (Cook 2008a, p. 17) to indicate that it is not restricted to only syntactic aspects. It claims that the L2 user is a unique individual who knows more than one language, and that an L2 learner's[1] mind is not the same in nature as the mind of a person who knows only one language (Cook 2002a, 2003). As the claims are related to 'mind' and indicate that language may well give some effects on mind, the notions naturally evoke the linguistic relativity hypothesis, also known as the Sapir-Whorf Hypothesis: the proposal that the language we speak affects the way we think about reality. Though multi-competence was not developed through the studies of the linguistic relativity hypothesis, it seems to have appeared at the right time in a sense, because ample empirical research over the relationship between language and thought had accumulated in the preceding years. In order to understand basic ideas of multi-competence, it is essential to understand the development of the linguistic relativity hypothesis before answering the question "What is multi-competence?" The

[1] The terms 'L2 user' and 'L2 learner' are interchangeably used here and throughout this thesis. 'Learner' was used because the author wants to include the expression 'Japanese learners of English', which appears many times in later chapters on the experiments in this study. The term 'L2 user' carries specific meanings in the framework of multi-competence, which is explained in a later section 1.2.3.

next four sections will describe the development of the studies on the Sapir-Whorf Hypothesis before introducing the fundamental notions of multi-competence.

1.1.2 *The Sapir-Whorf Hypothesis: Its beginning and decline*

Anyone who learns a second/foreign language would feel that the speakers of the target language may think differently from the speakers of his/her L1, because of the lack of precise equivalents between the two languages, different ways of expression, or simply because of the difficulty of reaching a native-like proficiency level in an L2. This seemingly naive idea about the relations between language and thought was explicitly proposed in writings by two American linguists and anthropologists, Edward Sapir (1929) and Benjamin Lee Whorf (1956) who, among others, proposed intriguing ideas on the close relationship between language, culture and thought from the 1920s to the 1950s. They came to develop the ideas through studying the cultures and languages of the indigenous American Indians such as Hopi and Navaho, which held completely different linguistic constructs from English and other well-known European languages most commonly used in research in linguistics and in related fields.

In the most well-known, frequently cited passage, Sapir (1929) wrote:

> Language is a guide to 'social reality.' … Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society. … the 'real world' is to a large extent unconsciously built up on the language habits of the group. No two languages are ever sufficiently similar to be considered as representing the same social reality (p. 162).

Whorf (1956) wrote along the same lines:

> It was found that the background linguistic system (in other words, the grammar) of each language is not merely a reproducing instrument for voicing ideas but rather itself the shaper of ideas, the program and guide for the individual's mental activity, for his analysis of impressions, for his synthesis of his mental stock in trade. … We dissect nature along lines laid down by our native languages. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds---and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way---an agreement that holds throughout our speech community and is codified in the patterns of our language (pp. 212-213).

In these passages both Sapir and Whorf argued in a determined way that our thought would be formed based on the language we speak. Their shared notions were named the 'Linguistic Relativity Hypothesis' or the 'Sapir-Whorf Hypothesis' after them. The hypothesis has been understood as being somewhere on a continuum from a strong version to a weaker version (Penn 1972). The strongest version claims the determinant role of language on the process of concept formation, and a much weaker version claims that different social realities between speakers of different languages. The strong version implies that we do not have that concept in our mind at all if our language does not express a certain concept, which even denies the translatability from one language to another, and also refuses to allow mutual understanding between speakers of two different languages. It ultimately makes any reality asserted in a language questionable if the concept expressed in a language is completely relative

(Penn 1972). Later on, the hypothesis has been treated in a more moderate way in its weaker version, and research has investigated how language may influence cognition, claiming certain aspects of a language may lead the speakers to pay more attention to some specific part of events surrounding us (Hunt & Agnoli 1991; Imai 2000). To cite the most representative example, it never argues, therefore, that speakers of a language do not recognise three different kinds of snow just because the language does not have those three distinctive words in it (Whorf 1956; Brown & Lenneberg 1954).[2]

The linguistic relativity hypothesis attracted a lot of attention when it emerged but lost its popularity and credibility in linguistics from the 1960s to the 1980s before the pendulum swung back to pay more attention to linguistic and cultural differences in the 1990s (Evans & Levinson 2009; Gumperz & Levinson 1996; Lucy 1997). The decline of this hypothesis in academic fields as a plausible research topic can be attributed to four main reasons; 1) the linguistics trend in those days, 2) interdisciplinary nature of the hypothesis, 3) ambiguity of the hypothesis, and 4) methodological problems.

As for the first reason on the linguistics trend in the 1960s to the 80s, more emphasis was being put on seeking similarities and universal aspects of human cognition, as Chomskian universalist linguistics spread. Most linguists had the idea that by examining a language, the formed abstract structure of language can be attained because languages differed only at the superficial level. So reports on common aspects

[2] As for the number of words for 'snow' in Eskimo, there are some controversies. One says it is incalculable because of the complex word formation system in the combination of a 'snow' root and suffixes (Martin 1986). Another says it would be more preferable to list lexemes and enumerates at least fifteen of them (Woodbury 1991). He presents at the same time a list of English words for snow such as 'avalanche', 'blizzard', and 'hail', which means English has more than one word for snow, too.

of around 30 languages by Greenberg (1963) were welcomed, which included such universal rules as *if a language has a VSO construct, it has prepositions,* and *if there are two noun phrases one of which is the subject and the other is the object of the sentence, the subject noun phrase always precedes the object noun phrase*. Linguists were captivated with the idea of seeking universals or similarities among languages, taking a modular view of language by differentiating the development of language from the development of cognition. Hence, they looked away from differences between languages and the relations between language and thought (Gumperz & Levinson 1996; Lucy 1997).

Secondly, the decline can be attributed to the vast related areas of research. That is, the issue of the linguistic relativity hypothesis covers interdisciplinary fields, such as linguistics, anthropology, psychology and sociology, so that it required much compound specialisation in nature (Lucy 1997). The ideas arose from linguistic studies, but comparative studies of lexical items or grammatical features between languages only do not reveal anything about the relationship between languages and thought. There should always be three elements of language, thought and reality involved in two relations, so that it would be claimed that language treats reality in a certain way and that it can influence thought related to that part of reality (Lucy 1997). Therefore, though Whorf (1956) presents differences between languages, for example, saying that English has three words for *insect*, *airplane*, and *aviator*, while Hopi has only one word for them, and that Hopi verbs do not distinguish between the present, past and future in the way as English verbs do, the linguistic descriptions do not verify that the Hopi speakers have different concepts over the three objects, nor that they perceive time in different ways from English speakers.

A third reason comes from the variable definition of 'thought' and 'language'. It was ambiguous in nature with the possibility that thought could range from perception and attention, object classification, learning, inference, memory, judgment, creativity and reasoning (Fishman 1960; Lucy 1997). Research areas, therefore, varied from perception of colour (Berlin & Kay 1969; Lucy 1992), object categorisation (Brown 1957; Carroll & Casagrande 1958), counterfactual analysis (Bloom 1981), to thought patterns (Kaplan 1965). Furthermore, it was even argued, as mentioned earlier in this section, an extremely strong version of the hypothesis could not be empirically studied because 'thought' claimed in the hypothesis was not a demonstrable phenomenon, hence "it is impossible to ascertain whether all thought is dependent on language or not" (Penn 1972, p. 33). Similarly, 'language' can also be dealt with at different levels. Should it be treated at the lexical level, so that lack of some word such as a colour name would verify the linguistic relativity? Or should it be morphosyntactic configurations that should be compared and analysed? These queries contributed to the hypothesis remaining merely speculation. Pavlenko (2011) points out that this confusion in interpreting 'thought' and 'language' attributes to the fact that Sapir and Whorf were linguistic anthropologists, not experimental psychologists. Thus she says that Sapir and Whorf were not particularly interested in testing different concepts and cognitive processes by conducting psychological experiments.

A fourth reason of the decline was that experimental methods were not developed and not firmly established except in colour recognition tests and object categorisation tests. Colour provides a favourable area to investigate how language dissects nature because it actually presents a continuous array without any breaks. As such, it made a suitable starting point for the investigation of linguistic relativity, once it

was found that two languages have different colour terms; for example between English and Zuni (a language spoken in the south-western part of the United States) (Brown & Lenneberg 1954), between English and Dani (a language spoken in Papua New Guinea) (Heider 1972), and between English and Navaho (Ervin 1961). Besides colour experiments, Carroll and Casagrande (1958) designed very skilful experiment methods to investigate how speakers of languages with different verb functions would classify objects. (The studies mentioned in this section will be introduced in detail in Section 1.1.3.) They themselves were not really sure, however, whether their techniques would be appropriate to study the relationship between linguistic forms and behaviours before they obtained positive results.

Methodological problems included methodological flaws. For example, Brown and Lenneberg (1954) once reported the relationship between language and perception by concluding there was a correlation between codability and recognition in colour perception among English native speakers, but later the findings were questioned under different experimental contexts by Lenneberg (1961). Carroll and Casagrande (1958) examined object categorisation propensity among Navaho-English bilinguals and English monolinguals. The results, however, revealed an unpredicted tendency of English monolingual children, which was speculated to be due to different educational backgrounds across groups. Other flaws were pointed out in a series of experiments with counterfactuals. Bloom (1981) explored how Chinese speakers and English speakers would interpret counterfactual sentences. His study later aroused controversial discussion over inappropriate stimulus sentences (Au 1983), and biased background of participants across different language groups (Liu 1985; Takano 1989).

These shortcomings of studies may have urged further studies on the one hand, but on the other hand they gave negative impact to the consequences. The most unfortunate state in those days was that, though Whorf (1956) described lexical differences which possibly caused conceptual differences between the Hopi speakers and the English speakers, there were not any follow-up empirical studies carried out to investigate exactly how different their perceptions actually were to verify even his assertions. There was no method designed to investigate such perceptual differences which might be caused by lexical differences between languages.

The controversy over the relationship between language and thought, therefore, seemed to have been settled after a long controversy in favour of universalism after the findings of universal colour perception among speakers of different languages (Berlin & Kay 1969; Lenneberg 1961; Li & Gleitman 2002; Heider 1972). In addition to that, the other controversial discussion over counterfactual understanding issue seems to have tapered off with negative results to the linguistic relativity hypothesis (Au 1983, 1984; Liu 1985; Takano 1989).

1.1.3 *Early stages of the Sapir-Whorf Hypothesis: Studies from the 1950s to the 1980s*

During the decline in interest and research on the linguistic relativity hypothesis, studies were ceaselessly and steadily carried on to investigate the causal effect of language on thought, and the experiment methods have been gradually developed, so that empirical research can be finally conducted in the 1990s and afterwards (Lucy 1997). Some major experiments should be reviewed here, which were conducted after Whorf's research until the end of the 1980s.

One of the earliest studies to investigate the causal effect of grammatical features on cognition was Brown (1957), though it was not a crosslinguistic study and done only among English speakers. He did an experiment using pictures of actions, objects, and substances, and found that English native speaker children could detect the semantic implications of verbs, mass nouns, and count nouns of their language. He concluded from this experiment that it was likely that speakers of languages other than English would detect the semantic nature of parts of speech in their own languages and would develop quite different cognitive categories. He suggested that grammatical features of a language would possibly affect the cognition of the speakers of the language. This supported language effect on cognition, though it remained to determine how seriously and how generally it may be affected.

Carroll and Casagrande (1958) designed two experiments by using triad pictures of actions for Experiment 1 and objects for Experiment 2. They asked the Hopi and English speaking participants to classify pictures. Experiment 1 revealed that different verb meanings between English and Hopi, which dissects actions in different ways, actually influenced how they grouped pictures depicting actions. Experiment 2 investigated how English and Navaho speakers behaved in responding to a triad object-matching task. The Navaho language requires the speakers to choose specific verb forms according to the attributes of objects, while English does not have such grammatical obligation. They hypothesised that such a specific grammatical feature in Navaho would lead Navaho speakers to group objects which shared the same shape more often than English speakers. The results showed as expected that Navaho-dominant Navaho children preferred to match objects according to the shape more often than English-dominant Navaho children. However, English monolingual

American children behaved in an unexpected way and matched objects based on the shape even more than Navaho-dominant Navaho children. Because the American children were from the wealthy Boston area, this unpredicted result was considered to come from their abundantly industrialised environment, which was very different from the Navaho environment.

Casagrande later conducted an additional experiment and reported predicted results from English monolingual children living in the Harem area, whose environments were much more like those of the Navahos (Fishman 1960). With more similar background of everyday life, it was revealed that English monolingual children showed a less shape-biased categorisation pattern compared to English-dominant Navaho children. Thus their finding proved that speakers of different languages with different grammatical features differ in categorising objects, which were favourable results for the proponents of linguistic relativity.

Many studies were carried on to investigate colour recognition differences across languages, as colour presents an unbroken continuous reality which is dissected by various colour terms. Brown and Lenneberg (1954) predicted that colours described with shorter names could be remembered and recognised more readily than other colours with longer phrasal names. Their prediction came from the fact that the native Canadians would distinguish three kinds of snow more often than Americans would do because of their three distinctive words for the English word ‘snow’, though it never meant that English speakers could not distinguish the differences. Thus they required the English speaking participants to assign names to colours presented and gave them a recognition task. Then they measured codability of colour names and found out that more codable names of colours would enhance recognition and memory. Therefore,

they concluded that language surely gave some effect on cognition. In the article, they cited Lenneberg and Roberts' (1956) experiment on Zuni Indians and English speakers, which provided positive results. That is, as Zuni has only one word for English yellow and orange, Zuni speakers frequently confused the two colours in the recognition task when English speakers did not. Also they reported Zuni-English bilinguals behaved somewhere in the middle between the Zuni monolinguals and the English monolinguals.

The Brown and Lenneberg (1954) experiment, however, was later reappraised by Lenneberg (1961) and the results were questioned in terms of its experimental methodology. He reported there was not a complete matching between the most common colour names in his study and the results of a colour recognition task in a previous study by Burnham and Clark (1955 cited Lenneberg 1961). He also found out that Zuni speakers did not behave differently from English speakers in the recognition task. Therefore, he concluded that language effect on perception did not always appear as a general phenomenon. Though the findings by Brown and Lenneberg (1954) may not be strongly supported, their approach to the linguistic relativity hypothesis by examining 'codability' was highly valued and had enormous influence on subsequent research (Lucy 1997).

Ervin (1961) used another technique to compare colour boundaries among English monolinguals, Navaho monolinguals and Navaho-English bilinguals. She observed that English and Navaho languages have different colour boundaries, and those differences did affect colour naming and reaction times of bilingual speakers. For example, Navaho has only one name for English *blue*, *green* and *purple*. Thus English-dominant Navaho-English bilinguals called a certain colour *green* significantly more often than the other participants, which was the most often called *yellow*. She

discussed that it was an effect of intrusion of newly acquired English colour names, and concluded that there was a semantic shift among bilinguals. This experiment revealed supportive evidence for language effect on cognition by examining not only monolinguals but also bilinguals, who behaved in-between the two monolingual groups.

Heider [Rosch] (1972) used even another technique to investigate how English speakers and Dani speakers would behave on colours. Dani has only two colour terms; *mili* for dark colour and *mola* for light colour. In this experiment, participants were asked to choose the best example of a colour X using the eight basic colour-name focal areas by Berlin and Kay (1969). After finding out that the best focal colours were the most saturated colours to both language speakers, Heider examined codability, response latency, and memory accuracy of the focal, intermediate, and boundary colours. The results showed both English and Dani speakers gave parallel patterns for each of focal, intermediate and boundary colours in terms of codability, response latency and memory accuracy. That is, Dani speakers gave shorter names to focal colours, responded more quickly to those, and remembered those more correctly though they did not have colour names for those. English speakers showed similar response patterns across those three categories of colours. She concluded, therefore, lack of colour names in Dani did not give effect on their colour perception, which refuted the linguistic relativity hypothesis. She stressed universal perception of focal colours disregarding the fact that English speakers were significantly more accurate in a memory task than Dani speakers.

After Heider's refutation of the Sapir-Whorf Hypothesis, however, Caskey-Sirmons and Hickerson (1977) compared colour perception of monolingual speakers of five different languages (Korean, Japanese, Hindi, Cantonese and

Mandarin) and their bilingual speakers with English as their L2. They examined the influence of learning English as an L2, which meant to examine direct effect of language learning. They found out that the speakers' identification of colour foci and boundaries were different across languages, and that their behaviours on colour perception were influenced by their L2 English. For example, monolingual Korean speakers use the Korean colour term *paran sekj* to refer to the greener and less purple colours than Korean-English bilingual speakers. Thus by showing L2 effect on their perception, they supported language effect on colour perception, whose results were quite similar to those of Ervin (1961).

Several years later, Kay and Kempton (1984) conducted a colour experiment on English speakers and Tarahumara speakers in northern Mexico, which has one word covering *green* and *blue*. They found differences in perceiving those colours between speakers of the two languages and supported the Sapir-Whorf Hypothesis. That is, presented three colours *green*, *blueish green* and *blue*, English speakers tend to consider that *blueish green* and *blue* were more distinguished, which were actually closer in discrimination distance than *green* and *blueish green*. The green-blue lexical distinction in English enhanced their cognitive distinction in the case of English speakers, but not Tarahumara speakers.

As shown above, there were comparatively many studies conducted regarding colour; some used a colour recognition task and some used a task of identifying colour foci and boundaries. As for the domain of colour, therefore, the investigation of the linguistic relativity hypothesis saw a considerable development of methodologies and research during the 50s to the 80s.

Apart from colour recognition research, another well-known experiment on the Sapir-Whorf Hypothesis is by Bloom (1981) over counterfactual expressions, which is expressed with the past subjunctive. They express hypothetical conditional meanings such as, "*If she were here, she would speak on my behalf*" (Quirk et al. 1985, p. 1013), which implies "Because she is not here now, she cannot speak on my behalf."

Bloom (1981) examined effects of counterfactual expressions on behaviours among Mandarin Chinese speakers and English speakers. He first noticed behavioural differences between speakers of the two languages in answering questionnaires on political situations. Some questions included counterfactual descriptions. Asked, "If the Hong Kong government were to pass a law …, how would you react?", surprisingly Chinese subjects often responded, "But the government hasn't," or "It won't." Thus he compared grammatical features of Chinese and English and found out that the Chinese language produces more ambiguity in differentiating factual events and counterfactual events than English. Then he conducted some counterfactual reasoning experiments on Chinese speakers and English speakers using controlled stories. The results of his experiments showed Chinese speakers had more difficulty in interpreting counterfactual premises than English speakers.

This study later provoked controversy (Au 1983, 1984; Bloom 1984) because it appeared to lack complete fairness in treating participants and reading materials across the two languages. Au (1983) pointed out the unidiomatic and unnatural expressions in Chinese stories used by Bloom (1981), hence made the results questionable. He used a revised version of Bloom's stories with more idiomatic expressions and found that both Chinese speaking participants and English speaking participants interpreted the counterfactual events equally well. Liu (1985) asserted the

different responses between English speakers and Chinese speakers were produced not by linguistic different forms, but by the familiarity/unfamiliarity with the stimulus stories together with cognitive developmental stages along with age. Takano (1989) also categorically denied linguistic causal effect and argued the difference in Bloom's experiment came from the difference in the amount of mathematical training among participants. His experiment, however, included only a story requiring mathematical probability reasoning. Therefore, the results seem to be fundamentally biased. Though this issue still remains controversial, a series of studies on counterfactual interpretation differences between Chinese speakers and English speakers undertaken first by Bloom (1981) surely contributed to establish a base for further research and played an important role to recall attentions to the relationship between language and thought.

The studies described above all involve English speakers, but there are some empirical studies originated in Europe by comparing speakers of European languages. Stromnes (1974a) compared Finnish, a Ural-Altaic language, to Swedish, an Indo-European language, and pointed out that nouns in Finnish carry some of the verbness of Swedish verbs, and verbs in Finnish carry some of the nounness of Swedish nouns. He studied newspaper headlines in both languages and observed that Finnish headlines contained significantly fewer verbs than Swedish headlines. This verb-oriented characteristic appeared in the verbless-sentence judgment task, too. Finnish speakers considered verbless sentences more complete and better than subjectless sentences, while Swedish speakers showed opposite tendencies. Stromnes further observed that Finnish noun cases are characteristic and different from Swedish in that they convey information as to two-dimensional space and time dimension; for example, *talo-ssa* 'house-staying in', *talo-sta* 'house-from', and *talo-lla* 'house-being

attached to'. On the other hand, Swedish has prepositions, which convey information as to three-dimensional movement such as; *upp* 'up', *ner* 'down', and *ur* 'up and out of'. Thus, analysing reports of ice-hockey matches, he found that Finnish speaking reporters tended to talk more about static and perceptual situations, and Swedish reporters tended to concentrate more on movements of players. From these studies, he concluded that the cognitive base of natural language is not completely universal due to different natures in verbs and nouns of languages, and supported the Sapir-Whorf Hypothesis.

Furthermore, as Finnish is an agglutinative language and has 15 noun case endings, and Swedish is an inflectional language and has prepositions, Stromnes (1974b) predicted Finnish speakers and Swedish speakers would respond differently in an association task. He prepared a film to depict two objects moving in 12 different ways corresponding to the 12 fairly frequently used case endings, and also invented artificial associative codes. As he predicted, Finnish speakers responded more correctly than Swedish speakers in the paring recognition task. Then he prepared another film to depict two objects in 21 movements corresponding to the Swedish prepositions. In this paring recognition task, the Swedish speakers and Finnish-Swedish bilinguals behaved significantly differently from Lappish-Finnish speakers who had never learned Swedish. Thus he reported Swedish and Finnish speakers would recognise relations of objects in different ways, which also support the relationship between language and a certain aspect of cognition.

This study over the structural differences between Swedish and Finnish developed into the study on the relation between language difference and occupational accident rate in Finland in Johansson and Salminen (1999). They found the occupational accidents rate among Swedish speaking workers was significantly lower than that of

Finnish speaking workers. And they claim the difference comes from the language differences; Swedish shows a greater concern in movements and time, while Finnish pays more attention to static relations. Though further investigation in this area is necessary, these studies propose a new possible research area, accident rates across workplaces with different languages, from a language and cognition perspective.

1.1.4 *Developmental decade of the Sapir-Whorf Hypothesis: Studies in the 1990s and in the early 2000s*

The 1990s saw a remarkable development in empirical research over the Sapir-Whorf Hypothesis. This is mainly due to the development of experimental techniques. In the preceding few decades, most of the cross-linguistic studies were conducted in rather limited domains. That is, studies were mainly of the relation of different colour names and their perception/recognition (Brown & Lenneberg 1954; Caskey-Sirmons & Hikerson 1977; Ervin 1961; Heider 1972; Kay & Kempton 1984), of specific grammatical characteristics and their recognition (Brown 1957; Carroll & Casagrande 1958; Stromnes 1974a, 1974b), and also of counterfactual expressions and their understanding (Au 1983, 1984; Bloom 1981, 1984; Liu 1985; Takano 1989). In the 1990s, a number of ingenious experiments were designed and non-linguistic domains of research extended into spatial cognition (Levinson 1997), and object categorisation (Lucy 1992). They made a considerable contribution to cognitive science and consequently to the development of the Sapir-Whorf Hypothesis research by turning the tables of the dispute. These empirical studies were made possible through thorough investigation of the target languages and cultures such as Yucatec and Guugu-Yimithirr speakers.

Lucy (1992) suggests a structure-centred approach, which starts with an analysis and then comparison of language structures and their semantics. Thus he made a detailed analysis of the Yucatec language (a Mayan language spoken in the Yucatan Peninsula) and compared it to English, observing differences in grammatical number marking patterns between the two languages. English speakers obligatory pluralise a large number of discrete countable nouns referring to multiple referents whether they are animate or inanimate, while Yucatec speakers only optionally pluralise a comparatively small number of animate nouns even referring to more than one discrete referent through the use of classifiers. Neither of them pluralise substances, which are not animate nor discrete objects. Therefore, a contrastive clear difference occurs when referring to inanimate objects: English speakers obligatory mark plural and Yucatec speakers do not as shown in Table 1 below.

Lucy predicted that, if these grammatical number marking patterns are reflected in their cognitive aspects, Yucatec speakers would not pay attention to the number of inanimate objects in the same way as English speakers would do. He prepared sets of pictures describing various scenes of everyday Yucatec village life such as a cooking area of a house, food preparation in a garden, animals and typical features of a yard, and so on. Each set consisted of an original drawing and five alternate drawings, which were different from the original one in terms of either the number of animate entities, the number of inanimate objects, or the amount of substance. The

	+animate, +discrete	-animate, +discrete	-animate, -discrete
English	+plural	+plural	-plural
Yucatec	+/-plural	-plural	-plural

Table 1. Number marking patterns in English and Yucatec based on Lucy (1992)

participants were asked which of the five alternate pictures was the most similar to the original. The results showed that English speakers were, as predicted, sensitive to the number of animate entities and inanimate objects, but not to the amount of substance. By contrast, Yucatec speakers were sensitive only to the number of animate entities, and not to the number of inanimate objects or to the amount of substance. That is, they showed significant cognitive differences where the grammatical number marking patterns are in maximal contrast.

Furthermore, Lucy (1992) pointed out a contrastive difference between English and Yucatec in marking plurals on individualised objects. English makes a clear distinction between count nouns and mass nouns: count nouns take obligatory number marking and require a numeral placed immediately before a noun phrase such as *three apples* when quantified. Mass nouns cannot take such a number marking system but require quantifiers combined with numerals, such as *three glasses of water* instead of **three waters*.[3] Yucatec, on the other hand, treats all common nouns as mass-like nouns: they use numeral classifiers to quantify objects, and the classifiers also convey further information about the shape and form of the objects such as *un-tz'íit kib* 'one-long-thin-wax' and *ká'a-tz'íit kib* 'two-long-thin-wax'. A numeral cannot appear without an accompanying classifier and they cannot just put numerals immediately before the noun phrase like **three apple* in Yucatec. These different types of number marking patterns could generate some different cognitive patterns in classification of objects.

[3] *Water* surely can be pluralised depending on the situations such as *We ordered three waters* and *A suspicious boat entered Japanese waters*. Furthermore, some count nouns can be treated as mass nouns too, such as, *The sauce contains onion* and *This desk takes a lot of room*. That is, count/mass distinction in English is not always mutually exclusive.

Because pluralisation postulates individualisation, speakers of pluralising languages such as English need to pay more attention to the way objects are individualised. Or to put it another way, they pay more attention to the contour of an object which dissects itself from the other entities. For example, they need to recognise 'a candle' rather than 'wax', hence they would pay more attention to shape. Thus Lucy (1992) predicted English speakers would tend to categorise objects based on shape, while Yucatec speakers would tend to categorise objects based on material of the objects. Then he carefully designed an experiment using triads which consisted of a pivot object and two alternate objects, one with the same shape as the pivot object and one of the same material as the pivot; for example, a small cardboard box, a small plastic box of roughly the same size and shape, and a small piece of cardboard about the size of a matchbook. The participants, both English and Yucatec speakers, were shown the pivot object and then asked to choose one of the alternatives which was more like the original pivot object. As predicted the results revealed that Yucatec speakers chose material alternates significantly more often than shape alternates, and the English speakers showed the opposite tendency. The responses reflected exactly the different number marking patterns described above between English and Yucatec, and provided evidence to strongly support language effect on cognition. These results were all derived from careful analysis and comparison of the languages.

Following Lucy, Imai and Gentner (1997) conducted similar experiments using triads on English speaking Americans and Japanese speakers at different age groups from infants to adults in order to see cognitive development and language influence. They observed differences in noun forms between English, Yucatec and Japanese as Figure 1 shows. Japanese and Yucatec similarly pluralise humans and some

animals only optionally, while English pluralise most of the animate and inanimate discrete objects obligatorily.

Imai and Gentner prepared three types of the standards, or pivot objects, and presented them to the participants with nonsense word names. The three types were complex objects (e.g., a wood whisk), simple objects (e.g., a pyramid) and substance (e.g., sand in an S-shape). Most of the participants of both Japanese and Americans chose the alternative based on shape for the complex objects which apparently had some functions. However, the two language groups responded significantly differently in the simple object trials and the substance trials. American participants from two-year-olds to adults treated simple objects like complex objects. In contrast, Japanese participants treated them intermediate between the complex objects and the substance, not showing

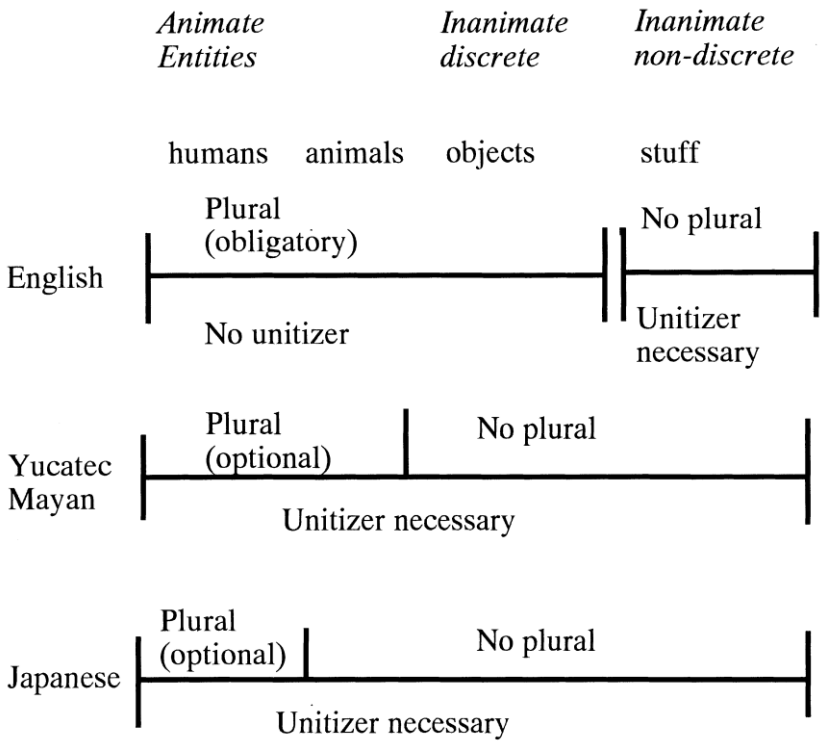


Figure 1. Division of the pre-individuation continuum in English, Yucatec Mayan and Japanese (Imai & Gentner 1997, p. 173)

a clear preference pattern. In the substance trials, Japanese participants except for the two-year-old group consistently showed strong material-based matching patterns, while none of the American groups showed such distinct material preference patterns.

Thus Imai and Gentner (1997) found that children universally preferred shape-based categorisation around the age of two when they are at the very beginning stage of learning first words. After that their categorisation should reflect some aspects of language. That is, the paralleled matching between the noun forms and the categorisation patterns should appear as they acquire different languages. Their research concludes that there is a certain universal ontological constraint working at the pre-linguistic stage, but there would be effects of language by constantly being exposed to some specific forms peculiar to the language that one acquires.

Another developed research area concerns space. Based on the detailed analysis of the language by Haviland (1993), Levinson (1997) explored how speakers of Guugu Yimithirr (an Australian aboriginal language near Queensland) would develop their spatial cognition by using 'absolute' spatial direction such as *north* and *south*, in contrast to 'relative' and 'egocentric' spatial directions such as *left/right/front/back* commonly used by speakers of English and other various languages. For example, Guugu Yimithirr speakers would say *George is standing north of the tree* instead of *George is standing in front of the tree*, or they would say *Go north* instead of *Take the next left turn*.

To explore language effects of their absolute direction terms on their spatial cognition, Levinson (1997) conducted several empirical experiments, which were developed by the Cognitive Anthropology Research Group at the Max Planck Institute in Nijmegen, Netherlands. For example, after travelling from a few kilometres up to 350

kilometres, Guugu Yimithirr participants were asked to point to some locations with deteriorated visibility. The average error was 13.9˚, while Dutch amateur mycologists showed only “the estimation a little better than random” (Levinson 1997; n. 20) in a similar experiment, after walking around in semifamiliar woods in the Netherland.

Levinson (2003) conducted another ingenious experiment using a memory recall task. Supposing the participants were facing north, they were first shown a line of figures of a toy man, a pig and a cow from left to right, that is, from west to east, on the desk. Then being led to another desk rotated 180˚ where they were facing south, they were asked to reconstruct the line of figures. Guugu Yimithirr speakers reconstructed the line of objects keeping the absolute orientation significantly more often than Dutch speakers; that is, Guugu Ymithirr speakers more frequently favoured using absolute direction systems and put the figures of a toy man, a pig and a cow from west to east whether they were facing north or south. These results showed Guugu Yimithirr speakers had significantly more sensitive senses of absolute directions than Dutch speakers, and presumably than speakers of languages with relative direction systems. The responses were exactly parallel to the directional expressions of the languages.

As for the absolute vs. relative orientation experiment, Li and Gleitman (2002) showed counter examples that English speakers did depend on absolute direction making full use of landmark cues, when situated in outdoor contexts rather than in rooms with a laboratory atmosphere. It is quite natural and usual that English speakers depend on absolute direction on a map saying, for example, *Thailand is west of China* and *The railroad station is on the north side of the river*, but they would never say *She was sitting south of me in the theatre* instead of *She was sitting to my right in the theatre*. Also English speakers would never be able to talk about a ship turned over precisely

from which direction to which, by referring to north, south, east and west. A Guugu Yimithirr speaker would do even many years after the event, at the same time using hand gestures accurately pointing the absolute directions, as Haviland (1993) reports. Therefore, such abilities of Guugu Yimithirr speakers and their cognitive patterns cannot be overlooked, even though Li and Gleitman (2002) reported English speakers' use of absolute directions in certain context.

Levinson also conducted a series of experiments on speakers of Tzeltal, a Mayan language in Mexico, from 1990 to 1995. In describing locations according to Levinson (2003), the Tzeltal language has basically two absolute reference terms *uphill* roughly meaning south and *downhill* roughly meaning north, which were presumably epistemologically came from the terrain the tribe were settled in. Because of these absolute reference systems, they can point to locations just like Guugu Yimithirr speakers, though with somewhat less accuracy. Furthermore, even though Tzeltal has terms for right and left referring to body parts, they do not habitually use them to indicate locations or direction. What was revealed by using a mirror-image fill-in task was a systematic downgrading of left/right asymmetries in their conception, so that Tzeltal speakers often conflated right and left. This provides additional support for language effects on cognition in the domain of space.

Boroditsky (2001) challenged a rather implicit area of language. She designed an experiment which would reflect the vertically-oriented temporal expression and the horizontally-oriented temporal expression in an ingenious way. This experiment was invented based on the fact that English typically uses a horizontally-oriented spatial metaphor for temporal relation such as *the day before yesterday/the day after tomorrow*, in which the spatial prepositions *before/after* is used to express the temporal relations.

On the other hand, Chinese uses a vertically oriented spatial metaphor to express time flow such as *xiá ge yue* 'down month' meaning *next month*, and *sháng ge yue* 'up month' meaning *last month*. In fact English also uses other ways to express temporal relations such as *early/late*, or even use vertically-oriented metaphors as in, *Traditions were handed down to the next generation*. The contrastive difference is, however, seen in the Chinese expressions above. Thus Boroditsky prepared two different sets of stimuli. One set was composed of a picture showing a horizontal motion followed by the target sentence, for example, *December comes after November*. Another set of stimuli was composed of a picture showing a vertical motion followed by the target sentence, for example, *August comes earlier than October*. So the combinations of stimuli are horizontal-spatial in the former set, and vertical-temporal in the latter set. Participants were asked if the target sentence was true or false. Boroditsky (2001) predicted that English speakers would understand the target sentence in the horizontal-spatial conditioning faster than Chinese speakers, and Chinese speakers would understand the target sentence in the vertical-temporal conditioning faster than English speakers. These predictions were confirmed. The vertical motion depicted in the priming picture facilitated the response of the Chinese participants, but not the English speaking participants. It is surprising that this kind of metaphoric language use gives some effects to certain cognitive domains.

Yet another interesting and clear experiment was conducted between English and Indonesian speakers by Boroditsky et al. (2002). They predicted different tense systems would generate crosslinguistic differences in similarity judgments and memory of an everyday event such as kicking a ball. Unlike English, Indonesian verbs do not mark tense in verbs, so that Indonesian speakers are not required to indicate whether the

event or action took place in the past, is taking place at present or will take place in the future. They can optionally use temporal markers such as *just now* or *soon*, but the tense of action is not marked, rather is inferred from context in most of the cases of communication. In the experiment, English monolinguals and Indonesian monolinguals were required to look at pairs of pictures and to rate how similar they were: for example, two pictures of the same person doing the same action in different tense, and two pictures of different persons doing the same action in the same tense. The results showed significant differences between the two groups. Indonesian monolinguals would consider the same actor in different tenses as more similar, and the different actors in the same tense as more different than English monolinguals. Also they showed significantly different responses in the memory task. Thus it was found that the different tense systems between the two languages affect the way they look at pictures in significantly different ways. Additionally more intriguing findings from their experiments were that the Indonesian-English bilinguals showed significant differences when tested in Indonesian from when tested in English when the same picture materials being used. The results support language effect on their sensitivity to tense; the bilinguals have shifted their sensitivity after they acquired certain proficiency in English.

In the domain of colour, follow-up research was conducted after Heider [Rosch] (1972) refuted the Sapir-Whorf Hypothesis, concluding that perception of focal colours is universal despite different lexical categories across languages. Roberson et al. (2000) investigated colour perception among Berinmo speakers in Papua New Guinea and English speakers and found their perception mirrored lexical colour categories in the two languages. English has colour terms *yellow*, *green* and *blue*, for which Brinmo

has generally two terms *wor* and *nol*. The lexical colour boundaries of the tow languages were reflected in their behaviours in a matching task, a similarity judgment task, and a learning/recognition task, and they concluded cognitive categories for colour appeared to be tied to the linguistic terms and supported linguistic relativity. A recent research by Agrillo and Roberson (2008) reconfirmed the relationship between codability and colour recognition examined by Brown and Lenneberg (1954). They showed there was a relation between communication accuracy and focal colours, and effectiveness of communication and focal colours, and questioned the results of Heider (1972) over inherent perceptual and memorable prominence of focal colours.

The studies described above may well provide enough evidence to show that language does give some effects on some parts of the cognition of human beings. It can be said that during the previous few decades studies relating to the Sapir-Whorf Hypothesis were trying to find positive relations between language, thought and culture per se. Into the 1990s, research started to specify which domain of human cognition what language is predicted to give what kind of effects in what way, while acknowledging underlying human cognitive universals.

Additionally, to review the related literature from 1950s to 1990s and early 2000s, the early studies on the Sapir-Whorf Hypothesis were mostly conducted between English, which is the most well-used language in the western academia, and indigenous languages such as Hopi, Navaho, Zuni in America, Dani in New Guinea, Yucatec in the Yucatan Peninsula, and Guugu Yimithirr in an aboriginal area near Queensland, Australia, which have a rather small population, and are not known to many people, though Chinese speakers were used in Bloom (1981). Therefore the background social, educational and geographical differences might have been big and may have caused the

differences in cognition (Carroll & Casagrande 1958) and may well be criticised easily because of unreliable experimental conditions for comparison (Mazuka & Friedman 2000; Li & Gleitman 2002). However, the studies started to include more populated languages in this century such as Chinese (Boroditsky 2001), Indonesian (Boroditsky et al. 2002) and Japanese (Imai & Gentner 1997), so that researchers do not have to go to remote places and start their research with analysing the indigenous language there from scratch. This situation was very fortuitous for the ideas of 'multi-competence' to flourish, which emerged in 1991, because multi-competence research, in a sense, could start based on already established studies on language and cognition.

1.1.5 *More evidence for the Sapir-Whorf Hypothesis*

Before going to the next section on 'multi-competence', we will see some more evidence for the Sapir-Whorf Hypothesis found in other research areas besides number, space, tense, and colour introduced above. Some studies were conducted on the relation between grammatical gender and the speakers' conceptual gender classifications. Grammatical gender is different from biological gender in the natural world and nouns are classified as masculine or feminine without regard to biological gender in some languages such as Spanish and French, but not in English. Boroditsky et al. (2003) report Spanish and German speakers tend to remember object-proper name pairs better when the grammatical gender and the gender of the proper names were consistent than when the two genders are not consistent. For example, Spanish speakers remembered the pairs better when an apple was called Patricia than Patrick, as the word for *apple* is feminine in Spanish. Also Spanish and German speakers tended to think of adjectives to describe objects according to their grammatical gender. For example, as

the word for *key* is feminine in Spanish and masculine in German, Spanish speakers thought of adjectives *golden, intricate, little, lovely, shiny* and *tiny* for the word, while German speakers thought of adjectives *hard, heavy, jagged, serrated,* and *useful*. The former group of adjectives were rated more feminine and the latter group of adjectives were more masculine by English speakers. These studies show how grammatical gender affects the way they look at objects around them.

In the study by Forbes et al. (2008), furthermore, the participants were French-English, English-French, Spanish-English, English-Spanish bilinguals and English monolinguals. They were asked to decide whether they would give a man's voice or a woman's voice to the pictured objects if they were the characters in a film. The results showed there was an effect of French grammatical gender on natural gender perception. In the case of Spanish gender, because its grammatical gender classification was found to be similar to that of natural gender classification, effect of the Spanish gender was not clearly observed. Thus the French-English bilinguals were the most likely to attribute a man's voice or a woman's voice according to French grammatical gender. These results clearly showed language effects on cognition.

Different cognitive activities between English and Spanish speakers are found in two studies. Gennari et al. (2002) first observed that English speakers tended to use more manner-verbs (e.g., *walk, run, stride, creep*, etc.) using obligatorily prepositional phrases (e.g., *in*/*out, up*/*down*, etc.) to indicate path in describing actions, while Spanish speakers tended to use more path-verbs (e.g. *entrar* 'enter', *salir* 'exit', *subir* 'ascend', etc.) using optional adverbial phrases to express manner (e.g., *entra cominando* '(he) enters walking') in describing the same actions. They found the preferred linguistic expressions among Spanish speakers gave effects on their similarity judgments, and

reported that Spanish speakers were more likely to select same-path alternates than same-manner alternates as similar to the targets under the encoding condition. As the difference was not found between the two language groups in the non-encoding condition, they concluded that language did serve as a tool of directing their attention to the specific aspect where the language expressed. Thus the findings also support the Sapir-Whorf Hypothesis.

Another study on cognitive differences between English and Spanish speakers is found in Fausey and Boroditsky (2008). Their study found that English speakers preferred to use more agentive expressions such as *She broke the vase* in describing accidental events than Spanish speakers, who were more likely to describe the same event as *The vase broke* using non-agentive expressions. In the recognition task, English and Spanish speakers did not show a significant difference in memorising intentional events but they did in memorising accidental events. That is, the preferred linguistic descriptions of Spanish speakers, which did not clearly show the agents, seemed to shift attention away from the agents of causal events. This study did not deal with specific obligatory grammatical features of language such as number (Lucy 1992; Imai & Gentner 1997), tense (Boroditsky et al. 2002), and gender (Boroditsky et al. 2003; Forbes et al. 2008), or specific cognitive domains such as colour (e.g., Agrillo & Roberson 2008; Brown & Lenneberg 1954; Heider 1972; Roberson et al. 2000) and space (Levinson 1997, 2003), but rather dealt with habitual and preferred expressions. Thus it opens a lot of possibilities for research on language and cognition at the pragmatic level.

Maass and Russo (2003) report how directionality of written language affects their mental representation of spatial events. Arabs read and write from right to left,

while speakers of English and many other languages read and write from left to right. In the experiments, Arabs tended to draw the subject of a sentence on the right, and Italians tended to draw it on the left. Also it was found that each language group was facilitated by their own writing direction in a sentence-picture matching task.

In a further developed study on how people look at motions, Maass et al. (2007) investigated how Italian and Arab speakers perceived the same performances (e.g., a football player kicking a ball) which drew opposite trajectories. Italian speakers perceived left-to-right performances were stronger, faster and more beautiful than right-to-left performances, and Arabic speakers showed the opposite tendency. The researchers attributed the different responses to opposite directions in reading and writing habits in their native languages. The studies not only give support to the Sapir-Whorf Hypothesis,[4] but the researchers also give an enlightening warning against underestimating differences between speakers of different languages, saying the vast majority of psychological research is carried out in culturally homogeneous contexts disregarding cultural variability.

We have seen ample evidence of the relationship between language and cognition, which shows that language works as attention-directing mechanism in the cognitive processing. Keeping in mind, however, that 'multi-competence' did not appear from those studies on linguistic relativity, we turn to the question "What is multi-competence?"

[4] Some may argue the direction of written language is rather part of cultural habits, and the authors of the article also say it is 'cultural influence', but I would like to consider it as language effect because learning how to write a language is part of acquiring the language.

1. 2 'Multi-Competence'

1.2.1 *Emergence of 'multi-competence'*

The aim of this study is to explore 'multi-competence' of Japanese learners of English. The ideas of 'multi-competence' were introduced and developed by Cook (1991, 1999, 2002, 2003, 2008). He originally defined multi-competence of L2 learners as "the compound state of a mind with two grammars" (Cook 1991, p. 112) and later redefined it as "knowledge of two languages in one mind" (Cook 2008a, p. 17). He asserts an L2 learner's mind is not the same in nature as the mind of a person who knows only one language due to the consequence of learning an L2.

This section first introduces fundamental concepts of the notion of multi-competence, and what kind of new perspectives concepts of multi-competence provide in SLA research, while showing some evidence of multi-competence.

1.2.2 *The term multi-competence: Definition*

The multi-competence idea was first introduced by Vivian Cook (1991) to address linguistic knowledge of an ordinary person with "the compound state of a mind with two languages" (p. 112) in the so-called poverty-of-the-stimulus argument of language acquisition. In this article he argues that the normal human environment includes input in more than one language, and that monolinguals are rather suffering from a form of language deprivation if they are exposed to only one language though they have capacity to learn more than one. Therefore, multi-competence was not developed through studies of the relation between thought and language, rather it emerged from the framework of Universal Grammar. Cook (1991) argues it is not

appropriate that linguistics tries to describe how monolinguals acquire a language, but rather the poverty-of-the-stimulus argument should deal with how the mind of humans manages to acquire more than one grammar.

Considering the common facts that there are 6000-7000 languages in the world (Crystal 2000/2004), that "*Ethnologue*" listed 6.912 known living languages (Gordon 2005), and that there are only 193 countries (MOFA 2009), it is estimated that more than 30 languages are used in a country on average (Machida 2008). The global situation also suggests that the majority of people in the world are multilingual users. In fact, it is quite difficult to find monolingual speakers of a language (Cook 2003). As for English alone, there are more L2 English users than L1 English users (Kachru 2009). Kachru (1992) classifies the English using regions into three concentric circles drawing on their sociolinguistic profiles; the "Inner Circle", the "Outer Circle" and the "Expanding Circle" (p. 356). English users in the world are estimated from 1 billion to 2 billion. If we take the lower number, about 18% people of the whole world's population use English, and if we take the higher number, about 36% use English for some purpose (Kachru 2009). The difference is big but the point is that the population of the Outer and the Expanding circles put together surely outnumbers that in the Inner Circle.

The number of L2 English users is still increasing. For example, Japan, often cited as the most monolingual country, belongs to the Expanding Circle, and officially started to teach English to children at the age of 10 in 2011, which means Japanese children officially start to learn English two years earlier than before (MEXT 2009).

Thus Japan will produce more L2 English users[5] in the near future, though the proficiency level probably will be quite limited.

When looking at multilingual situations in various countries further with a demographic view, for example, India has English and Hindi as its national or official languages but has 428 living languages listed with a population of approximately one billion (Gordon 2005). Among them, an estimated 333 million people are English users (Kachru 2009). The United States, where naturally indigenous and immigrant languages are expected to be used, has 238 languages listed with a population of 290 million (Gordon 2005). If we look at West Africa, there are 420 languages spoken among the population of 97 million in Nigeria, and there are 253 languages spoken among 9.6 million people in Cameroon. Their official languages are French and English in both countries (Omoniyi 2009). With these patterns from around the globe, we can see how people are situated in bi- or multi-lingual contexts.

Thus multi-competence emerged "out of fairly technical questions within Universal Grammar theory" (Cook 1992, p. 558), reflecting the global reality where multilingual users are the norm, and they are continuously increasing in number. Cook (1999) further developed the notions of multi-competence to describe the uniqueness of L2 users. These are the main concern of this thesis. Cook asserts the L2 user's mind is not the same in nature as the mind of a person who knows only one language as a consequence of learning more than one language.

[5] Whether Japanese children at the age of 10-12 can be called 'English users' may be a controversial issue. But from a multi-competence view, which prefers to use the term 'L2 user' to 'L2 learner' (Cook 2002a), they are also L2 English users.

When discussing the nature of multi-competence, it needs to be compared to 'interlanguage'. Cook (2003) introduced the term multi-competence because interlanguage does not appropriately capture the state of the learner's language. Interlanguage was coined by Selinker (1972) to indicate "a separate linguistic system based on the observable output which results from a learner's attempted production of a TL (target language) norm" (p. 117). So it is an L2 learner's language system, which is neither the L1 nor the L2, but makes a perfectly logical system to the learner at any particular moment in his/her learning sequence. Viewing the learner's language as an independent system brought SLA research into a new era and interlanguage has been the standard term for the L2 user's language since it appeared in the field of SLA (Ellis 1994). We need now to compare those notions to see the differences. Figure 2 shows a basic framework of interlanguage and Figure 3 shows that of multi-competence.

Interlanguage is an interim language, and it refers to the processes of learners' language development by repeated hypothesis testing and amendments. It is systematic because learners draw on the rules they have internalised using the knowledge of both

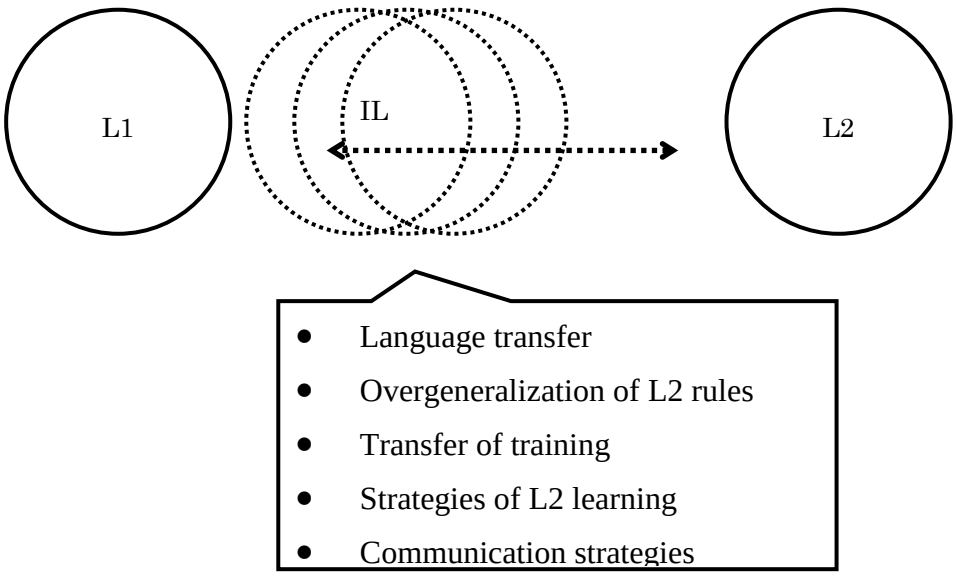


Figure 2. The interlanguage framework base on Selinker (1972)

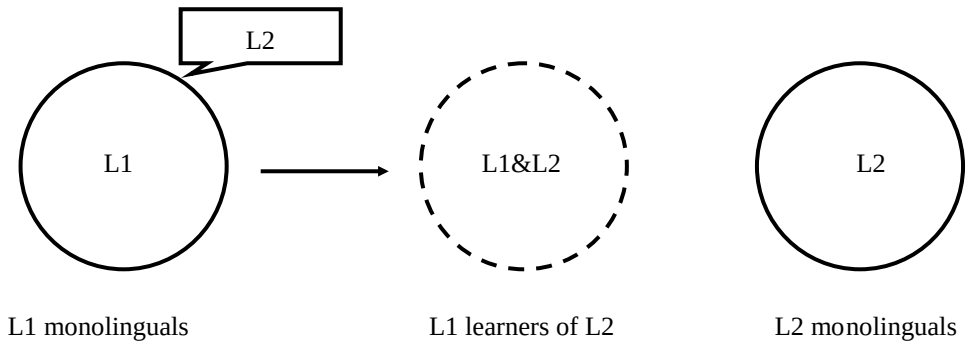


Figure 3. The multi-competence framework based on the formulations in Cook (2003)

their L1 and L2. Interlanguage is independent in the sense that it is distinct from either the learner's L1 or L2 and that the notion observes the active role of the L2 learners. Interlanguage is created through five basic learning processes: language transfer, overgeneralisation of L2 rules, transfer of training, strategies of L2 learning, and communication strategies (Selinker 1972). Thus it is not stable, but consists of systematic and independent grammars of L2 learners on their way to the target language. It should be understood as a system in its own right. Figure 2 shows the relationship among L1, interlanguage and L2. The relationship shows that interlanguage is independent from both L1 and L2, but it is an interim language on its way to full target language competence. Thus, the layered dotted circles indicate plasticity of interlanguage, which may change and develop at any time being affected by five principal cognitive processes shown in the box.

On the other hand, multi-competence shows a different configuration as Figure 3 shows. It claims that as a consequence of learning L2 put into the mind of an L1 user, it becomes a compound state of L1 and L2 in the same mind, which is different from those of L1 and L2. The dotted line indicates the relationship of L1 and L2 can be

dynamic at times and at levels of language. L2 learners' interlanguage and multi-competence might be considered to have similar concepts, in that they are independent from L1 and L2 and in that they are both dynamic, not stable.

However there are three distinctive aspects of multi-competence which make it completely different from interlanguage. One is that interlanguage is still compared to the monolingual native speakers and hence it is viewed as "incorrect" (British Council, online, n.d.) and "deficient by definition" (Kasper & Kellerman, 1997, p. 5). Therefore, it should be aimed at reaching closer to the target language. On the other hand, multi-competence does not hold such negative views over the L2 users. Second is that multi-competence includes both L1 and interlanguage in one individual person. Although interlanguage is treated as an independent learner language and can be considered to be even a new variety of English, it reflects only the learner's current L2 knowledge. The third distinctive aspect is that multi-competence refers to 'the state of mind', which includes cognitive aspects of the speaker, while interlanguage does not. These aspects of multi-competence provide us with new theoretical perspectives on the L2 users and their knowledge of languages and cognition. The three distinctive aspects are described in more detail in the following sections 1.2.4 *The L2 users' right,* 1.2.5 *The L2 users' knowledge of their L1*, and 1.2.6 *The L2 users' mind* respectively.

1.2.3 *The L2 user as a unique individual*

Described in the previous section, multi-competence refers to the knowledge of an L2 user who knows more than one language, and the notions were developed within Universal Grammar theory reflecting the present global situation of multilingual society. Knowing two languages should not be considered in a negative way as having

imperfect knowledge of an L2, which is deficient and deviated from the native speaker norm. Rather it should be viewed as having knowledge of his/her L1 and, in addition to that, having knowledge of his/her L2, which is actually much more than knowing only L1.

L2 users are, therefore, different from monolinguals because they can use more than one language, even if their knowledge of the L2 is limited. Because having two languages in their mind, they can perform specific activities by using them, which monolinguals cannot (Cook 2003). L2 users are by any means bilinguals, if they can manage to use their L2 in any meaningful way to communicate in their real life however limited it may be, once they get out of the language class, because equally fluent balanced bilinguals are not realistic (Grosjean 1989). Though they are far from a native-like proficiency level in most of the cases in L2 learning, they may use their L2 for many different purposes: for instance, when travelling, when getting general information such as world news, any specialised information for pursing his/her career, or information just for personal interests, and when studying the language for the sake of learning it. In more professional contexts, some L2 users can have a career as a language teacher, an interpreter or a translator, which substantially requires high proficiency of the two languages.

Also L2 users often code-switch from one language to another, which is a common behaviour seen in bilingual settings. Code-switching can be operated on physiological and sociological criteria such as age, sex, race, religion, and other situations (Fishman 2007). For example, a government official in Brussels may use French in his office, Dutch when drinking at his club, and a local variant of Flemish at home. However, code-switching may also occur according to the participants, the

physical settings, the topics, functions of discourse, and the style employed in the situation. Therefore, the government official mentioned above may use Flemish when bumping into his childhood friend co-worker in his office, but tend to switch into French when they talk about their work affairs or when somebody else joins their conversation who is not familiar with Flemish (Fishman 2007).

Code-switching may occur even more frequently in one sentence: for example, one Japanese student may talk to another, when both of them know English and know that the other person also knows both languages, 'Reading *sureba suruhodo*, confuse *suru yo*,' meaning, 'The more reading I have, the more confused I get' (Cook 2003, p. 5). Code-switching, however, is not a sign of confusion but it is one aspect of skilful L2 use (Cook 2003). This is quite natural because the two languages are almost always activated in the mind (Grosjean 1989). Certainly these are the activities which monolingual people can never do.

More specifically the uniqueness of the multi-competence concepts can be found in the three points below:

1) L2 learners should not be judged against the native speaker norms of the target language, but they should be judged as unique individuals having rich minds with the knowledge of their L1 as a native speaker and the additional knowledge of their L2;
2) L2 learners' knowledge of their L1 is not the same as that of monolingual L1 speakers because their L2 has affected their L1 at some level of the language;
3) as a consequence of the L2 effects on the L1, L2 learners think or perceive things differently from monolingual L1 speakers.

In the following sections, these three points are described in detail separately.

1.2.4 *Uniqueness of 'multi-competence' 1: The L2 users' rights*

For L2 learners at various stages of learning, complete competence of the target language is "an ideal goal to keep in mind" (Stern 1983, p. 341) and "(t)he native speaker's 'competence', 'proficiency', or 'knowledge of the language' is a necessary point of reference for the second language proficiency" (Ibid. p. 341). Nevertheless we have seen, or experienced, how difficult it is for adult L2 learners to reach a near-native level of proficiency in the target language. Teachers often seem to say that "80% of the L2 learners of English in the world are, at any given time, beginners" (Cook 1997, p. 281) and those who would successfully advance as far as to be indistinguishable from native speakers are only about 5% of all learners (Selinker 1972).

As already briefly mentioned in the framework of multi-competence, however, those negative views are rejected. Multi-competence views do not consider L2 learners as lacking complete L2 knowledge or speaking a deficient and deviated form of the L2. Rather, multi-competence sheds light on the positive side of L2 learners, acknowledging that they have extra knowledge of the L2 in addition to their L1. An L2 learner, from this perspective, is not someone who is learning or has learned another language besides his/her first language and has failed to become a native speaker of the language. Instead an L2 learner is someone who knows more than one language and makes a unique individual. Multi-competence is a term to cover, therefore, both the L1 and the L2 interlanguage in a learner's mind. This is because interlanguage is an interim language on its way to the target language and always has a monolingual L1 norm.

Grosjean (1989) proposes a similar view to multi-competence. He states “the bilingual is NOT the sum of two complete or incomplete monolinguals” (p. 6) and argues that bilinguals should not be evaluated in terms of fluency and balance of the two languages judged against the monolingual norms because real and equally fluent balanced bilinguals are not realistic. He gives a warning against such a monolingual view, which expects well-balanced bilinguals to speak the two languages well. He instead claims a bilingual holds a unique and specific linguistic configuration. From this kind of perspective, we can see that the L2 learner has more than one language in the mind, so it is different from either the mind of the L1 monolingual or that of the L2 monolingual. Because of this uniqueness, it is argued that L2 learners should not be judged by the native speaker norm but should be treated in their own right. It’s important to see that they have acquired their L1 as a competent native speaker and later they have also acquired some L2 knowledge even though it may not be perfect. In other words, it is not appropriate to judge the L2 speakers against the L1 norms. It is to compare two things completely different by nature.

As for comparing two different things, Labov (1969) also gives a caution. He argues that in the development of sociolinguistics the importance of studying nonstandard Englishes within the cultural context in which they were developed. He says it is wrong to view any nonstandard English as a token of poor verbal skills, lack of logical thoughts, and ungrammatical use of the language. Rather he stresses such behaviour was led by the ignorance of the researchers. Cook (2002) describes the situation in the same vein as something like comparing apples with pears. Thus, judging L2 speakers in their own right, we find that they are not failed native speakers, but they are just different from L2 native speakers.

We have used the term *native speaker* without much consideration so far in this thesis, but the status of the native speaker itself has been thrown into question. The term *native speaker* has provoked extended debate in the last few decades in the field of sociolinguistics and in TESOL as well (Davies 2003; Kramsch 1997; Murahata 2006; Paikeday 1985; Rampton 1990). A native speaker of a language is understood as "someone who has learned the language from his earliest days by virtue of having been born in the country in which it is spoken" (Paikeday 1985, p.2) in the most general sense. The language ability of the native speaker, however, cannot be guaranteed only by birth or nationality (Rampton 1990). Paikeday (1985), a lexicographer of American and Canadian English dictionaries, even says that the native speaker is "a useful artifact of thought … arbitrary and elusive a concept as Abnominable Snowman … a legal fiction" (pp.2-3). He also argues that someone who judges grammaticality of a language is not just a native speaker but a proficient user of a language. Kramsch (1997), describing the native-speaker-dominant TESOL situation, states that "the native speaker is in fact an imaginary construct" who has to be "a canonically literate monolingual middle-class member of a largely fictional national community whose citizens share a belief in a common history and a common destiny" (p. 363). She claims native speakership neither comes from birth nor education but rather from "acceptance by the group that created the distinction between native and nonnative speakers" (p. 363). Davies (2003) expands the definition of a native speaker and says someone can be a native speaker by being an exceptional learner.

It might be the case, therefore, that L2 learners have much more sophisticated knowledge about the L2 than the *native speaker* of the language. Now that the status of the native speaker is questionable, the native speaker norm which L2 learners have been

judged against does not seem so monolithic any more. This kind of view also makes it clearer that L2 learners should not be judged by the native speaker norm.

To describe this unique status of L2 learners, Cook (1999, 2002) prefers to use the more neutral term *L2 user*. The term *L2 learner* has a connotation that the person is still in the process of development and in an "unfinished state" (Cook 1999 p. 196), while we rarely call adult native speakers *L1 learners* even if they still have a lot of things uncertain in terms of appropriate usages of their L1 (Crystal 2000). After they have reached a certain age, they *are* native speakers of the language whatever variety of the language they may speak, or whatever level of the language proficiency they have acquired. L2 users, therefore, means "any person who uses another language than his or her first language" (Cook 2002a p. 1) at any level. If they use their L2 in any meaningful way exploiting whatever knowledge they may have for real communication, they are L2 users just as a bilingual communicator has developed communicative competencies in the two languages that is sufficient for everyday life as required by their needs (Grosjean 1989). Again it should be emphasised that their L2 use should not be considered to be defective, or should not be judged against the native speaker's norms, but L2 users should be treated in their own right. In this thesis, however, both terms 'L2 user(s)' and 'L2 learner(s)' are used interchangeably or intentionally depending on the contexts in the following chapters.

1.2.5 *Uniqueness of 'multi-competence' 2: The L2 users' knowledge of their L1*

The second unique point of multi-competence notions lies in evidence of effects of the L2 on the L1. As the term multi-competence is defined as a compound state of mind of more than one language, this suggests that the two languages affect

each other bilaterally in the mind. Effects of the L1 on the L2 are quite often researched as 'interference' or 'transfer' in the field of SLA (Cook 2003), but the reverse phenomena have not often been examined so far. This is partly because SLA research has embraced the native-speaker as a norm for a long time. In other words, L2, or interlanguage, of the L2 learners has been always compared to and judged against that of the monolingual native speaker. However, the multi-competence perspective sheds light on other aspects of L2 learners, saying that L2 learners' L1 knowledge is not the same as that of monolingual speakers of the L1 as a consequence of learning another language. The differences can be detected at various levels of language: major studies on how one's L1 is affected by their L2 are introduced below at the levels of phonology, vocabulary, pragmatic use, syntax and writing skills.

Phonology

Flege (1987) studied how French learners of English and English learners of French learned to produce L2 sounds authentically. French /t/ has significantly shorter Voice Onset Time (VOT) values than English /t/. Interestingly he found bi-directional effects. That is, their L2 /t/ sounds were affected by their L1s and their L1 sounds were affected by their L2s. French users of English produced French-like English /t/ with significantly shorter VOT values than English monolinguals, and produced English-like French /t/ with longer VOT values. Similarly the experienced English learners of French produced French /t/ with English-like VOT values and produced French-like English /t/ with significantly shorter VOT values than the English monolinguals. Also French learners of English had French /u/ sounds affected by learning English, though learning French did not seem to affect English speakers' English /u/ sound. The bi-directional

effect on /t/ in French and English showed the convergence of VOT in French and English, and consequently their /t/ sound has become intermediate between the monolingual speakers of French and English. This study exactly indicates a "compound state of a mind with more than one language" (Cook 1991, p. 112) and makes evidence of multi-competence at the phonological level.

Furthermore, Obler (1982) investigated Hebrew-English balanced bilinguals over VOT in producing and perceiving plosive voiced (b/d/g) and voiceless (p/t/k) consonants. She reported that the bilinguals produced those sounds in their L1 Hebrew with VOTs which were significantly different from monolingual Hebrew speakers. They were all somewhere in the intermediate position between the group mean VOTs of Hebrew speakers and English speakers, hence they were considered to be affected by English. Furthermore, the bilinguals had a broader range of perception boundaries for the consonants, which may suggest they have reconstructed the broader perception area as a consequence of acquiring English.

Between English and Spanish, voiceless /p/ and voiced /b/ make interesting points of research. Zampini and Green (2001) report that Spanish-English bilinguals differentiated English /p/ and /b/ from Spanish /p/ and /b/, which means they made distinctions similar to monolinguals in producing the two sets of sounds. However, they performed in significantly different ways from both monolingual groups with regards to the duration of closure intervals in production and reception of those consonants. Spanish-English bilinguals produced Spanish /b/ with significantly longer closure intervals than Spanish monolinguals, and produced English /b/ and /p/ with significantly longer closure intervals than English monolinguals. English-Spanish bilinguals also showed monolingual-like responses in hearing the sounds in both languages, but treated

closure intervals in different ways from English monolinguals in perception. Thus it seems the phonetic systems of the two languages affect each other in their mind.

A recent study by Harada (2007) examined the VOT of voiceless stops such as /p, t, k/ of English-Japanese bilingual children speaking in both English and Japanese. Japanese has much shorter voiceless stops VOT values than English. He found that the bilingual children distinguished between Japanese and English VOT, but still they produced voiceless stops with significantly longer VOT values than the monolingual Japanese children and their Japanese-English bilingual teachers. He also found that the teachers, who were Japanese native speakers and advanced learners of English, produced Japanese voiceless stops with significantly longer VOT values than the monolingual Japanese children and adults, while their VOT values for English were not significantly different from those of the monolingual English adults. These findings suggest that both bilingual children and bilingual teachers had their Japanese voiceless stops VOT values affected by those of English. Hence they have developed phonetic competence differently from monolingual Japanese speakers, which is clearly the L2 effect on the L1.

Vocabulary

As regards L2 influence on L1 vocabulary, Tokumaru (2005) shows advanced Japanese learners of English displayed cross-linguistic transfer of meaning from L2 English to L1 Japanese in an association task. In the task, the Japanese participants were shown Japanese loan words that originate from English. Their associated words by the advanced learners were more English oriented in meaning and hence different from those of Japanese learners of English at the beginner's level. For example, advanced

learners would think of *office*, or *work* when hearing *bosu* 'boss' in English, while novice learners would think of *gangster* and *monkey*. This is because the Japanese loan word *bosu* means a strong leader of gangsters and politicians or a leader in a group of animals, and is not related to the workplace.

Laufer (2003) studied collocational knowledge in Russian of Russian-Hebrew bilinguals, and found that their collocational judgments were affected by their L2 Hebrew. The participants were Russian immigrants in Israel and Russian monolinguals in Moscow. For example, they were presented with a sentence *Ja zakryl televizor* in Russian, which literally means 'I closed the TV' and were asked to correct it if they thought it was incorrect. The correct form of the verb should be *vykluchil* 'switched off', but the longer they lived in the Hebrew speaking context, the more frequently they failed to correct it. Laufer also studied L1 Russian lexical diversity in a free composition task, and found a gradual decline in lexical variation as they stayed longer in Israel. This linguistic status may be called attrition to some degree, but from the multi-competence perspective it is a compound state of mind of L1 Russian and L2 Hebrew in one mind.

Pavlenko (2003) reports cases of 'lexical borrowing', 'loan translation' and 'semantic extension' in L2 Russian in a story telling task by Russian-English bilinguals, who were staying in the States as university students. Lexical borrowing is to use L2 words by adapting them into L1 in phonologically and morphologically appropriate ways. Loan translation is found when one language lacks a concept which can be expressed in the other language. For example in her study, as Russian does not have the notion of *privacy*, English-Russian bilinguals expressed the notion by Russian words such as *solitude*, or *emotions* and *feelings*. Semantic extension is a strategy to use some

expression of a language which partly share the meaning with the equivalent of the other language when appropriate translation cannot be found. For example, a participant used a Russian word for 'little girl' when monolingual Russian speakers would use 'young woman', which was for them more appropriate. Thus those Russian-English bilinguals spoke in their L1 Russian in different ways from Russian monolinguals as a consequence of learning English.

Syntax

Seliger (1989) conducted a longitudinal study over the use of English relative clause by an English speaking child learning Hebrew as an L2. He found that the English system of relative clauses was gradually invaded by the L2 Hebrew relative system, which has only one relative marker *se-*, all relative pronouns being simplified to 'that'. Another point found was that the pronominal referent was kept instead of empty trance as in *I going to tell you a different thing that everyone likes it*, following the Hebrew rule that the pronoun is retained in the relative clause with the exception of the subject position. This case may be an example of L1 attrition in a sense, but from a multi-competence perspective, it is not considered to be wrong or deficient, but shows a unique aspect of the English-Hebrew bilingual.

Cook et al. (2003) reveal that Spanish, Greek, and Japanese advanced learners of English all performed differently from novice learners of each language. The researchers used the Competition Model Paradigm to examine the different ways of sentence processing among different language speakers. The participants were presented a sentence with two noun phrases and one verb such as *The dog pat the tree* or *Watches the monkey the pen* in their respective L1, and required to indicate which of

the noun phrases was the subject. All advanced English learners of Spanish, Greek and Japanese performed differently from novice learners over animate cues and subject case cues, but most markedly Japanese participants with high proficiency of English behaved quite unexpectedly, preferring animate and plural cues significantly more frequently than novice learners in deciding on the subject.

Pragmatics

There are some paralinguistic effects of the L2 on the L1, too. Krause-Ono (2004) shows transfer from a high backchannels L2 to a low backchannels L1. German speakers give much less backchannels when talking with someone, while Japanese speakers give backchannels much more often. In her study a long-term German resident of Japan indicated influence of her L2 Japanese to L1 German and produced many backchannel cues, appearing Japanese-like when talking to her German friend in German. This kind of study of paralinguistic behaviour also reveals L2 effects on L1. It should be added, however, that it was still at a beginning stage and needs further research.

Suzuki (2010) investigated strategies of refusing offers among Chinese learners of Japanese (CLJs). CLJs in China and CLJs staying less than one year in Japan used different strategies when using Chinese from when using Japanese and they were indeed different from strategies Chinese monolingual speakers' use. However, CLJs staying more than two years in Japan used the same strategies when using Chinese as when using Japanese. Thus she concluded their L1 Chinese is affected by their L2 Japanese at the pragmatic level.

Writing skills

Kecskes and Papp's (2000) longitudinal study examined whether L2 learning effects on the L1 were even manifested in foreign language users who were in the native language context and were learning the L2 in a classroom setting. They found the experimental groups of Hungarian high school students learning English, French and Russian as a foreign language exceeded control classes in their writing skills. Those high school L2 learner students created more complex sentences in terms of structure and could develop arguments in a clearer and stronger way. This shows that L2 learning can enhance overall language skills, which is another unique aspect of multi-competent learners.

A small-scale study by Ooi (2008) on development of writing skills among Japanese junior high school students shows potential transfer of writing skills from L2 to L1. She taught them how to construct paragraphs in an English class for one term. Japanese writing typically develops based on a traditional writing style of *ki-sho-ten-ketsu* (literally beginning-development-change-conclusion). It usually starts with a simple introduction of the topic, then comes development of the topic. The *ten* (change) part states different points of views, or intentionally go off the topic to give a deep impression. The most important part comes at the end sometimes in a blurred way. On the other hand, English writing develops in a linear way from the topic sentence, to supporting evidence and examples, and to a clear conclusion. These differences are well shown in the figures drawn by Kaplan (1965). Practicing writing a short passage in a clear and developmental way with evidence and examples in English, Japanese high school students learned how to make a plan of their passage before their writing and became more conscious of discussing in a logical way when they wrote their opinions

even in Japanese. Thus Ooi (2008) observed positive transfer of writing skills from L2 to L1 and describes it as evidence of multi-competence.

This section has seen how L2 learning affects their L1, at various levels of language such as phonology, lexicon, syntax, pragmatics and writing skills. These findings make the assertion clear that L2 users are different from monolinguals of their L1. Then what happens to their compound mind with more than two languages? the next section discusses this issue.

1.2.6 *Uniqueness of 'multi-competence' 3: The L2 user's mind*

As described in the previous section, L2 users' L1 is not the same as that of monolinguals. Then how do L1 and L2 interact in the mind? There are some possible relationships of how two languages are stored in one mind.

Cook (2002a) describes three possibilities of relationships of two languages in one mind as Figure 4 (p. 56) shows; separation, interconnection and integration. Separation is the state in which the two languages are independent. Interconnection is the state in which they are connected to each other to a greater or lesser degree. Integration is the state where they are totally integrated as a single system in the mind. The relationship of the two languages, however, is considered not to be static but rather dynamic, according to which language is dominantly used or what kind of task is being done using the language, for example, whether one is making a public talk or calculating. Also the continuum applies to specific areas of language such as phonology and grammar. With these dynamics at different levels of language, therefore, the line shows a continuum with arrows at the both ends, which means flexibility of the states.

From a common view in psychology, furthermore, there are at least two layers of representation in mind; a lexical layer and a semantic (conceptual) layer (De Groot 2002). For example, English has the word *apple* and Japanese has the word *ringo* for the concept of [apple]. In this case, there are two separate lexical items and one concept. For some English-Japanese bilinguals, though *apple* and *ringo* are closely stored in mind, an *apple* is a *red small apple* and is associated with *an apple pie*, *apple juice*, and *cider*, and it is something to bite one whole. On the other hand, a Japanese *ringo* is a *big yellowish red apple* and reminds them of *Oamori* which is a major apple-producing area in Japan, and it is something to peel and cut into pieces before eating. However, some Japanese may also eat an apple whole and think of cider. In this case, the two items and concepts are somewhat interconnected. For some other English-Japanese bilinguals, both *apple* and *ringo* mean a compatible kind of apple and are associated with a wider range of things crosslinguistically and crossculturally. In this case, the lexicon and concepts are integrated. These relationships of lexicon and concepts are shown Figure 5 (p.56), which is a modified version originated in Cook (2002a).

L2 users are somewhere on a point along the continuum reflecting different stages of development, different language levels such as phonology, lexicon, and syntax, and how close the two languages are due to the frequency of L2 use. They may be even flexible to move along the continuum during the use of the languages. To whatever extent the integration of the languages may advance, we can see that a compound state of mind of more than one language, multi-competence, is categorically different from a monolingual state of mind. If we look at the bilingual conceptual layer in the mind, therefore, it is asserted that L2 users think differently as some evidence from experiments already shown above.

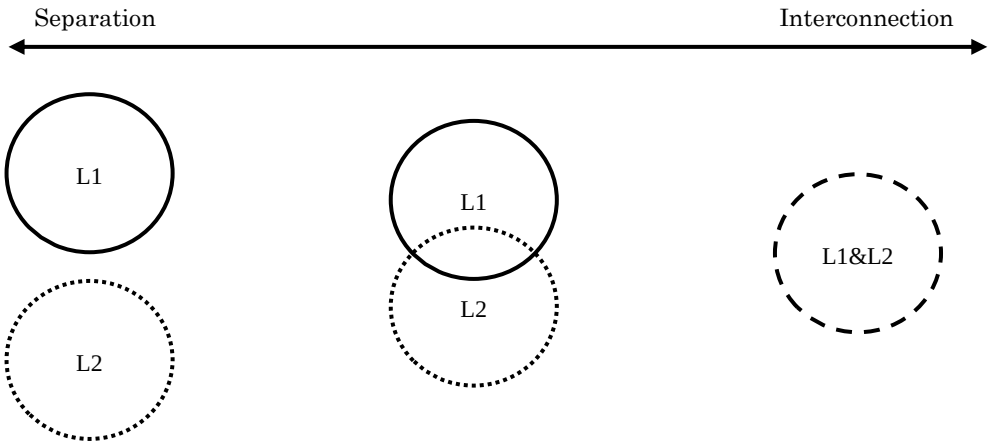


Figure 4. Possible relationships of L1 and L2 in multi-competence (Cook 2002a, p.11).

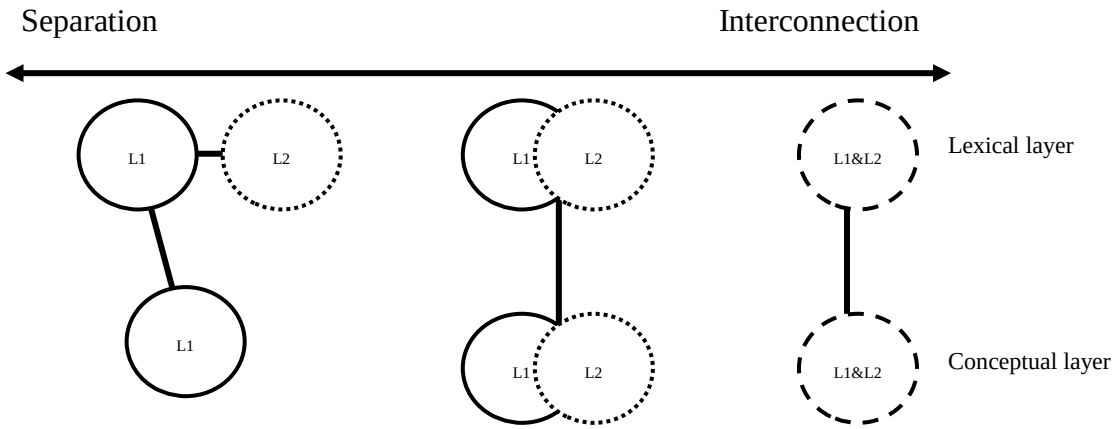


Figure 5. The integration continuum of possible relationships between, L1, L2 and concepts in mind modified based on figures in Cook (2002a)

Therefore, it is asserted in a framework of multi-competence that as a consequence of effects of the second language on the first, L2 users have different minds from monolingual speakers. 'Mind' here refers not only to knowledge of languages but also to cognition and can be placed by *thought* as in the proposal of the Sapir-Whorf Hypothesis; that is, it covers any aspect of perception of colour, space,

time, object categorisation, etc. Such L2 users' minds had been already investigated and presented even before the notions of multi-competence were introduced (Carroll & Casagrande 1958; Caskey-Sirmons & Hickerson 1977; Ervin 1961). They were sought after in examining the effects of language on thought in order to verify linguistic relativity. Hence, they were incidental findings of uniqueness of L2 users' minds. Other findings presented by Cook and associates were obtained by replicating or extending experiments which had been already conducted crosslinguistically among monolingual speakers of different languages (Athanasopoulos 2006; Athanasopoulos 2009; Athanasopoulos et al. 2004; Cook et al. 2006). Findings of multi-competence, therefore, stand on the accumulation of previous findings. In this sense, multi-competence emerged at the right time as the pendulum of linguistic relativity has swung back to the side of its original point.

Those examples of multi-competence can be found among the earlier studies of the Sapir-Whorf Hypothesis. As already introduced in Section 1.1.2, the studies by Carroll and Casagrande (1958) and Casagrande (Fishman 1960) showed that English-dominant Navaho-English bilinguals gave different response patterns from Navaho-dominant Navaho-English bilinguals and English monolinguals in an object grouping task. The studies showed that more knowledge of English gave some effects on Navaho speakers in categorising objects. Also as described in the same section, Ervin (1961) found that Navaho-English bilingual speakers called a certain area of colour *green* significantly more often than the other participants. This can be an effect of L2 English on L1 Navaho speakers, who had acquired new colour terms by learning English. The bilinguals behaved differently from English monolinguals and Navaho monolinguals, therefore the results show evidence for multi-competence. Furthermore,

Lenneberg and Robert (1956) reported that Zuni-English bilinguals behaved in the middle between Zuni monolinguals and English monolinguals in a colour recognition task.

Research on colour perception is an established area of crosslinguistic studies over linguistic relativity, and various experiment methods have been developed. Using those methods, recent studies have added some more evidence of multi-competence. By asking focal colours of monolingual Greek-English bilinguals and English monolinguals, Athanasopoulos (2009) investigated whether Greek-English bilinguals had a different perception of the colour 'blue' from monolinguals. There are two blues in Greek, *ghalazio* ‘light blue’ and *ble* ‘dark blue’, and he found advanced-level bilinguals shift their prototypes for *ble* toward English *blue,* and *ghalazio* away from English *blue.*

Furthermore, Athanasopoulos et al. (2004) examined colour perception of Japanese learners of English and Japanese monolinguals. They investigated how two groups would dissect two pairs of colours of *ao* (blue) and *mizuiro* (light blue), and *midori* (green) and *kimidori* (yellowish green). English does not distinguish the two colours in each of blue and green, while Japanese distinguishes the two. The results show that the L2 English somewhat affects their L1 Japanese. That is, as they grow in learning English, they tend to perceive less difference between the two blues and two greens in the difference judgments task. The study of Japanese blues was further developed by Athanasopoulos et al. (2011). They confirmed language effect on colour perception among Japanese monolinguals by showing different linguistic categories produced different colour perception. They also found that advanced Japanese-English bilinguals displayed perceptual flexibility depending on the frequency of English use in

their daily activities, which ultimately showed that it was language that affected their colour perception.

Besides colour experiments, an interesting experiment in bilingual cognition was carried out by Cook et al. (2006) on concepts of shape and material among Japanese learners of English. The original idea was developed by Lucy (1992) (see Section 1.1.4) and he found different cognitive behaviours between English speakers and Yucatec speakers in the shape-or-material matching. Following Lucy, Imai and Gentner (1997) conducted similar shape-or-material matching experiments and verified different matching preferences between English and Japanese speakers. They found that English speakers tended to match objects in the same shape and that Japanese speakers tended to match objects of the same material. Cook et al. (2006) further replicated the same experiment on Japanese-English bilinguals. They found that the advanced Japanese-English bilinguals staying in the UK showed a more shape preference tendency, which was considered to be the intermediate behaviour between the lower Japanese-English bilingual group and the English speakers. This behaviour is thought to be the outcome of restructuring the mind of L2 learners as a consequence of acquiring English.

Another study by Lucy (1992) was replicated by Athanasopulos (2006) on Japanese learners of English. It was also originally done on English speakers and Yucatec speakers. Athanasopoulos concludes that Japanese learners of English are restructuring their cognitive disposition toward inanimate countable objects due to contrasting grammatical number marking systems between English and Japanese (see Section 1.1.4). Lucy (1992) observed that English takes plural forms of inanimate countable nouns while Yucatec does not. The results of the experiment using drawings

revealed that Yucatec speakers did not discern changes in the number of inanimate countable objects as often as English speakers, hence he concluded that different grammatical number systems of the two languages were reflected in their cognitive behaviour. Athanasopoulos (2006) found the same differences of noun forms between English and Japanese and repeated the study on English and Japanese speakers. He investigated how Japanese-English bilinguals would behave in Lucy's picture matching task, and found that advanced Japanese learners of English had developed sensitivity toward inanimate countable nouns.

Further, Yelland et al. (1993) examined the benefits of bilingualism over monolingualism of Grade 1 school children with relatively limited experience (one hour a week) of Italian as their L2. They found, after six months of teaching, that Italian bilinguals showed significantly higher level of awareness in terms of vocabulary skills than monolinguals.

We have seen that L2 users perceive colours differently from L1 speakers in the area where colour terms do not exactly match between the two languages, and that L2 users categorise objects in different ways from L1 speakers when they attend to certain categorisation tasks because different noun forms in the languages impose different restrictions on their usage and consequently lead the speakers' attention to different aspects of objects. Thus the studies discussed above indicate that two languages are not stored separately in mind, but rather can be evidence of an integrated state of mind with L1 and L2 as Figure 3 (p.39) shows.

1.2.7 *Conclusion of chapter*

This chapter first overviewed the emergence, decline, and revival of the Sapir-Whorf Hypothesis. In the following sections, the ideas of multi-competence were introduced, describing how they have developed with positive evidence to support the framework. To conclude, L2 users would shift certain aspect of their cognition as a consequence of learning another language besides their L1. There have been two crucial questions: if an L2 learner would develop certain different cognitive patterns as a consequence of learning another language, or the person would still keep the L1 cognition without getting any language effect of the L2. The answer to the former question has been found to be affirmative.

The cognitive shift in L2 users is logically quite predictable since there is language effect on cognition as the Sapir-Whorf Hypothesis has been verified between different languages. Language is not only a communication tool, but it surely plays a role in cognitive development. Further research then is necessary to determine what part of language would be related to what part of cognition. This thesis will explore a specific cognitive aspect of Japanese learners of English and examine if there are any effects of learning English as their L2 besides their L1 Japanese. The research is based on certain cognitive differences between the Westerners and the Southeast Asians. The next chapter will discuss the specific cognitive aspects which are found and generally accepted in the field of social psychology: that is, categorisation of taxonomically related objects and thematically related objects.

Chapter 2. The West and the East:

The Taxonomic-Thematic Triad Matching

2.1 The West and the East

2.1.1 *Introduction*

The aim of the present study is to investigate multi-competence in Japanese learners of English (JLEs). In order for that, the study first seeks differences in categorisation behaviours between English speakers and Japanese speakers, then seeks to confirm multi-competence in JLEs, and ultimately examines how JLEs shift their categorisation behaviours as they acquire high proficiency of English. With these aims in mind, this chapter explores how Westerners and East Asians, that is, English speakers and Chinese, Koreans and Japanese speakers, tend to show different behaviours in object categorisation. It specifically explores their different responses when they are required to categorise taxonomically-related objects and thematically-related objects.

As for research approach, this study takes one of the three approaches Lucy (1997) proposes.[6] He says there are three approaches to linguistic relativity as to which of the three issues of language, reality and thought will be the departure point of study, which also account for multi-competence studies. The three approaches are: *structure-centred, domain-centred,* and *behaviour-centred.* The structure-centred approach starts with the detailed analysis of the languages involved. When different

[6] Lucy (2010) suggested only two approaches: the structure-centred approach and the domain-centred approach. Discussion on his elimination of the behaviour-centred approach, which this study takes, is done in the discussion chapter.

linguistic forms in a specific area of meaning are observed, then different interpretations of the reality may be revealed. Lucy (1992) took this approach. He found the relation between grammatical number marking systems and cognition among speakers of American English and Yucatec. The domain-centred approach starts with investigating how various languages encode a certain domain of experienced reality. The most well-known research domain is colour (Brown & Lenneberg 1954; Lnneberg & Roberts 1956; Ervin 1961; Heider 1972; Berlin & Kay 1969; Caskey-Sirmons & Hickerson 1977; Kay & Kempton 1984). Levinson (1997) also took the domain-centred approach and investigated how space was realised differently between Guugu Yimithirr speakers and Dutch speakers, and between Tzeltal speakers and English speakers. The third approach, behaviour-centred, starts with finding a marked difference in behaviour. For example, Bloom (1981, 1984) first noticed that Chinese people behaved differently from English speakers in dealing with counterfactual events. Then he investigated how differently they would interpret counterfactual sentences. It provoked a series of discussion (Au 1983, 1984; Liu 1985; Takano 1989), and still the field needs further research (Yeh & Gentner 2005). The studies mentioned in this paragraph were all introduced in Section 1.1.4.

The present research takes the third approach: the behaviour-centred approach. Some contrastive behaviours have been found between Westerners and East Asians in the field of social psychology (Kitayama et al. 2003; Masuda & Nisbett 2001, 2006; Miller 1984; Morris & Peng 1994; Nisbett 2003; Nisbett & Miyamoto 2005; Norenzayan et al. 2002). Based on those findings, the present research is pursued from a linguistic relativity perspective and a multi-competence perspective, and investigates whether any language effects are possibly involved in causing the behavioural

differences. Thus, this chapter first explores how Westerners and East Asians tend to behave differently in Section 2.1.2, and it further reviews previous studies with special concern on the behavioural differences in a specific type of triad categorisation in Sections 2.2 and 2.3, before exploring into language differences in Chapter 3.

2.1.2 *The analytic view and the holistic view*

Different cognitive patterns between Westerners and East Asians have been systematically investigated in the field of social psychology, and ample empirical research results have been presented in the past decade or so (Kitayama et al. 2003; Masuda & Nisbett 2001, 2006; Miller 1984; Morris & Peng 1994; Nisbett 2003; Nisbett & Miyamoto 2005; Norenzayan et al. 2002). It was found that people from different areas of the world or speakers of different languages think differently and perceive their world in different ways. According to these findings, Westerners are more likely to use categorisation and rules in reasoning about everyday life events, while East Asians are more likely to emphasise relationships and similarities. Westerners are also considered to hold an analytic view paying much attention to salient objects and their properties independently from the context, while East Asians have a holistic view paying much attention to relationships among objects and taking the contexts into consideration. These differences are summarised in Table 2.

A series of investigations started in the 1980s in North America with demographically complex situations. Among the early studies over people's attributions in psychology, Miller (1984) investigated whether there were any differences in the way English speaking Americans and Hindi speaking Indians would look at surroundings. She asked the two groups of participants of American adults and Hindi speaking adults

Westerners	East Asians
• Having an analytic view • Using categorisation and rules in reasoning • Paying much attention to salient objects and their properties • Context-independent	• Having a holistic view • Emphasising relationships and similarities in reasoning • Paying much attention to relationships among objects • Taking the contexts into consideration

Table 2. Different views between Westerners and East Asians

both living in the States to describe everyday events and people they knew, and found characteristic differences between the groups in the description. Americans tended to describe ordinary everyday events in terms of general dispositions of people involved such as 'He was just a very self-absorbed person.' or 'She is very competitive.' On the other hand, Hindi speakers tended to describe similar events referring more to the contextual situations and personal relations such as 'It was early in the morning.' or 'She had three brothers.' The differences found in the ways Americans and Hindi speaking Indians constructed narratives were significant: Americans were more interested in describing the focal agents than Indians did and Indians paid more attention to the contextual settings when describing events than Americans did. By describing the differences, Miller also emphasised the importance of cross-cultural research into social influences on attributional diversity among people with different ethnic backgrounds. He argued that the differences in dispositional features were not arising only from individual cognitive capacities or information processing experiences, but also from social conceptions the person had been exposed to. Thus Miller

empirically revealed the differences in people with different ethnic backgrounds and proposed possible contextual effects on people's behaviours.

Similar contrastive findings were reported years later by Morris and Peng (1994). They noticed that newspapers based on different language groups described two murder cases in different ways. Then they investigated how people from different language groups would understand them and what they would consider the causal factors of the cases. They found different judgment traits between Americans and Chinese university students over possible causal factors for two murder cases with a Chinese perpetrator and an American perpetrator. For both cases, American students considered personal dispositions as causal factors significantly more than Chinese students, while Chinese students considered the perpetrators' personal situations as causal factors significantly more than American students. And a Chinese newspaper in fact gave more extra situational information of the cases, which an American newspaper lacked. Furthermore, Chinese students tended to think that those murder cases might have been averted if the situations had been different. However, most American students felt they would have occurred because it was the perpetrators' long-established dispositions that made the crimes happen. These tendencies of Americans and Chinese support the findings by Miller (1984) describing two different behavioural patterns of people with different ethnic backgrounds. These two studies show differences between Westerners and East Asians: that is, Westerners tend to pay more attention to salient objects and their properties independently from the context, while East Asians tend to pay more attention to relationships among objects, taking the contexts into consideration.

In order to see more about these differences between the West and the East, a

further investigation went into how Westerners and East Asians looked at objects in the scenes and recalled them. Masuda and Nisbett (2001) designed an experiment using approximately 20-second-long animated films, which depicted underwater scenes. In the film, for example, there were big focal fish moving actively in front, small fish, frogs and newts moving behind them, and stationary shells, vegetation, and rocks in the background. American and Japanese university students were asked to see the films twice and after that to recall and tell what they saw, and also to take recognition tests. The results showed very contrastive behaviours. Both American and Japanese participants made reference to salient objects equally well in the description task, but Japanese participants also made reference to background non-focal objects and relationships between the background objects significantly more than American participants did. It is particularly notable that Japanese participants started the recall statements with sentences of holistic descriptions significantly more often such as 'It looked like a pond', while Americans started the description with reference to focal objects such as 'There was a big fish, maybe a trout, moving off to the left' (Nisbett 2003). In addition, the two groups also showed contrastive responses in the recognition task. It was designed to present both the focal and non-focal objects with the original background, no background and novel backgrounds. Japanese participants showed significantly higher recognition accuracy with the original background than American participants. On the contrary, American participants showed significantly higher accuracy with novel backgrounds than Japanese participants. These results indicate not only that American participants paid more attention to the salient objects than Japanese participants and Japanese participants paid more attention to the background than American participants, also that Japanese participants tended to grasp the objects

combined with the context, while American participants tended to decontextualise the objects.

Masuda and Nisbett (2006) further confirmed differences between Americans and Japanese in an experiment examining how differently they would notice changes in the focal objects and in the background. They provided both groups of participants with still photos and with animated short films, and studied how differently they attended to the changes in the photos and in the films. Pairs of still photos and pairs of films were made with one of each having a slightly different object from the other one. The differences were made both in the focal objects and in the peripheral objects in the background context. Japanese participants noticed significantly more changes in the context than American participants, and Americans took significantly more time to identify the changes in the context than Japanese. These findings also support the dichotomous views of the analytic view of the West and the holistic view of the East.

As to the dispositions of contextualisation by the East Asians and decontextualisation by Westerners, Kitayama et al. (2003) successfully revealed context-dependent and context-independent tendencies of Japanese and Americans through an experiment. They developed a test called *the framed-line test*, which required participants to draw a line in a square. Specifically, they were shown a square frame, within which was printed a vertical line. Then they were presented another square frame of the same size or different size and asked to draw a line. The drawing task had two kinds: one was an absolute task, which required a line identical to the original line in absolute length, e.g., 3cm or 6cm, and another was a relative task, which required a line in proportion to the height of the surrounding frame, e.g., one third of the height of the square. The results revealed significantly different performances between

Japanese and Americans. Japanese participants performed the relative task significantly more accurately than the absolute task, and American participants performed the absolute task significantly more accurately than the relative task. Also there was a significant difference between the performances of the two groups in each task. Thus it was concluded that East Asians tend to be influenced more by contextual elements in a situation, while Westerners tend to show more context-independent behaviours. The results also support the previous findings by Miller (1984), Morris and Peng (1994) and Masuda and Nisbett (2001, 2006).

Furthermore, Kitayama et al. (2003) predicted that one may get some effect of the host culture on his/her behaviour while staying in another culture, and conducted the same experiment both in Japan and the United States on four groups: Japanese in Japan, Japanese in America, Americans in America, and Americans in Japan. The results showed that Japanese in Japan were significantly more accurate in the relative task than the absolute task, and American in the States were significantly more accurate in the absolute task than in the relative task. As predicted, the other two groups showed an effect of the host cultures. That is, Japanese in America showed response patterns which were similar to those of Americans in the States, and Americans in Japan showed response patterns which were similar to those of Japanese in Japan. This behavioural shift can be considered as evidence of multi-competence, though Kitayama et al. (2003) did not take language effects into consideration. It is noteworthy, however, that this shows a case in which people develop their unique cognitive patterns by being exposed to two different societies, and their cognitive patterns are somewhere in-between the two societies.

2.1.3 *Taxonomic and thematic relationship categorisation*

These contrastive behavioural patterns are also found in a specific type of triad categorisation of objects (Chiu 1972; Gutchess et al. 2006; Ji et al. 2004; Unsworth et al. 2005). *Category* is "a number of objects which are considered equivalent", and "categories are generally designated by names" (Rosch et al. 1976, p. 383). To categorise means, therefore, to determine that an object belongs to a certain category with a name on it because of the certain properties it has, or that some objects belong to a category of a name because of certain common properties they share. Lakoff (1987) argues that "there is nothing more basic than 'categorization' to our mental activities" (p. 5), and that "an understanding of how we categorize is … central to an understanding what makes us human" (p. 6).

The object categorisation process involves behaviours such as recognising an object from the other surroundings, paying attention to certain part of characteristics of the object, finding out certain kind of similarities and relating those characteristics as inherent ones to the objects (Imai 1997). It is, therefore, part of the psychological process of viewing the reality. The present study is based on the contrastive behavioural differences between Westerners and East Asians and investigates whether there are any language effects on the ways English speakers and Japanese speakers categorise objects.

This section looks at two well-known studies about object categorisation conducted in the 1970s: one explored differences between American children and Chinese children, and the other one investigated cognitive development of children. The former, the earliest and best-known study on cross-cultural differences in categorisation is by Chiu (1972). The latter, one of the most classical works on cognitive development is by Smiley and Brown (1979).

Chiu (1972) used triad pictures, for example, *monkey-panda-banana* as shown in Figure 6, to investigate how American children and Chinese children, 4th and 5th graders, would categorise objects. He asked the participants to select two of the three objects in the triad that went together, and further asked to explain the choice. American children tended to select *monkey* and *panda*, while Chinese children tended to select *monkey* and *banana*.

The choice *monkey-panda* indicates grouping (i.e., categorising) based on a taxonomic relationship since *monkey* and *panda* belong to the same taxonomic group of *animal*, while the choice *monkey-banana* denotes grouping based on a thematic relationship, or called contextual relationship alternatively, because it is generally thought that *monkeys* like *bananas*. Thus, a taxonomic relationship is found between objects which belong to the same taxonomic category, therefore members of the same category share "an essential core or are similar in some perceptual, biological, or functional properties" (Lin & Murphy 2001, p. 3). On the other hand, a thematic

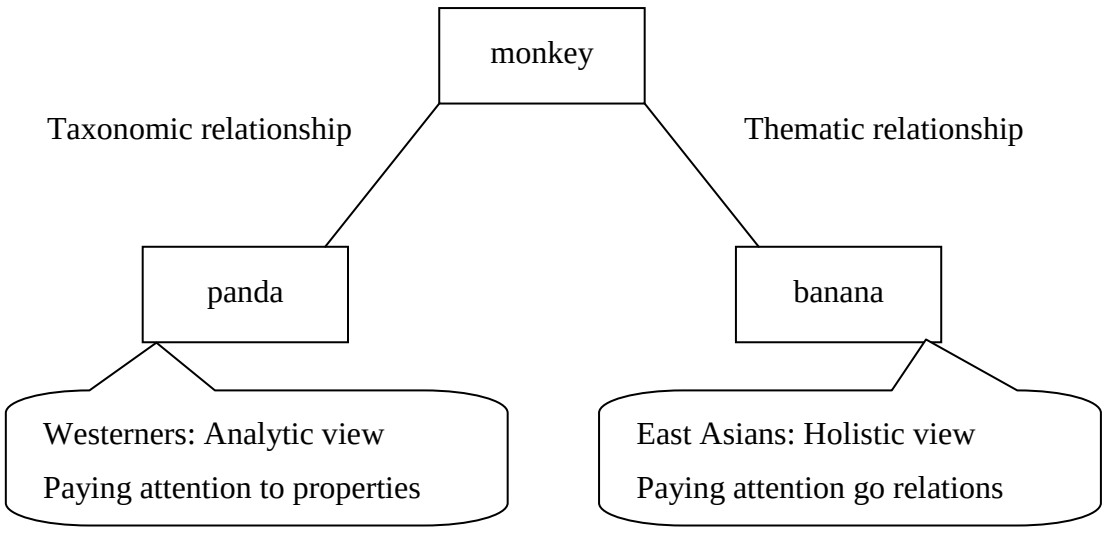


Figure 6. Taxonomic and thematic relationships and different views between Westerners and East Asians with an example of monkey-panda-banana

relationship is defined as "the external or complementary relations among objects, events, people, and other entities that co-occur or interact together in space and time" (Ibid. p. 3). Some thematic relations are spatial (e.g., *birds* are often found among *trees*), functional (e.g., we cut an *apple* with a *knife*), causal (e.g., *cows* produce *milk*), and temporal (e.g., *seeds* grow into *plants*). Henceforth, this type of triad is called 'the taxonomic-thematic triad' throughout the present study.

In Chiu's (1972) experiment, the participants were required to give choice explanations after they made choices. The explanations were also examined and classified into four patterns. That is, the *descriptive-analytic* explanation which identifies similar parts of stimuli and differentiates them based on those similarities: e.g., 'Because they are both holding a gun'. The *inferential-taxonomic* explanation, which categorise based on inferences made about the stimuli: e.g., 'Because they both have a motor'. The *descriptive-whole* explanation, which identifies whether a stimulus as a whole is similar to another whole stimulus: e.g., 'Because they are both large'. Finally the *relational-contextual* explanation categorises based on functional and thematic relationship: e.g., 'Because the mother takes care of the baby'. The results showed American children gave significantly more choice explanations based on descriptive-analytic, inferential-taxonomic, and descriptive-whole categorisations, while Chinese children gave choice explanations based on relational-contextual categorisations. Those findings suggest that American children and Chinese children showed different tendencies in categorising objects: Americans were more similarities-oriented and Chinese were more relations-oriented.

These categorisation preferences of the two groups were consistent with the findings described above that Westerners view the world in an analytic way by paying

more attention to properties of salient objects, while East Asians view the world in a holistic way paying more attention to the relations of objects as Figure 6 (p. 71) shows. This kind of research based on the taxonomic and thematic categorisation was also found in studies on cognitive development of children.

Smiley and Brown (1979), in analogous to the paradigmatic-syntagmatic word association development of children, investigated whether there was any developmental change, or rather as they preferred to describe, any preference shift among young children in the taxonomic-thematic categorisation. They considered the paradigmatic relation between words was analogous to the taxonomic relation between objects. Paradigmatically related words such as *run* and *walk*, and *apples* and *dogs*, belong to the same syntactic category 'verb' and 'noun'. They also considered that syntactically related words such as *beautiful* and *flowers*, and *run* and *fast* were related just in the way thematically related objects were related. According to Smiley and Brown (1979), young children are generally believed to develop from syntagmatic responses to paradigmatic responses in a word-association task: from syntactically related pairs such as *beautiful-flower* to pairs of words belonging to the same grammatical form class such as *tree-flower*. The shift occurs around the age of seven. Thus they investigated this kind of developmental shift from syntagmatic to paradigmatic relations would occur in the taxonomic-thematic object categorisation.

The researchers used the taxonomic-thematic triad pictures, which were similar to the triads used by Chiu (1972) above. After confirming the names of the objects, they asked the participants, 'Which of the two (alternatives) goes well with the ___ (the name of the target)?' and asked them to give the justification of the choice. They conducted two experiments on different age groups from preschool children to

elderly people in the United States. The first experiment revealed young children up to Grade1 (aged seven) and the elderly people group aged 66-85 tended to group thematically-related objects more frequently than taxonomically-related objects, while the other groups of school age and college students tended to group taxonomically-related objects more often than thematically-related objects. The participants could also explain the reasons for the grouping explicitly in justifiable ways, though this task was not assigned to preschool children.

The second experiment showed that the participants could modify their responses through training, but the training effect faded away under no constraints. Thus the first experiment showed that preference for taxonomic grouping increased as children grew up, but decreased at a much later stage of life, though it didn't show when it exactly started to decrease, due to lack of complete data from all of the different age groups. Noteworthy is that the authors called for a caution in understanding the phenomenon as age-related capacity, but rather they argued it was one of conceptual preference affected by various individual experiences such as schooling, because the participants showed capacity to modify their ways of grouping under certain circumstances.

To date these two studies in the different fields have been followed and developed by further research. Thus there are two streams of research in the area of taxonomic-thematic object categorisation. In one stream, as represented by Smiley and Brown (1979), it is argued that small children below approximately seven years of age tend to relate objects in a more thematic-oriented way and they shift their categorisation patterns to more taxonomic-oriented ones as they grow. The other stream of research focuses research on groups with different ethnic backgrounds. As represented by Chiu

(1972), Westerners, or American children aged around nine to ten, tend to be more taxonomic-oriented and Asians, or Chinese of around the same age, tend to be more thematic-oriented. Then what does it mean that Asians are thematically oriented in the same way as smaller children in the United States do? Does it mean that Asian children do not develop some part of their cognition as in the same way as American children do? The next section will examine the subsequent studies. Section 2.2 explores studies on the cognitive development of children, and Section 2.3 explores studies on speakers of different languages, that is, English and Chinese speakers. These explorations lead to the next step of this study developed in Chapter 3, which looks into differences in noun forms across languages.

2.2 Taxonomic-Thematic Object Categorisation in Cognitive Development

2.2.1 *Overview*

Object categorisation is closely related to cognitive development of small children and it helps to investigate how they understand the meaning of words they hear. Cognitive development among children is not a central concern of the present study but it shows how language is related to form categorisation among young children in their language acquisition process. Thus it is important to understand how language is involved in this area before we go into further research. It is generally known that at the age of approximately 10-12 months, infants start to produce their first words, which is followed by steady and gradual growth of vocabulary. Then at the age of approximately 17-20 months, they suddenly start to acquire words at an enormous speed. The stage is

called the naming explosion. This period comes to a close around two years of age, when they start to produce multi-word sentences (Imai 1997; Waxman & Hall 1993).

In the process of language development, the biggest question among cognitive psychologists in the field of child development is how a child will take it when he/she hears a novel word because there must be a large number of possible ways to understand it. As Quine (1960) brought up this argument in a well-known example of '*Gavagai*', infants face meaning-word matching situations every time they hear a novel word in the process of language acquisition. By hearing an adult saying 'a dog', how can an infant learn this unfamiliar word refers to a dog? 'Dog' could be a proper name of the object, could mean 'four-legged object', 'brown', 'animal', even the state of 'being on a lead', or 'being walked by a human'. Here, the question is what kind of characteristics they pay attention to when they hear a novel word, and why. In interpreting 'dog' as 'four-legged furry animal', some characteristics necessary to interpret it as a dog are missing. But at least it is interpreted in a proper direction, since 'dog' does not indicate a thematic relation such as 'being walked on a tight lead'. That is, the word is understood categorically, not thematically. Then what kind of mechanism is involved in this word-meaning mapping, which leads the inference in a proper direction?

One way to investigate how infants proceed in the process of language acquisition is using the taxonomic-thematic triads. The task of matching objects reveals how they are looking at the world. As described in the previous section, Smiley and Brown (1979) investigated cognitive shift of American children, and found out that American children aged from five to seven shifted object categorisation patterns from thematic to taxonomic as they grew. A contradiction arises here. If small children up to

Grade 1 tend to prefer thematic-oriented categorisation as Smiley and Brown (1979) shows, how do they acquire an object name they hear for the first time? If they are thematically oriented, does that make it difficult to acquire words at early stages? Some may wonder what happens to infants younger than children aged five-seven.

Table 3 lists some major studies conducted on small children to adults of Americans and Japanese in a chronological order starting with Smiley and Brown (1979). Subsequent studies in the table by Markman and Hutchinson (1984), Waxman and Hall (1993) and Waxman and Markow (1995) revealed that language enhances taxonomic-oriented categorisation among small children and it was found that even infants younger than two years of age showed some language effect on taxonomic categorisation. However, the next two studies by Waxman and Namy (1997) and Lin and Murphy (2001) found that categorisation varies under different instructions. It is interesting to note that Waxman and Namy (1997) found that the 'another one' condition produced taxonomic-oriented grouping the most frequently. This fact raises a possibility that some language form may facilitate certain processes peculiar to the language form in cognitive development, though taxonomic matching was clearly enhanced by language among not only English speakers but also Japanese participants in Sugimura (1992). Blaye and Bonthoux (2001) revealed thematic matching preference among four-year-olds, which was also found by Waxman and Namy (1997). However, Waxman and Namy elicited taxonomic preference among three-year-olds in the same study. Then do children shift from taxonomic to thematic preference, and not from thematic to taxonomic preference? Studies subsequent to Smiley and Brown (1979) are examined in more detail below to see how language enhances taxonomic categorisation.

Study	Participants	Major findings
Smiley & Brown (1979)	Am. Preschool to elderly	From thematic to taxonomic, then back to thematic shift along with age. Possible effects of experience and environment.
Markman & Hutchinson (1984)	Am. 2-5 years	Language enhances taxonomic matching in the novel word condition (abstract constraint). Confusion in writing a reason for thematic relations under the word conditions.
Sugimura (1992)	Jap. Preschooler, 3rd graders, & adults	Language enhances taxonomic matching. From thematic to taxonomic preference shift along with age.
Waxman & Hall (1993)	Am. 15-21 months	Language enhances taxonomic matching in the novel word condition among younger children. Not necessarily thematic oriented. Thematic categorisation may need more knowledge.
Waxman & Markow (1995)	Am. 12-13 months	Language effect on categorisation at the basic level in the novel word condition even before the naming explosion.
Waxman & Namy (1997)	Am. 2-4 years	Different instructions cause different response preferences. 'Another one' condition most produces taxonomic grouping. 2-year-olds – no-preference 3-year-olds – taxonomic preference 4-year-olds – thematic preference under a certain instruction
Lin & Murphy (2001)	Am. Adults (university students)	Categorisation varies under different instructions, triads and tasks: taxonomic choices varied and accounted for from 27% to 85% of the whole responses.
Blaye & Bonthoux (2001)	Am. 3-5 years	3-year-olds – no-preference, no flexibility in choice 4-year-olds – thematic preference, some flexibility in choice 5-year-olds – flexibility in choice

Table 3. Studies on taxonomic-thematic categorisation in the field of cognitive development (Am. means American participants, and Jap. means Japanese participants)

2.2.2 *Language effects on categorisation: From Markman & Hutchinson (1984) to Waxman & Namy (1997)*

Markman & Hatchinson (1984)

Investigating how children understand the meaning of a word, Markman and Hutchinson (1984) hypothesised language played a constraining role in the process of object categorisation among small children, which will lead them to attend to properties of an object pointed. They assumed that children should try to identify an object more often when they are said, for example, 'Look, this is a dax' than when they are said, 'Look at this'. Then they constructed a novel-word condition and a no-word condition and conducted a series of experiments using a taxonomic-thematic matching task on children of two to five years old. Presented with three objects such as *police car-car-policeman* and *tennis shoe-high heeled shoe-foot*, children chose thematically-related objects at around chance level in the no-word condition, but they chose taxonomically-related objects significantly more often in the novel-word condition than in the no-word condition. That is, language facilitated taxonomic matching. Interestingly, a further experiment revealed an awkward dilemma of children. When they were asked to justify the relation after choosing an object, most of the children failed to justify the relation when they chose thematically related objects in the novel-word condition, while most of the children successfully justified the thematic relation in choosing thematically related object in the no-word condition. This result indicates object names seem to have interfered with thematic relationship explanation. Additionally, four to five year olds tended to choose taxonomically related objects more often when they heard the unfamiliar word *dax* for *cow* than when hearing the familiar name 'cow'.

With these results, Markman and Hutchinson (1984) concluded that language placed an *abstract constraint* on children, which would lead them to attend to properties of objects and to search for an individuated object on hearing an unfamiliar name. An

abstract constraint was imposed on them to abstract certain properties from the object that were necessary to categorise it. They also argued that from this study, innate or acquired this constraint may be, infants aged two to three already knew that a count noun referred to a category, and this abstract constraint could make their language learning tremendously simplified. So infants did not have to attend to other possible ways, such as attending to the material of the object or the thematic relations between the object and its surrounding things, when they faced a meaning-word matching situation.

Waxman & Hall (1993)

What happens to infants younger than two years old? Waxman and Hall (1993) investigated whether infants of 15-21 months of age have acquired the linkage between the count noun and its meaning. Their age range is just before and after the naming explosion period of 17-20 months old, and thus Waxman and Hall (1993) investigated how language enhanced their object categorisation at different points of language development. The results showed both 16-month-olds and 21-month-olds chose taxonomically-related items significantly more frequently in the novel noun condition than in the no word condition. In other words, when hearing a novel word '*X*', an infant would expect it refers to an object, thinking, '*X*? What is an *X*?' then pay attention to salient characteristics of the object and try to link the word and the object. That seems to be why children tend to choose taxonomically-related objects more often in the novel word condition than in the no-word condition, when asked to choose an alternative which went with the target object in a triad set. Thus it was confirmed that labelling, or language, did influence their object categorisation following the previous

study by Markman and Hutchinson (1984). Most importantly, the effect was observed even among the infants at the age prior to the naming explosion. That is, children are innately guided to pay attention to individual objects, and related the meaning of words to objects, when they start to acquire language. These results of the experiments could be an answer to Quine's (1960) query on how infants would learn unfamiliar words referred to objects.

The overall results of the experiments showed tendencies of taxonomic categorisation, contrary to the general understanding that small children are more likely to choose thematically-related objects than taxonomically-related objects. The 21-month-olds spontaneously showed, however, more thematic-related behaviours than 15-month-olds while they played with the objects, such as putting the cup to the mouth of the doll. Watching those behaviours, Waxman and Hall speculated that the infants around 15 months of age might not yet have reached the stage of appreciating thematic relations of objects, because thematic relations require more information other than characteristics inherent in the objects themselves. It is quite possible to understand that appreciation of thematic relations require world knowledge about typical functions and actions related to the objects, therefore, taxonomic knowledge precedes thematic knowledge early in development. After they reach nearly school age, they may show thematic preference.

Waxman & Markow (1995)

Furthermore, Waxman and Markow (1995) found specific linkages between language and conceptual organisation even earlier in cognitive development. They designed a very ingenious experiment and investigated how infants of 12 to 13 months

of age would categorise objects. They made up two groups of objects: one group was made of basic level objects such as four cars in different colours, and the other group was made of super-ordinate level objects such as a horse, a tiger, a bear, and a panda. There were two conditions in presenting objects, the labelled condition and the non-labelled condition. Generally humans are likely to pay more attention to a novel object than to a familiar object, trying to find out what the unfamiliar object is. Based on such human characteristics, infants' looking time was measured to see how much attention they paid to what.

Presented objects one by one, small children paid significantly less and less attention to objects at the basic level than at the super-ordinate level, and paid significantly less and less attention in the labelled condition than in the non-lebelled condition. The results revealed that even at a very early stage of language acquisition of infants at the age of 12-13 months, language enhances categorisation. That is, when presented four objects of the same category at the basic level one by one, while hearing, 'Look, a car!' 'Look, a car!' repeatedly, children gradually lost interest and did not pay attention to the fourth object any more. This attitude of losing interest means that the infant have established a linkage between the language and the object, in other words, he/she has categorised the object. Thus they were able to categorise objects most easily at the basic level under the labelled condition.

Waxman & Namy (1997)

Regarding thematic preference among pre-school aged children, Waxman and Hall (1993) found that infants aged 15-21 months were not always thematic oriented, which was different from the findings by Smiley and Brown (1979). In the traditional

studies experimenters usually presented a target object and two alternatives, and asked the children which 'goes with' the target, or to 'find another one'. Assuming that those differences in instructions may have given some effects to the responses, Waxman and Namy (1997) used three different types of instructions and examined if they gave any effects to the response choices. The instructions were, 1) *Look! That is an X. Which goes best with the X?* 2) *Look! That is an X. Which one goes with it?* and 3) *Look! That is an X. Can you find another one?* Indeed, the participants showed different alternative preferences under different instructions. Both three-year-olds and four-year-olds chose significantly more taxonomic relations when asked to find 'another one' than when asked 'which goes best with' or 'which one goes with'. Four-year-olds showed consistently thematic choice patterns when asked 'which one goes best with'. Three-year-olds did not show any consistent thematic choice patterns either in the 'goes best' or the 'goes with' conditions. These findings revealed the linguistic cue of 'another one' enhanced taxonomic relations, clearly because the linguistic form 'another one' implies an individuated object in a more salient way, and the infants are already sensitive to such a grammatical form. On the other hand, the 'goes best' condition enhanced thematic relations, but this effect was found only among four-year-olds.

From the fact that infants gave different responses under different instruction types, they argue conceptual preference is not always stable and can be flexible and context-dependent. As for thematic-taxonomic preference shift, the experiments showed two-year-olds did not show any preference, three-year-olds showed rather taxonomic oriented preference, and four-year-olds showed consistent thematic preference in the 'goes best' instruction. The results partly supported Waxman and Hall (1993) in suggesting thematic categorisation would need more knowledge than taxonomic

categorisation, as thematic preference did not appear among the younger groups in any conditions.

Sugimura (1993)

The studies described above all conducted in the United States and the participants were all American children. One study targeted Japanese preschool children, third-graders, and adults, which was conducted to investigate language effects and triad type effects on taxonomic-thematic categorisation. Sugimura (1993) designed three kinds of taxonomic-thematic triads: (1) same-level concept triads such as *goldfish-tropical fish-fishnet,* (2) superordinate triads such as *apple-carrot-knife*, and (3) functionally-related triads such as *frying pan-kettle-fried egg,* in which the target and one of the stimuli were related in terms of function and do not have a one-word taxonomic category name. There also were three labelling conditions: (1) the Concept Condition, where subjects were given a name of the taxonomic category or a word related to the target word such as *fish*; (2) the Instance-Labelling Condition, where they were given the name of the target object such as *goldfish*; and (3) the No-Labelling Condition, where they were not given any label.

The study found effects of age and labelling conditions. Taxonomic oriented grouping was observed significantly more often among third graders and adults than among preschoolers. Taxonomic categorisation was also observed significantly more often under the two labelling conditions, that is the Concept Condition and the Instance-Labelling Condition, than the No-Labelling Condition among preschoolers and third graders. Among adults, labelling effects on taxonomic categorisation were

observed only under the Concept Condition. Thus it was found that there was an effect of labelling even among Japanese.

As for thematic relationships, adults gave various reasons for their thematic choices, for example, ‘Flowers in a vase are typically seen at the alcove’, while children gave mostly only complementary relationships for the reason of the thematic choices such as ‘Flowers are put in a vase’. These explanations for choice reasons were interpreted to suggest that adults looked at objects in a more diversified way than children and showed age differences in the utilisation of concept labels for categorisation.

To summarise, the studies introduced above have found that, firstly, language plays an important role in cognitive development among infants by leading their attention to properties of discrete and concrete objects as a whole: that is, language imposes the abstract constraint on infants in the process of learning new words of objects, which makes it easier for them to learn meaning of words. Thus language enhances taxonomic categorisation in the taxonomic-thematic triads matching task among children from 15 months to five years old, and also facilitates the process of word-meaning matching process among infants at the age of as early as 12-13 months. The language effects were verified by comparing behaviours under the labelling condition and the no-labelling condition in the experiments. This kind of language effects were found across speakers of different languages: both English speaking children and Japanese speakers including preschoolers and adults.

Secondly, it was found some linguistic forms enhance taxonomic categorisation in the taxonomic-thematic triads matching task. For example, the

instruction ‘find another one’ enhances the taxonomic-oriented matching more than the ‘which goes best with’ or ‘which one goes with’ instructions. The linguistic form ‘another one’ clearly individualises objects in a salient way.

Thirdly, studies did not confirm the development from thematic-oriented categorisation to taxonomic-oriented categorisation among children. It was rather from taxonomic to thematic because the understanding of thematic relationships between objects requires more complicated knowledge than understanding categories.

Thus far, we have seen that language enhances the matching of language meaning and objects, and thus help children to categorise objects. It seems there are more to see concerning thematic relationship in concept development.

2.2.3 *Flexibility in taxonomic-thematic relationship categorisation: From Waxman & Namy (1997) to Lin & Murphy (2001)*

Waxman & Namy (1997)

Regarding the thematic relationship concepts, Waxman and Hall (1993) argued a thematic preference may appear after the taxonomic categorisation was achieved. This would be because understanding thematic relations involves much more knowledge about the world than understanding taxonomic relations, and infants at the age of 15 months would not yet have reached the thematic categorisation stage. It is quite plausible, therefore, to assume taxonomic knowledge precedes thematic knowledge. Waxman and Namy (1997) found that three-year-olds and four-year-olds showed taxonomic preference under the ‘another one’ condition, and four-year-olds showed consistent thematic preference in the ‘goes best’ instruction condition. That means, if they are not in a linguistically taxonomically-enhanced condition using the

phrase ‘find another one’, but in a neutral condition using the phrase ‘goes with’, three-year-olds are more taxonomic oriented and four-year-olds are more thematic oriented. They did not find any preference among two-year-olds.

Blaye & Bonthoux (2001)

A preference for thematic relations among four-year-olds was clearly manifested by Blaye and Bonthoux (2001), too. They investigated flexibility in categorisation among three- four- and five-year-olds. They designed an experiment which presented triads in different scenes; *apple-banana-knife* presented in a *vegetable counter* scene and in a *kitchen* scene. That is, they examined whether grouping two objects from *apple-banana-knife* presented in a vegetable counter scene may change from grouping two objects from the same items but presented in a kitchen scene. Three-year-olds did not show any consistent preference for relations, and did not shift their choice in any systematic way according to the scenes provided. Four-year-olds showed matching flexibility to some extent by taking account of contextual information, but less than five-year-olds. Five-year-olds seemed to be able to relate objects in a principled and flexible way by taking the contextual information into account in their matching choice. Thus they found the development of categorical preference from non-preference at the age of three, to the thematic preference at the age of four, also the development of categorical flexibility acquired at the age of four-five.

From these findings, therefore, the conceptual type basically grows from the non-preference state to the taxonomic preference state around the age of three, and to the thematic preference state around the age of four-five when they have acquired enough knowledge to understand the relations between the objects. Then they shift their

preference to taxonomic again when they start school education, though language may direct their attention to specific aspects and give effects to their categorical relation judgments.

Lin & Murphy (2001)

The argument that conceptual preference is not always stable and rather context-dependent can be found in Lin and Murphy (2001). They challenged taxonomic preference of adults, arguing that thematic knowledge is as important and necessary as categorical knowledge for adults. They conducted ten experiments on American adults and showed the responses varied under different conditions.

Some major findings are that the 'best form a category' instruction generated more taxonomic grouping (50% of the whole responses) than the 'goes best with X to form a category' condition (38%). The instruction 'Which of the three can be called by the same name?' enhanced the taxonomic matching the most (85%). Taxonomic grouping also increased in percentage when the visual stimuli were added to the words (from 27% to 44%). When the participants were asked to decide which one of the two would be more likely to 'have the same bacteria', the thematic matches rose considerably.

Thus the findings of their experiments did not support the general assumptions that educated adults prefer taxonomic over thematic categories and that there is a developmental shift from thematic to taxonomic. They verified that categorical preference of American adults could vary under different instructions and in different contexts, which was also argued in the study over infants of two-four years old by Waxman and Namy (1997).

This section outlined findings on flexibility in the taxonomic-thematic triads matching task among English speaking children and adults. The previous section reviewed that several studies (Markman & Hutchinson 1984; Sugimura 1993; Waxman & Hall 1993; Waxman & Markow 1995) verified that language directs children's attention to the object it may refer to, and described how this trait helps infants acquire language. On hearing a new word infants as early as at the age of nine months innately focus their attention on an individuated object, not on the relations of objects, and try to match the new word to the object. There are well-known traditional research findings of the thematic to taxonomic shift in cognitive development of children (Smiley & Brown 1979). In this section, some other studies (Waxman & Namy 1997; Lin & Murphy 2001) showed American children at the age of 2-4 years and American adults shift their taxonomic and thematic preferences under different instructions, with different stimuli and in different contexts. Under neutral conditions, however, it was further confirmed that children develop their categorisation preference from the non-preference state around the age of two at the very beginning stage of language acquisition, to the taxonomic preference state around the age of three, then to the thematic preference state around the age of four when they have enough world knowledge about the relationships between the objects. When findings by Smiley and Brown (1979) are added here, it is further confirmed that children may shift their categorisation preference from thematic to taxonomic once again after understanding thematic relationship when they reach the age of schooling.

If children's response patterns shift along with age in the taxonomic-thematic triads matching task, then what does it mean that there are cross-cultural differences

found in similar matching tasks? The next section describes some findings from cross-cultural studies over object categorisation.

2.3 Taxonomic-Thematic Categorisation in Cross-Cultural Studies

2.3.1 *After Chiu (1972)*

As described in 2.1.3 above, Chiu (1972) found American children and Chinese children show significantly different behaviours in the taxonomic-thematic categorisation task. American children showed significantly more taxonomic-oriented choices, hence grouped, for instance, *seagull* and *squirrel* together, and Chinese children were significantly more thematic-oriented, hence grouped, for instance, *squirrel* and *tree* together. As Table 4 shows, some follow-up experiments were conducted years later on English speaking adults and Chinese speaking adults. They showed consistent taxonomic preference among English speakers and thematic preference among Chinese speakers across different age groups, though infants and young children were not included. Now we will look into each study in more detail.

2.3.2 *Ji et al. (2004)*

Nisbett and his colleagues investigated conceptual and behavioural differences between the West and the East (Masuda & Nisbett 2001, 2006; Nisbett 2003; Nisbett & Miyamoto 2005; Norenzayan & Nisbett 2002; Norenzayan et al. 2002). Among them was Ji et al. (2004), who conducted taxonomic-thematic triads experiments on American and Chinese adults and also sought after linguistic influence on cognition.

Study	Participants	Major findings
Chiu (1972)	Am. & Chi. 4-5th graders	Am. – Taxonomic preference. Chi. – Thematic preference.
Ji et al.(2004)	Am. (Chi.-Eng. bilinguals)	Am. – Taxonomic preference. C-E Bilinguals – Thematic preference. Mainland Chinese and Taiwanese showed significant differences according to the languages used in the test.
Unsworth et al. (2005)	Can. (Chi. & Western)	The Western group showed taxonomic preference and responded significantly more quickly to taxonomic pairs.
Gutchess, et al. (2006)	Am. Young & elderly. Chi. Young & elderly.	Chinese elderly people recall words based on a significantly less taxonomic clustering than the other participants.

Table 4. Cross-cultural studies on taxonomic-thematic categorisation (Am. means Americans, Can. means Canadians, and Chi. means Chinese)

Ji et al. (2004) considered that if there were differences in certain cognitive aspects between English speakers and Chinese speakers, then it may be possible to examine language effect by using bilinguals as participants. That is, they had had enough empirical research findings which showed differences in cognition and reasoning styles across cultures. Furthermore they found that some studies had shown language effect on spatial perception (Boroditsky 2001) and on categorisation (Markman & Hutchinson 1984). Thus they thought it may be possible to examine language effect on the taxonomic-thematic categorisation among Chinese-English bilinguals.

The participants of the experiment were all university students and divided into four groups. The first group was Chinese-English bilinguals in Mainland China, who started to study English comparatively later and did not use it for daily communication. The second group was Chinese-English bilinguals originally from

Hong Kong and Singapore staying in America. The third group was Chinese-English bilinguals originally from Mainland China and Taiwan staying in America. The second group and the third group were differentiated because of different English learning backgrounds. Hong Kong and Singaporean bilinguals started learning English earlier and were exposed to English in everyday life more often than Mainland Chinese and Taiwanese bilinguals, since English is one of the official languages in Singapore and in Hong Kong, and secondary schools and universities use English as a primary medium of instruction there. Also Singapore and Hong Kong were former British colonies and more westernised than Mainland China and Taiwan. Reflecting those differences in exposure to English, they made two different groups of the Singaporean and Hong Kong bilinguals, the second group, and the Mainland Chinese and Taiwanese bilinguals, the third group. The fourth group consisted of English monolinguals in America. The Chinese-English bilinguals were tested in either Chinese or English, and the Americans were tested in English.

The taxonomic-thematic triads matching task was used. The results showed that Americans revealed a clear taxonomic preference, and none of the Chinese-English bilingual groups revealed a taxonomic preference whether tested in Chinese or in English. There was a significant language effect for the Chinese group in the Mainland China and the Chinese and Taiwanese group in America. Both of the groups chose taxonomic alternatives significantly more often when tested in English than tested in Chinese, though overall preference of the two groups was clearly thematic-oriented. There was no correlation, however, between Chinese participants' self-reported TOEFL scores and their matching preferences.

To see the effect of language more clearly, furthermore, they compared Chinese in Mainland China and Hong Kong Chinese in Hong Kong. These two groups were different in the amount of exposure to English and in the length of time studying English. For this experiment they made two sets of test materials, so that all the participants were tested both in English and Chinese with a two weeks' interval between. The test results showed Mainland Chinese revealed greater thematic preferences than Hong Kong Chinese. More notably, there was a significant language learning context effect between the two groups. Mainland Chinese chose significantly more thematic alternatives when tested in Chinese than when tested in English, on the other hand, Hong Kong Chinese did not show much difference in their choice preferences between the two testing language conditions.

Thus Ji et al. (2004) supported findings by Chiu (1972) and observed that English monolinguals and Chinese-English bilinguals did show different response patterns in the taxonomic-thematic matching task, taxonomic-oriented and thematic-oriented respectively. Furthermore, they revealed that Chinese-English bilinguals did show different response patterns according to the language used in the test. Using English surely had some effect on their responses and made them more taxonomic-oriented. This kind of effect was clearly manifested among Mainland Chinese and Taiwanese bilinguals, but mitigated among Singaporean and Hong Kong bilinguals. English proficiency did not seem to be related to their matching preferences. Therefore, Ji et al. argued that language used in the test affected the responses of only Mainland Chinese and Taiwanese bilinguals, so that language played a role in tuning categorisation, and concluded that it was rather culture not language that actually led to different matching preferences. That is, Chinese-English bilinguals in Mainland China

and Taiwan had two independent language systems of Chinese and English rather than one compound system, so that they were more susceptive to cuing of the testing language. Further discussion over bilingual Chinese and their proficiency in this study is held off until Section 2.4.

Before going to the next section, it is necessary to discuss how 'culture' should be defined in the context of the comparison of Westerners and East Asians. Ji et al. (2004) concluded that it was rather 'culture' not 'language' that actually led to different matching preferences among Chinese-English bilinguals, and that language only played a role in tuning categorisation. Not only Ji et al. (2004) but also other studies of different cognitive patterns between Westerners and East Asians in social psychology (to cite a few, for example, Kitayama et al. 2003; Masuda & Nisbett 2001; Norenzayan et al. 2002) did not give any precise definitions of culture. From the description in their conclusion by Ji et al. (2004), however, it is clear that they differentiate culture and language, and do not include language in culture. We can find in Nisbett (2003) some descriptions which argue where to look for the cause of East-West differences. The enumerated possible causes may be: 'biology', 'language', 'economics', 'social systems', 'social practices', 'education', and 'inertia'. In the following paragraph in the same page he goes on to say:

> *The social practices* promote the worldviews; the worldviews dictate the appropriate thought processes; and the thought processes both justify the worldviews and support *the social practices* (Italics is by the author) (p. xx).

From this description researchers in the field of social psychology assume culture to mean 'social practices', and from descriptions in Ji et al. (2004) they differentiate

'culture' and 'language'. In this thesis, therefore, I use the term 'culture' following those definitions.

2.3.3 *Unsworth et al. (2005)*

Another cross-cultural study on categorisation is found in Unsworth et al. (2005). They used university students in Canada as participants, and divided them into the Chinese group and the Western group according to their cultural backgrounds. The Chinese group participants had a strong Chinese cultural background, which means that they were of Chinese descent, speaking Mandarin or Cantonese besides English, and practicing Chinese culture to a great extent. The Western group participants had a strong western cultural background, being of European descent, speaking only English, and practicing Canadian culture to a great extent.

First, taxonomic-thematic triad pictures were used and participants were asked which two pictures should be grouped together and further asked to provide a brief explanation for their decision. The results showed significant different responses between the two groups. The Western group showed a significant taxonomic preference of the groupings, but the Chinese group showed almost equal rates of the two types of grouping. Secondly, a picture-priming task was conducted and the participants were required to decide if the target picture, for example, *car*, was related to the priming picture, for example, *tyre* or *elephant*, or not. This experiment again showed that the Western group responded significantly faster to taxonomic pairs than thematic pairs, while the Chinese group responded almost equally fast to taxonomic pairs and to thematic pairs. The third experiment was a timed pictures matching task. As for the response latencies, the Western group responded significantly faster when they made

taxonomic groupings than thematic groupings, and the Chinese participants did not show much difference in choosing taxonomic pairs from choosing thematic pairs. As for the selection preferences, however, there was no significant difference found.

In these experiments, significant behavioural differences in categorisation were found among undergraduate students who had different cultural backgrounds living in the North America. However, the Chinese group did not show a strong preference for thematic grouping. Presumably it was because all of the Chinese group participants had experience with Western culture to some extent. Even if they were of Chinese descent and could speak Mandarin or Cantonese, and they reported that they practiced Chinese culture to a great extent, they were attending a university in Canada. So they were not truly representatives of Chinese individuals.

2.3.4 *Gutchess et al. (2006)*

Gutchess et al. (2006) investigated how age and culture affects categorisation. Smiley and Brown (1979) had investigated conceptual preferences in English speaking Americans from preschool children to elderly people, and found that the children group up to Grade1 and the elderly people group aged 66-85 showed a thematic preference in a triad matching task. After this study, most of the following studies investigated only young adults. Gutches et al. (2006) examined both young and elderly people who belonged to different cultural groups. They explored whether the extent of cultural exposure gave any effects on categorical organisation by conducting a free recall test on younger and older adults from the United States and Mainland China. There were four groups: the Young American, the Young Chinese, the Elderly American and the Elderly Chinese. All the groups were made of comparable samples with equivalent levels of

education, and general intelligence. They used two lists of 20 words as stimuli: one consisting of unrelated words and the other consisting of taxonomically related words chosen from four categories. The participants were shown randomised words one by one on a computer screen, and asked to recall the words after a short distraction task.

The results showed that all the four groups recalled categorised list words better than random list words. In terms of the number of the words recalled, there were not significant differences between the two cultural groups, yet in terms of the clustering strategies, there was a main effect of age: there was a significant difference between young adults and older adults. There was not any main effect of culture, but there was a significant difference between the Elderly Americans and the Elderly Chinese. That is, the young adults recalled the words based on the taxonomic relations significantly more than the older adults. When compared between the cultures, the difference was found only among the older adults: the Elderly Americans recalled the words based on the taxonomic relations significantly more than the Elderly Chinese. Namely, even if they recalled about the same number of words, the young adults and the Elderly Americans tended to cluster the words which belonged to the same category: they recalled *apple*, *pear*, *orange*, and *banana* rather than *apple*, *Monday*, *heart*, and *pear*.

Further a similar experiment was repeated with a list of words that were less strongly associated with the categories. Then the main effects of both age and culture were significant in terms of the clustering strategies in recalling. Chinese participants relied on a clustering strategy based on categories less often than Americans, and especially the difference was more prominent for elderly Chinese. Thus Gutchess et al. (2006) confirmed cultural differences in categorisation strategies using a free recall task.

Furthermore they found the long-term exposure to the culture strengthened the culture effect. Though this experiment measured categorical strategies only, which was likely to be only one of many strategies for successful recollection, it revealed cultural differences in attention to categories.

This section reviewed three studies on cross-cultural differences in the taxonomic-thematic categorisation. Though they did not always yield the same results as Chiu (1972), which showed a straightforward and systematic paradigm of a taxonomic preference among Westerners and a thematic preference among East-Asians, they did verified some clear differences between groups with different cultural backgrounds.

Ji et al. (2004) found clear matching preferences between English speaking Americans and Chinese-English bilinguals. The most notable finding in this study is that Chinese-English bilinguals from Mainland China and Taiwan revealed significant differences when tested in English from when tested in Chinese. They concluded, however, the differences to be attributable to culture, not language. Unsworth et al. (2005) showed both the Chinese group and the Western group categorised taxonomically-related objects in a similar way, but the Western group showed a significant taxonomic preference over thematic relations, and responded significantly faster to taxonomic groupings than the Chinese group. A main finding by Gutches et al. (2006) was that categorising traits are strengthened though long exposure to culture, and the differences between the two cultural groups were more prominent between the elderly groups. Thus overall results of the three studies still showed Westerners' stronger preference of taxonomic grouping than that of East Asians. In the next section,

these findings were reviewed from the perspective of second language acquisition and discuss backgrounds for further feasible research.

2.4 From Cross-Cultural Studies to Cross-Linguistic Studies

Studies on cognitive development of children did not yet show how they develop their cognitive aspects on object categorisation, as shown in Table 3 (p. 78). The participants of the studies differed in age. The same experiment tasks were not expected to be used for all the age groups; for example, the triads matching task could not be used to investigate 9-month-olds as in Waxman and Markow (1995). The materials differed in triad objects used as shown in Appendix A (pp. 280-283). Lin and Murphy (2001) especially argued that the thematic relations in the previous studies were not strong enough, and they used triads consisting of well-known objects by confirming the object relationships in a pretest. Some studies did not list up all of the objects used (Gutches et al. 2006; Ji et al. 2004). Also the aims of the studies were slightly different: some studies were aimed at investigating categorisation shift along with age, some were aimed at examining language effect, and still others were designed to see the effects of different instructions. As shown in Table 4 (p. 91), the cross-cultural studies did not always use Chinese monolinguals, or did not always use the taxonomic-thematic triad matching task. Thus the studies on object categorisation are not always commensurable with each other within and across the research fields. They were, however, supplementary and supportive to each other in some part, and at least, the following three points have been verified:

1) Language does affect behaviours in object categorisation and makes the categorisation incline to taxonomic-based whether the participants are Americans or Japanese regardless of age when considered within the same language groups.
2) There are some taxonomic-thematic preference shifts along with age in the object triads matching task within the same language group.
3) There are some different preferences among adults between different cultural groups, English speaking North Americans and Chinese speakers, in the object triads matching task.

Then from the point of view of second language acquisition, especially from the multi-competence perspective, such questions naturally arise: whether speakers of different languages respond in different ways because of the language they speak rather than the culture they are exposed to, and whether speakers of a language reconstruct different cognitive patterns as a consequence of learning another language. Specifically because the two languages used in the cross-cultural experiments, English and Chinese, are quite different in the number marking systems of nouns, they attract the attention in the SLA field for the possibilities of further cross-linguistic studies. The results of the experiments introduced above show that language directs the children's attention to isolated, individuated objects at the early stage of language acquisition, but the same mechanism does not seem to be always working to adult speakers of different languages. Though language influences both English and Japanese speakers at various ages toward taxonomic-oriented categorisation, adults of different language speakers still show different matching preferences. If language affects children's behaviours and directs

children's attention to isolated, individuated objects, would different language forms affect in different ways?

One aspect to note is that 'language' in the studies over cognitive development of children always refers to a count noun. In the triads matching task, the triads almost always consisted of individuated objects such as *tree*, *car*, and *nest*. And those are the words easy to acquire for children at an early age (Gentner & Boroditsky 2001; Waxman & Hall 1993). Soja et al. (1991) found that infants' ontological categorisation precedes appreciation of syntactic forms. Also Markman and Hutchinson (1984) discussed that language places an abstract constraint as shown in Section 2.2.2 above. Therefore, some biological constraint is expected to affect human infants in the process of language acquisition at the early stage, so that they should dissect concrete and solid objects from the surrounding environments. This constraint seems to be consistent with the English noun forms. English explicitly marks an isolated object by a count singular noun, but some other languages such as Chinese and Japanese do not differentiate a count noun from a mass noun. Sugimura (1993) showed a similar language effect on object categorisation among Japanese participants of different age groups including adults, though the Japanese language does not obligatorily distinguish count nouns from uncountable nouns.

These apparently contradictory findings remind us of a series of experiments on shape or substance preference by Lucy (1992), Imai and Gentner (1997), and Cook et al. (2006) described in 1.1.4 and 1.2.6 above. Lucy (1992) observed a contrastive difference between English and Yucatec in marking number on individualised objects. English makes a clear distinction between count nouns and mass nouns, while Yucatec treats all common nouns as mass-like nouns. He predicted English speakers would tend

to categorise objects based on the shape of the objects, while Yucatec speakers would tend to categorise objects based on material of the objects (see Section 1.1.4 for further detail). He used triads consisting of an object and two alternate objects, one in the same shape as the pivot object and one in the same material as the pivot. The results revealed as predicted that Yucatec speakers chose material alternates significantly more often than shape alternates, and the English speakers showed categorisation based on shape. The responses reflect exactly the different number marking patterns between English and Yucatec.

Imai and Gentner (1997) extended Lucy's experiments using shape-material triads on English speaking Americans and Japanese speakers at different age groups from infants to adults in order to see categorisation development and language influence (see Section 1.1.4 for further detail). They concluded that children universally prefer shape-based categorisation around the age of two when they are at the very beginning stage of learning first words. After that their categorisation will reflect some aspects of language. That is, the paralleled matching between the noun forms and the categorisation patterns will appear. Thus, there is certain ontological constraint working on language acquisition at an earlier age at the pre-linguistic stage, but there would be effects of the language they acquire by constantly being exposed to some specific forms peculiar to the language.

Cook et al. (2006) further replicated the experiment conducted by Imai and Gentner (1997). They found that Japanese learners of English (JLEs) at an advanced level staying longer in the UK showed a stronger shape preference tendency than the other JLEs staying for a shorter period, which was the intermediate behaviour between the short-stay JLE group and the English speakers. This behaviour is thought to be the

outcome of restructuring the mind of L2 learners as a consequence of acquiring English. Therefore, the long-stay JLE group must have acquired material preference tendencies in shape-material categorisation in the process of acquiring their L1 Japanese, and restructured the categorisation tendencies toward a shape preference while being exposed to and using English noun forms for a long time.

It may be possible to consider that the object categorisation patterns reflected on a taxonomic-thematic triads matching task should emerge along with age in similar ways to shape-material triads matching task. That is, though language seems to universally enhance taxonomic-based categorisation, long exposure to different language forms may lead to different categorisation patterns between speakers of different languages such as English and Chinese. Speakers of a language may acquire different ways of categorisation in the taxonomic-thematic triads matching task as a consequence of learning another language after their L1. Then what is it that makes speakers of different languages behave in different ways in the taxonomic-thematic triads matching? It should also be a big concern among linguists whether it is culture or language that affects the cognition, though the differences are attributed to cultural differences by most of the previous studies in the field of social psychology as described in Sections 2.2.2-2.2.4.

Looking back at the previous studies once more here, one of the footings for further possible studies of the cross-linguistic research can be found in Ji et al. (2004), Nisbett (2003) and Unsworth et al. (2005). Ji et al. (2004) revealed that the Chinese-English bilinguals staying in Mainland China showed significantly different responses when tested in English than when tested in Chinese. They started to study English comparatively later, and were exposed to comparatively less English in their

daily life than the Chinese-English bilinguals from Hong Kong. The researchers concluded that the effect may be cultural rather than from language, and suggested further research on whether there would be any language effect on categorisation or not. Unfortunately there was no correlation between language proficiency and categorisation preference found among the participants. It is presumed mainly because the participants had already reached a fairly high level of English proficiency: the average of their self-reported TOEFL test scores was 607 for the Mainland China and Taiwan Chinese, and 598 for Hong Kong and Singapore Chinese. With these advanced learners of English, it is questionable what kind of language effect the researchers intended to see. While they recruited monolingual English speakers and English-Chinese bilinguals with different English learning experiences, and conducted experiments on them seeking language effects, they concluded the differences to be attributable to culture. In order to see language effect in a more rigid way it is necessary to recruit Chinese participants ranging from a beginners' level to an advanced level in English proficiency, or ideally to include participants who are close to monolingual Chinese speakers.

The same can be said with the participants in the Unsworth et al. (2005). The participants were university students residing in Canada, and they were grouped into the Chinese group and the Western group according to their language backgrounds and the amount of exposure to Chinese and Western cultures. The Chinese group, therefore, could speak Chinese but must have had a very good command of English, and used it as a means of communication in their daily lives. If the Chinese group had been composed of Chinese participants who had not been exposed to Western culture so much as the Chinese students living in Canada, there might have been different pictures revealed for

the Chinese group. Therefore, it is necessary to investigate bilinguals at different proficiency levels in their L2, if the aim of the research is to see any language effects.

Regarding a language effect behind these results, another angle was found in Nisbett (2003). He observed that "English speakers know from linguistic markers whether it is a category or an individual that is being talked about" (p. 156) and speculated that different noun forms between English and Chinese may cause some effect on their different ways of grouping objects. The Chinese language does not have the noun forms to make distinctions between *duck*, *a duck*, *the duck*, *the ducks*, and *ducks*, which are distinguished from one another in English. Moreover, he says that English has a clearly distinguished generic noun phrase in the zero article plural form *ducks*, though *a duck* and *the duck* are possibly used to refer to a category as a whole (Huddleston & Pullum 2002), while Chinese lacks the plural noun form in the first place and does not have a specific way to express a generic reference as English does. Therefore, Nisbett (2003) asserts that the lack of the specific generic noun form referring to a category in Chinese may somehow distract Chinese speaking participants' focal attention from the properties of the taxonomically related objects.

Combining the findings over Chinese participants in the taxonomic-thematic matching experiments appeared above and Nisbett's assertions together, it is expected that Japanese speakers will behave in ways similar to the Chinese speakers in carrying out the object matching task. Japanese are part of the East-Asian ethnic group. They participated in experiments by Masuda and Nisbett (2001), Masuda and Nisbett (2006), and Kitayama et al. (2003) and showed behaviours such as paying attention to the backgrounds and relations of objects, giving context-dependent responses and having general holistic views, which are characteristics of the East-Asians according to the

research findings in the field of social psychology. Furthermore, the Japanese language does not have the noun forms to make distinctions between *duck, a duck, the duck, the ducks,* and *ducks,* which are distinguished from one another in English, but not in Chinese. Then it is worthwhile to investigate how Japanese would respond in the taxonomic-thematic matching task, and to examine whether there is any correlation between English proficiency and matching preferences in the framework of multi-competence.

Regarding generic expressions in English, they are not so simplified as Nisbett (2003) describes (Berry 1993; Huddleston & Pullum 2002; Quirk et al. 1985). Detailed descriptions of the generic expressions of English, Chinese, and Japanese are necessary. Therefore, the next chapter describes the use of generic expressions in English, Chinese and Japanese.

The present research takes the behaviour-centred approach that Lucy (1997) proposed, as stated at the beginning of this chapter. Now that some contrastive behaviours have been found in the taxonomic-thematic categorisation between English speakers and Chinese speakers, then certain areas of language which are presumed to be related to the categorisation should be analysed and compared in relation to these the languages. The present study will focus on generic expressions and go on to analyse generic expressions in English, Chinese and Japanese in the next chapter, and then further investigate how speakers of English and Japanese and Japanese learners of English will behave in the taxonomic-thematic categorisation task.

Chapter 3. Generic Expressions in English, Chinese and Japanese

3.1 Introduction on Generic Nouns

In the previous chapter, we have seen that Nisbett (2003) observed that "English speakers know from linguistic markers whether it is a category or an individual that is being talked about (p. 156)" and Chinese speakers do not because the Chinese language does not have such noun forms as to distinguish *duck, a duck, the duck, the ducks* and *ducks.* Especially he speculates that the zero article generic plural noun[7] such as *ducks* in English and the lack of such a generic noun in Chinese may give some causal effects on different behaviours in the taxonomic-thematic categorisation task between English speakers and Chinese speakers. Though his experiment compared Chinese speakers with English speakers, the present research focuses on Japanese learners of English and examines if they will behave differently from English speakers. Because Nisbett (2003) predicts language effects on categorisation, if the Japanese language is similar to the Chinese language as far as the lack of a specific generic noun form is concerned, it would be worthwhile to predict that Japanese speakers and Chinese speakers would behave in similar ways in the triad categorisation task. Furthermore, it would be plausible to compare behaviours of Japanese speakers to those of English speakers in a triads matching task. The aim of this

[7] Nisbett (2003) calls this form 'the bare plural' but the term 'the zero article plural' is used throughout this thesis in order to distinguish it from Chinese and Japanese noun forms which do not have articles. It is not appropriate to use the same term for noun phrases of languages with and without articles. Therefore, 'bare' is used in describing noun forms in Chinese and Japanese.

chapter, therefore, is to investigate generic noun forms in English, Chinese and Japanese in order to support the prediction.

Generic nouns "are used to refer to the class or species generally" (Quirk et al. 1985, p. 265), or "refer to a kind as a whole" (Gelman 2004, p. 445). Or it is also said that "a generic statement applies broadly to a category" (Ibid. p. 446). Therefore, such a noun as *birds* in a sentence *Birds fly* is a generic noun which refers to a category.[8] Without them, we have to say *This bird flies, and that bird flies, too,* referring to each specific bird, or say *All birds fly*, referring to all the members of the category, or even *Some birds fly*, referring to certain restricted members of the kind. These expressions of *all birds* and *some birds*, however, are different from generic expressions as explained in detail in the following section. Generic expressions, in a strict sense, also include such generalised expressions as *John smokes a cigar after dinner*, which describes John's habitual behaviour. It is considered to be a description of his general characteristics (Krifka et al. 1995). Such characterising expressions referring to a specific person with a proper noun are not relevant to the present research of object categorisation, therefore they are excluded and generic nouns referring to a category are considered here.

Generic nouns make it possible to talk about a category in general without being constrained to specific things and events. Research on cognitive development shows that generic concepts play an important role in cognitive development of infants because "kinds organize knowledge and guide inferences about the unknown" (Gelman 2004, p. 446). Recent studies in psychology also demonstrate that people can make rich

[8] In this thesis, 'kind' and 'category' are used interchangeably without carrying specific implications with the terms, following Gelman (2004).

inferences about the surrounding world through developing concepts of kinds (Gelman 2004; Murphy 2002; Prasada 2000). According to those studies, once we acquire generic concepts, we can learn essential properties of the kind to enlarge our knowledge of the world. We can also talk about enduring, abstract and timeless events apart from a specific context, and properly infer what seems to be happening. As Prasada (2000) states, a large part of our world knowledge consists of knowledge about kinds rather than about particular instances, episodes or events. It is very important and necessary, therefore, for us to acquire generic concepts.

Generic references are expressed differently across languages, but what is very intriguing is that no language has a specific form in order to particularly express genericity (Jespersen 1924). For example, in English the singular or the plural noun form with or without a definite or indefinite article is used to express the concept. It appears, therefore, as if "generics are marked more by their absence than by their presence" (Gelman 2004, p. 473). Also the ambiguity that a generic expression produces makes it difficult for L2 learners to acquire such language forms (Snape et al. 2009). These facts cause the situation that generic expressions are ambiguous in most languages, including English. Thus there would be a question about how Nisbett's (2003) statement should be treated, which says that English has a specific generic expression such as *ducks*.

We need to know what generic expressions are in the first place before we search into generic noun forms in English, Chinese and Japanese respectively. The following two sections describe some characteristics of generic knowledge to understand generic noun phrases, and how people acquire such knowledge.

3.2 Generic Knowledge

3.2.1 *Categories*

Generic nouns refer to categories as a whole such as *birds*. All the category members, however, do not seem to have an equal status to form the category. That is, as Rosch (1975) argues, some members of a category take perceptually salient and central positions of a category, and thus are more representative and typical than other members. The most representative member of a category is a prototype of the category. Though there is a discussion going on in the field of cognitive psychology on different approaches to how categorical concepts are formed, at least it can be said that our

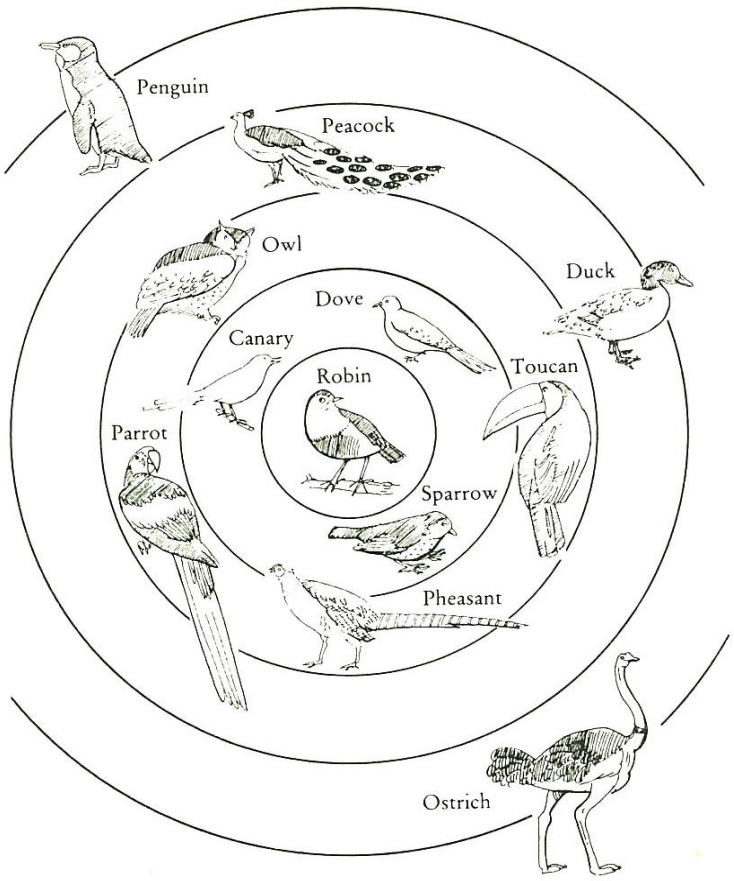


Figure 7. Birdiness rankings (Aitchison 1994, p. 54)

knowledge about categories of things is formed in terms of attributes of more typical members of the category (Lakoff 1987). That is, categories have gradations of typicality, so that some are more typical members of a category and some are atypical. Aitchison (1994) plainly visualises the gradation of birdiness. In Figure 7, for example, *robins* are more typical than *owls. Owls* are more typical than *penguins,* and so forth. People form their concepts of a category based on the characteristics of an ideal exemplar, *robins* in this case, and decide on some other members by matching them against the features of the prototype. Thus most people tend to think of a small sized creature, which has a beak, has two wings, therefore flies, chirp merrily, and is covered with soft feathers, when they think of *a bird*. They rarely think of a *penguin*, which is bigger and doesn't fly, and therefore, is more peripheral in the category.

What is concerned here in the present cross-linguistic research is that prototypes may be different across cultures and languages, regions in the world, and even personal interests. *Robins* are a prototype of a bird to English speakers but may not to Japanese speakers. *Chairs* are a prototype of furniture to English speaking people, but may not be to people who usually do not use chairs but rather sit on a floor mat. *Apples* may be a prototype of fruits to some people but *coconuts* may be more typical to some people living in warmer regions. Thus the act of categorisation and developing concepts around the prototypes are universal, but different groups of people may have different prototypes of categories. This feature of categories should be kept in mind when the present research proceeds further in designing experiments.

Rosch (1973) also argues that some categories are not made arbitrary but are highly determined in similar ways across cultures and languages. They are called *basic level categories*, and they carry the most information, possess the most characteristics in

common, and are the most differentiated from one another. Thus basic categories such as *dogs* and *chairs* are easily differentiated from other categories such as *cats* and *beds*. They are usually easily categorised and distinguished from other categories at the basic level. When asked *Do you have any pets?*, most people would prefer to say *I have a dog* rather than *I have a terrier* or *I have a spaniel.* And *dog* and *cat* are the words a child would learn before *terrier* and *British shorthair.* It is, furthermore, difficult to draw a picture of *an animal* or *a piece of furniture* but it is much easier to draw a picture of *a dog* or *a chair*.

Some superordinate categories and subordinate categories may develop in different ways across different groups of people. For example, a superordinate category *pets* may include different animals and living creatures across different regions in the world. Or there may be a group of people who do not even have a conceptual category of *pet.* At a lower level, such categories *sardine*, *mackerel*, and *herring* are more familiar to some people, while *fish* is more often used by people who do not know those kinds very well. Expertise naturally needs more subordinate level names. Then the next concern is what constitutes generic knowledge.

3.2.2 *General characteristics of generics*

This section describes some basic characteristics of generic knowledge based on Prasada (2000) and Krifka et al. (1995). Though generic noun phrases are generally considered to refer to a category as a whole, there are some aspects of general characteristics of generics to note here regardless of the different prototypes across cultures and languages and different linguistic forms across languages.

First of all, it is intriguing that though generic expressions refer to a category as a whole, the concept is different from *All birds can fly* or *Any bird can fly*. Indeed some birds do not actually fly, but the existence of exceptions would not make it unacceptable to say a generic expression such as *Birds fly*. Thus, generic knowledge is not regarded as false even if there are some exceptions and counter-examples (Prasada 2000). This characteristic of generic expression is easily understood from the prototype theory. That is, some members of a category are more typical and some are atypical, as shown in Figure 7 above. For example, the general description (1) is quite agreeable and acceptable as a generic expression. It refers to birds as a category, but we soon notice that there are some kinds of birds that do not fly such as *penguins, kiwis,* and *ostriches*, which are more peripheral members of the category. Strictly speaking, such statistical knowledge as (3) is considered to be more correct and seems to be more appropriate from a realistic point of view. However, statistical regularities are not what is expected when talking about birds in general (Prasada 2000). (1) also does not mean (2), so that we can say that generic expressions are different from expressions using such quantifiers as *all*, *every*, and *some*.

(1) Birds fly.

(2) All birds fly.

(3) X% of birds fly.

This kind of characteristic of generic expressions can be tested by a diagnostic test for genericity suggested by Krifka et al. (1995). This test shows genericity by combining the sentence in question with an adverb like *usually* or *typically*. If the

sentence does not show major change in meaning by adding such an adverb, it is generic. (4) does not change its meaning so much by being added *usually*, so (4) and (5) are not very different. *Usually* approves exceptions. When the meaning of the sentence is changed considerably by adding *usually*, it is not generic but it is specific or indefinite. (6) is considered to refer to an indefinite lion on a specific occasion, and by adding *usually* to it, (7) indicates the occasion was repeated many times, and it is not generic (Krifka et al. 1995).

(4) A lion has a bushy tail. (Krifka et al. 1995, p. 9)

(5) A lion usually has a bushy tail. (Ibid.)

(6) A lion stood in front of my tent. (Ibid.)

(7) A lion usually stood in front of my tent. (Ibid.)

Secondly, generic knowledge involves knowledge about essential properties of a category (Prasada 2000). That is, some generic knowledge is about essential properties that are taken for granted as a consequence of being a member of the category. Therefore, it is possible to say (8) below in case the referent is an unknown object that has wings and can fly. That is, by virtue of being able to fly in the way general birds fly the unknown object is assumed to be a bird. Furthermore, because the property of *flying* is so essential that (9) sounds redundant. It is as unnatural as saying 'I saw a four-legged dog'. On the other hand, (10) sounds quite all right because *being able to talk* is not expected as an essential property of a bird. So the sentence (8) also proves the acceptability of the generic expression (1).

(8) That must be a bird because it flies.

(9) He keeps a bird that flies.

(10) He keeps a bird that talks.

Generic expressions are often found among natural categories as in the examples above, but there are also general expressions about artefacts and social categories. Their essential properties are more strictly attributed to members of the category as shown below. For example, in order to be an airplane the flying machine should *have wings* for flying as shown in (11), and in order to be a *submarine* the diving machine should *be airtight* as shown in (12). Otherwise, they do not function as an airplane or a submarine. The same can be said with a *lifeguard* as in (13).

(11) Airplanes have wings. (Prasada & Dillingham 2006, p. 107)

(12) Submarines are airtight. (Ibid.)

(13) Lifeguards can swim. (Ibid.)

Thirdly, from these examples, we can say that generic knowledge often has a normative aspect (Prasada 2000). 'Normative' means that the knowledge about properties and characteristics of a kind often leads us to think 'If it is a bird, it should naturally fly', or 'If it is an airplane, it should have wings'. On the other hand, statistical expressions and specific expressions do not lead us to expect that way. Compare the sentences (3), shown above and repeated here, with (14), and (11), again repeated, with (15). Addition of *should* to the sentence (3) makes it quite a different assertion (14). The

two sentences (11) and (15) do not differ from each other so much as (3) and (14) do. This indicates that generic sentences have a normative aspect in nature.

(3) X% of birds fly.

(14) X% of birds should fly.

(11) Airplanes have wings.

(15) Airplanes should have wings.

Fourth, generic expressions do not consist exclusively of such essential properties as described above. In the samples below, being friendly as in the sentence (16) is not considered to be an essential property of being a Midwesterner in the United States. Or to be a Midwesterner, a person does not have to be friendly. It is rather attributed as one of the commonly agreed characteristics of the Midwesterners. Therefore it is less essential than 'living in the Midwestern states' as stated in (17).

(16) Midwesterners are friendly. (Gelman 2004, p.448)

(17) Mid westerners are the people living in the states in Midwestern United States.

Therefore, generic knowledge involves commonly agreed knowledge that is induced from specific instances. This kind of generic sentences such as (16), also *Italians like pasta*, and *Cars are expensive* are called characterising sentences (Gelman 2004; Krifka et al. 1995) and can be considered to be generic.

Lastly, as the example (16) shows, generic knowledge involves knowledge about a well-established category (Krifka et al. 1995): in other words, what makes a

category is ‘the shared knowledge of a community of speakers’ (Chierchia 1998, p. 348). People may think *Midwesterners* constitutes a group of people and can be considered as a distinguished category, and it seems so as far as (16) is accepted. It is not possible to form a generic noun phrase unless it is about a well-established category. The following two sentences (18) and (19) show the difference between a category-referring noun and an object-referring noun. It is doubtful to assume that *green bottles* makes a category, so that most people would agree to say that (19) is not acceptable as a generic sentence about *green bottles*. If the nouns are definite singular nouns, they are in a clearer contrast as (20) and (21) show. That is, (20) can be generic but (21) is clearly considered to refer to a specific object.

(18) Coke bottles have narrow necks. (Krifka et al. 1995, p. 11)

(19) Green bottles have narrow necks. (Ibid.)

(20) The Coke bottle has a narrow neck. (Ibid.)

(21) The green bottle has a narrow neck. (Ibid.)

To sum up this section, generic knowledge has the following basic characteristics:

1. Generic knowledge is not regarded as false even if there are some exceptions and counter-examples.
2. Generic knowledge involves knowledge about essential properties of a category as a whole.
3. Generic knowledge often has a normative aspect.

4. Generic knowledge involves commonly agreed knowledge that is induced from specific instances.
5. Generic knowledge involves knowledge about a well-established category.

With these characteristics in mind, we will further see how people are usually considered to acquire generic knowledge.

3.3 How to Acquire Generic Knowledge

Concepts of categories are fundamental in human thought and communication. Nonetheless, it is not yet clear how one acquires general concepts of categories. This section outlines the difficulty in explaining how people acquire generic knowledge and use generic expressions.

There is a problem of generic language concerning how children understand, learn and use generic noun phrases (Gelman 2004), and a problem of generic knowledge concerning how people acquire generic knowledge from a limited number of exemplars (Prasada 2000). As for the problem of language, English speaking children seem to use not only linguistic cues, but also contextual cues, general knowledge, and prior knowledge to specify generic expressions (Cimpian & Cadena 2010; Cimpian & Markman 2008) because there is not only one particular linguistic form to express the concept. For example, Gelman (2004) shows that caretakers may talk to infants using such utterances as, 'Look as this bear. Bears are huge,' and 'This is a squirrel. And they eat acorns,' while pointing at a picture book. The plural form without an article *bears*, and the anaphoric use of the plural pronoun *they* helps infants to infer that these items

implicitly refer to *bears* and *squirrels* in general as a taxonomic category. Furthermore, the present tense is another cue, because the meaning is different if it has a progressive aspect: compare *they eat acorns* and *they are eating acorns.* Thus lack of determiners, number, together with tense and aspect, are important cues to indicate genericity. It seems this kind of caretakers' input shows partly how children learn essential properties of a category, which is one of the basic characteristics of generic expressions. From general knowledge, furthermore, it is usually understood, for example, that such a temporal state as *being sick* does not make a proper predicate of a generic sentence referring to bears and squirrels in general. Thus even small children understand that such a temporal predicate would not be either an essential property of a category, or a normative property of being a member of the category.

The problem of generic knowledge deals with how it is possible to abstract essential properties and to establish a category with only limited experiences. People can even acquire the concept by looking at one example of the category (Gelman 2004; Prasada 2000). For example, we may see a new type of TV set on some occasion and can recognise another one sometime later. Also infants will correctly learn that a small animal with a bushy tail called *squirrel* likes to eat acorns, not 'the animals living in the tree' or not 'all of the animals' like to eat acorns. What is the mechanism of learning genericity of a category? Because there is not only one particular linguistic form to exclusively express generic concepts, it does not seem easy for English speaking children to construct generic concepts through only linguistic forms as described in the previous paragraph (Cimpian & Markman 2008). The object categorisation process involves behaviours such as recognising an object from the other surroundings, paying attention to certain parts of characteristics of the object, finding out certain kinds of

similarities and to relate those characteristics as inherent ones to the objects (Imai 1997). For those behaviours to take place, some verbal interactions described above such as ‘This is a squirrel. And they eat acorns’ would enhance children to categorise objects. Also through interactions with adults using generic statements such as ‘they are made like that’, children are encouraged to learn generic aspects of artefacts (Cimpian & Cadena 2010). Apart from these examples of language specific evidence, the language effect on categorisation was explored in the studies in cognitive development in the previous chapter, which is briefly reviewed here.

In the development of general concepts of categories, language itself, that is, verbal stimuli, seems to play a crucial part. Markman and Hutchinson (1984) showed that children at the ages of 2 to 5 were guided to categorise objects by language. Being presented with a taxonomic-thematic triad, they preferred to group taxonomically-related objects more often when hearing new words than when hearing no word. This fact shows that children are to learn general properties of a category being guided by language. Waxman and Hall (1993) also confirmed language influence on taxonomic-based object grouping as early as 15 months old. Waxman and Markow (1995) further observed that words enhance object categorisation among even younger children at the age of 12 to 14 months old: they could match a novel word and the meaning of an object and extend it to other members of the object. Innate ability to individuate a concrete solid object as a whole is approved. Furthermore it was asserted by Waxman and Markow (1995) that language enhances the development of generic concepts by drawing their attention to the objects. Then children develop their concepts on categories along with their experience of some particular language.

If language gives some effects on the development of generic concepts, what will happen if people are exposed to different languages which have different generic noun forms? As for effects of different linguistic forms, it was found that the phrase ‘another one’ enhanced taxonomic categorisation more than the other phrases ‘go with’ and ‘best go with’ (Waxman & Namy 1997). The phrase ‘another one’ individuates an object in a more explicit way than the other phrases. Then different linguistic forms may well give different effects across different languages. In the previous chapter, we saw that Yukatec speakers and Japanese speakers behave differently from English speakers in classifying objects: shape-based or material-based classification (Lucy 1992; Imai & Gentner 1997). The former languages do not differentiate countable and uncountable nouns as clearly the latter language. The differences in noun forms seem to guide into different cognitive behaviours. That is, English speakers tend to prefer shape-based categorisation, and Yucatec and Japanese speakers tend to categorise objects based on material more frequently than English speakers. This kind of phenomenon occurring between speakers of English and so-called mass noun languages such as Yucatec and Japanese is later called the Mass Noun Hypothesis (Kuo & Sera 2009).

Then it is quite plausible and worthwhile to predict and examine that there would be some cognitive differences as a consequence of acquiring different generic noun forms by learning another language. This research extends the taxonomic-thematic matching task experiment originally done on English and Chinese speakers to English and Japanese speakers. In order for the experiment to be done, generic expressions in each language are examined in the following three sections.

3.4 Generic Expressions in English

3.4.1 *General view*

Quirk et al. (1985) and Huddleston and Pullum (2002) describe the three most general ways to express generics concerning countable nouns in English. For example, the noun phrases in the following six sentences are all interpreted as generic.

(1) A lion is a ferocious beast. (Huddleston & Pullum 2002, p. 407)

(2) The lion is a ferocious beast. (Ibid.)

(3) Lions are ferocious beasts. (Ibid.)

(4) A tiger can be dangerous. (Quirk et al. 1972, p. 265)

(5) The tiger can be dangerous. (Ibid.)

(6) Tigers can be dangerous. (Ibid.)

The expressions *a lion, the lion* and *lions,* and *a tiger, the tiger, and tigers* are all generally understood as ‘any lion/tiger that exists’ in the sentences above. That is, the three noun forms ‘the indefinite article + singular countable noun’, ‘the definite article + singular countable noun’, and ‘the zero article + plural countable noun’ can read generically in English. ‘The definite article + plural countable noun’ such as the one in *The lions are ferocious beasts* is obligatorily interpreted as non-generic, referring to some specific groups of lions. This form holds a generic function only when it refers to the people of a nationality, an ethnic group, etc. such as in *The Romans defeated the Carthaginians in 202 BC* (Quirk et al. 1985, p. 283).

The form ‘the zero article + singular countable noun’ such as *lion* may possibly be generic in case a captured lion is treated as food: for example, *Do the animals eat lion?*, in which *lion* means lion meat. This is the case in using *chicken* for food, in contrast to *a chicken* or *chickens*, and *fish*, in contrast to *a fish* or *fishes*. The noun form can also be generic in a sentence like *Man is mortal*. However, Jespersen (1924, p. 213) gives only two examples for this singular noun without any article: *man* and *woman* such as in *The proper study of mankind is Man*, and *Woman is best when she is at rest*. Therefore, the use of this form for generic seems to be quite limited. These two forms of noun phrases, ‘the definite article + plural countable noun’ and ‘the zero article + singular countable noun’, thus, are not quite relevant here, and will be excluded in the further discussion.

The examples of the three different forms to mean generic above from (1) to (6) show that the generic expressions in English are not as simple as Nisbett (2003) says. He mentions only one form of the noun ‘the zero article + countable plural noun’ as the generic phrase in English. Among the three noun forms, however, Berry (1993) says ‘the zero article + plural countable noun’ is the most commonly used pattern, and Jespersen (1924) also says generic plural nouns without articles are very frequently used. Judging from these descriptions, the speculation by Nisbett (2003) cannot be flatly disregarded. Also it should be noted that Berry (1993) warns that it is not possible to use any generic expression instead of another interchangeably. This study, then, deals with the three forms of generic noun phrases and investigates how they are different.

3.4.2 *Three forms of generic nouns: non-interchangeability*

The three generic noun forms 'the indefinite article + singular countable noun', 'the definite article + singular countable noun', and 'the zero article + plural countable noun' cannot be always interchangeable. For example, to cite the examples above again, they are interchangeable in sentences (7), (8) and (9) below. The next three noun phrases in (10), (11), and (12) below cannot be used interchangeably to mean generic. This is because 'the indefinite article + countable singular noun' is not generally acceptable in talking about the location or existence of a kind of animal, thing, or person. Similar examples are **A dodo is extinct now*[9] and **Asia is the home of a tiger*, while *An adult porpoise is six feet long* is considered to be an acceptable generic expression (Berry 1993, p. 36).

(7) A tiger can be dangerous. (Quirk et al. 1972, p. 265)

(8) The tiger can be dangerous. (Ibid.)

(9) Tigers can be dangerous. (Ibid.)

(10) *A tiger is becoming almost extinct. (Ibid. p. 282)

(11) The tiger is becoming almost extinct. (Ibid.)

(12) Tigers are becoming almost extinct. (Ibid.)

Furthermore, in referring to some people in general, the zero article plural nouns would not be interchangeable with 'the indefinite article + singular countable noun'. For example, comparing the following two sentences, while *doctors* in (13) is generic, *the*

[9] An asterisk attached to an example means unacceptable, and a question mark means questionable in interpreting it as generic here.

doctor in (14) would be interpreted as non-generic and referring to a specified person in most of the cases:

(13) Doctors are kind people. (Huddleston & Pullum 2002, p. 407)

(14) ?The doctor is a kind person. (Ibid.)

Genericity would blur across the positions in the sentence, too. Of the three options in the three sentences (15), (16), and (17), only *the medieval mystery play* in (16) refers to mystery plays as a genre, *a medieval mystery play* in (15) refers to only one play, and *medieval mystery plays* (17) is most likely to refer to a subset of them (Quirk et al. 1985). The contrast in meaning will clearly appear in (18), in which the same phrase *medieval mystery plays* takes the subject position and the whole sentence explains what kind of plays they are. Therefore, it is most likely generic.

(15) Nora has been studying ?a medieval mystery play. (Quirk et al. 1985, p.28)

(16) Nora has been studying the medieval mystery play. (Ibid.)

(17) Nora has been studying ?medieval mystery plays. (Ibid.)

(18) Medieval mystery plays focused on the representation of Bible stories in churches … .[10]

[10] This sentence was found in the Internet encyclopedia; available at http://en.wikipedia.org/wiki/Mystery_play. In this explanatory sentence, it is notable that the other two noun phrases *Bible stories* and *churches* are both zero article plurals. This shows how the zero article plural noun is often used to explain something.

Also after the verb *like* and similar preference descriptions, the zero article plural nouns are generally used as in (21) and the other forms are not acceptable as in (19) and (20) (Shobo 1996). In the two sentences (22) and (23), *the tabloid newspaper* means different: in (22) it refers to a specified tabloid newspaper, while it has a generic function in (23), as 'the definite article + count singular noun' is often used in referring to an area of study (Berry 1993).

(19) Elephants like *a peanut. (Shobo 1996 p. 142)

(20) Elephants like *the peanut. (Ibid.)

(21) Elephants like peanuts. (Ibid.)

(22) ?The tabloid newspaper is a disgrace. (Huddleston & Pullum 2002, p. 407)

(23) Hugo has turned the tabloid newspaper into a research industry. (Ibid.)

Thus, generic phrases do not have exclusively the generic function. Here is a very good example of how the meaning of 'a paper' can change from the specific use to the generic use (Christophersen 1939). As the context becomes less specific from referring to a person designated by the pronoun *I* on a specific occasion of *this morning* in (a), to more general descriptions with the subject of *you* in (c) and (d), *all* in (e) or *everybody* in (f) without any specific time, and finally to a general description about a paper with no referring to any specific person or event in (g), the meaning of *a paper* becomes more and more general. Thus the context plays an important role in determining generic use of 'indefinite article + singular countable noun' in the sentences below.

Definite

(a) I bought *a paper* this morning but left it in the train after I had read it.

(b) I saw Mr. Jones in the train this morning. He was reading *a paper*, so he did not see me.

(c) If you buy *a paper* tomorrow, will you bring it home for me to read?

(d) Do you buy *a paper* every morning?

(e) All Englishmen buy *a paper* every morning.

(f) Everybody ought to buy *a paper* in the morning.

(g) *A paper* in the morning is not a luxury.

Indefinite

It seems there is something like a continuum of definiteness in the use of 'the indefinite article + singular countable noun' with 'definite' at one end and 'indefinite' at the other end as the arrow shows above. This phenomenon is particularly interesting from the viewpoint of generic expressions. As Quirk et al. (1985) states, genericity arises as number and definiteness become less clear. Then, the phrases 'the indefinite article + singular countable noun' and 'no article + plural countable noun' are equally indefinite, though the indefinite 'a' may give a little more clarity of number, that is, it clearly indicate *one*. Does it mean zero article plural nouns are more appropriate than indefinite article singular nouns when used as generic nouns? It may be so since generic nouns refer to members of a category and rarely refer to only one member of a category.

Though zero article plural nouns are used to indicate both generic and indefinite references, it is the most frequently used form among the generic noun phrases (Barry 1993). One example was already shown above in (17) and (18). The zero article plural nouns *medieval mystery plays* take the object position and the subject position respectively and have different meanings. The two examples below, which take the same sentence position, show some different degrees of definiteness. *Bottles* in (24) obviously refer to some indefinite bottles in the kitchen and *bottles* in (25) refer to bottle in general, hence a generic expression. If *usually* is added to test genericity, the difference becomes clearer.

(24) Bottles are standing all over the kitchen. (Krifka et al. 1995, p. 11)

(25) Bottles are fragile.

(26) Bottles are *usually* standing all over the kitchen.

(27) Bottles are *usually* fragile.

In addition to these, the non-progressive verb form and absence of a modifier specifying a particular individual are also considered to be cues to interpret generic nouns (Cimpian & Markman 2008; Gelman & Tardif 1998). Therefore, the following two sentences are not interpreted as generic. It is possible to say *Birds fly/The bird flies/A bird flies* in a generic sense, but when it turns to bear the progressive aspect as in (28), the meaning is quite different. *A bird* in (28) refers to one bird. The reason is obvious: the progressive indicates a temporal event in progress. The adjective *half-blind* in (29) also makes the phrase refer to a specific bird, though the sentence interpretation

still depends on the attributes of the adjective. Therefore, it is possible to create a generic sentence such as *The trapped rat fights*.

(28) A bird is flying.

(29) The half-blind bird flies.

Thus English speakers are required to use linguistic knowledge and general knowledge to interpret generic expressions. The sentence (30) is an interesting example of how inconsistency in the knowledge makes the genericity unacceptable. Usually the form 'the definite article + plural countable noun' are not used for generic reference. *The wolves* is not acceptable in a generic sense because it is generally understood as referring to a specified group of wolves. There is something wrong with the sentence (30) because it has a generic attribute *being carnivorous*, which usually describes the essential property of the whole category of the animal. It is strange to say that some wolves are carnivorous and other wolves are not. Therefore, an acceptable sentence should be (31) which does not have a definite article. The sentence (32) is quite acceptable, which refers to some specified animals which were dying at a place.

(30) ?The wolves are carnivorous. (Quirk et al. 1985, p. 283)

(31) Wolves are carnivorous. (Ibid.)

(32) The tigers were dying under a big tree.

To sum up, generic English phrases referring to a category as a whole have three forms; 'the indefinite article + singular countable noun', 'the definite article +

singular countable noun', and 'the zero article + countable noun'. These three forms are not interchangeable but there are some restrictions: existence and extinction would not be expressed with '*a* + singular form'; '*the* + singular form' often reads as a specific expression when referring to a person; '*the* + singular form' may lose genericity in the object position of a sentence, and the form is often preferred when referring to a field of study. Furthermore, in order to interpret genericity it is necessary to use the tense, the aspect, and general knowledge cues as well. Among the three forms of generic noun phrases, the zero article plural form is most frequently used and neutral, but it is not possible to say it refers exclusively to a generally whole category but it also refers to indefinite entities.

3.5 Generic Expressions in Chinese

The different behaviours in the taxonomic-thematic matching task were found between English speakers and Chinese speakers (Ji et al. 2004), and Nisbett (2003) speculated that the differences could be attributed to different generic expressions in the two languages, as described in Section 2.4, pp. 105-106. It is necessary, therefore, to explore how different the generic expressions in the two languages are. It is further necessary to confirm that Chinese resembles Japanese in generic expressions, as the present study aims to investigate how differently English speakers and Japanese speakers behave in the taxonomic-thematic categorisation task. Thus this section explores generic expressions in Chinese, and the next section explores those in Japanese.

Generic noun phrases referring to a category, which are expressed in three ways in English such as *a lion*, *the lion* and *lions*, are all expressed in one way in Chinese as below. That is, the three noun forms are not distinguished in Chinese.

(1) shīzi shì xiōngměng de shòulèi

lion be ferocious NOM beast

A lion is a ferocious beast.

The lion is a ferocious beast.

Lions are ferocious beasts.

In order to further understand noun phrases in Chinese, it is important to note that Chinese is among the numeral classifier languages (Allan 1977). Classifier languages require classifiers in order to express the quantity of the entities which nouns refer to. In many cases the classifier denotes some salient characteristics of the referents of the nouns. English has classifiers, too, when mass nouns are quantified such as *a piece of cake*, *two glasses of water*, and *three grains of rice*. The big difference is that Chinese requires a classifier much more frequently than English. That is, a classifier is necessary before the noun when it occurs with a number (e.g., *yí* 'one', *shí* 'ten', *bàn* 'half'), and/or a demonstrative (i.e., *zhèi* 'this', *nèi* 'that', *něi* 'which'), or certain quantifiers (e.g., *zhěn* 'whole', *jǐ* 'how many/a few', *mǒu yi* 'a certain', *měi* 'every') (Li & Thompson 1981). English does not require classifiers in those cases unless the nouns are mass nouns. For example, look at the Chinese examples from (2) to (4).

(2) sān – ge rēn (Li & Thompson 1981, p. 104)

three – CL person

three people

(3) zhèi – zhǎn dēng (Ibid.)

this – CL lamp

this lamp

(4) nèi – liù – běn shū (Ibid., p. 105)

that – six – CL book

those six books

(5) zhěn – ge fángzi (Ibid.)

whole – CL house

the whole house

Sān–ge rēn ‘three people’ in (2) and *nèi–liù–běn shū* ‘those six books’ in (4) refer to more than one items, but the nouns *rēn* ‘person’ and *shū* ‘book’ are not pluralised, though English makes the distinction between the singular and the plural such as *one person/six persons* and *one book/two books*. That is, the noun *shū* ‘book’ in Chinese does not change its form whether it refers to one book or two books. As the noun is not pluralised, the number is ambiguous unless number is expressed.

Chinese speakers would say Chinese does have plural noun forms, but they are used in limited cases. Plurality of pronouns is marked with the suffix *–men* as shown in (6) below. The suffix can extends to some nouns referring to people as in (7) when

there is some reason to emphasise the plurality but it is generally very rare. It is generally said, therefore, that the Chinese language does not make a clear distinction between singular and plural in the noun form.

(6) tā	s/he	tā–men	they
nǐ	you	nǐ–men	you (plural)
wǒ	I	wǒ–men	we

(7) lǎoshī–men	teachers
zuéshëng–men	students
péngyǒu–men	friends

Also it is not always clear whether the noun is definite or indefinite because Chinese does not have such articles as English does, such as in the sentences below.

(8) tā méi yǒu zìxíngchē

3sg not exist bicycle

S/He does not have a bicycle.

(9) tāmén tóu zìxíngchē (Li & Thompson 1989, p. 128)

they steal bicycle

They steal bicycles.

(10) tāmén tóu – le zìxíngchē

they steal – PFV bicycle

They stole the bicycle.

(11) tā qí zìxíngchē qù xuéxia

3sg ride bicycle leave school

S/He goes to school by bicycle.

Zìxíngchē ‘bicycle’ in (8) most likely refers to one bicycle, judging from the context where the subject is singular, that the sentence describes the present situation, and that one person owns one bicycle in most general cases. *Zìxíngchē* ‘bicycle’ in (9), however, is most likely to refer to bicycles in general. Thus it is pluralised in English, because the sentence is interpreted as describing the present repeated behaviours of *tāmén* ‘they’. In fact, the English sentence ‘They steal bicycles’ was translated into Chinese as *tāmén tóu zìxíngchē* ‘they steal bicycle’ by three Chinese informants in exactly the same way, and they said that there was no way of indicating plurality here. Furthermore, whether the bicycle is specified or not, the noun form does not change as the sentences (10) and (11) show. Because the sentence shows the perfective aspect by the verbal aspect marker *-le*, *zìxíngchē* ‘bicycles’ in (10) is likely to be interpreted as specific. The sentence (10) could be (12) in order to clearly show that the noun is specific by putting the demonstrative *nèi* ‘that’. But one informant still said that it sounded unnatural because it was impossible to point to the stolen bicycle by saying the demonstrative *nèi*, which had been stolen and should not be there. This example shows ambiguity of definiteness in Chinese.

(12) tāmén tóu – le nèi – ge zìxíngchē

they steal – PFV that – CL bicycle

They stole the bicycle.

Ambiguity of the noun phrase is also shown in the following example(13) when it appears as a topic. In this sentence, it is not clear whether the *gǒu* ‘dog’ refers to ‘the dog’ or ‘dogs’, but most plausibly it does not mean ‘a dog’ because it is not appropriate as a topic.

(13) gǒu wǒ yǐjing kàn – guo le (Li & Thompson 1989, p.86)

dog I already see – EXP CRS

{ The dog I have already seen
{ Dogs I have already seen

Noun phrases without classifiers are interpreted as definite or generic in Chinese. When they occur in the subject position or the object position of the verb, they are usually generic as shown in (14), (15), and (16).

(14) māo xǐhuān hē niú – nǎi (Ibid., p. 129)

cat like drink cow – milk

Cats like to drink milk.

(15) wǒ xǐhuan chī píngguǒ (Ibid., p. 87)

I like eat apple

I like to eat apples.

(16) wǒmen zhòng huāshēng (Ibid., p. 128)

we grow peanut

We grow peanuts.

Māo ‘cat’ in (14), *píngguǒ* ‘apple’ in (15) and *huāshēng* ‘peanut’ in (16) are bare nouns without demonstratives, quantifiers or numbers. They are generally interpreted as generic nouns from the context and the meanings of the sentences. That is, in the case of (14), *māo* ‘cat’, not ‘this cat’ or ‘that cat’, is the subject of *xǐhuān hē niú – nǎi* ‘like to drink milk’. In such a case the subject is most likely to be read as a generic noun ‘cats’, which refers to cats in general. Also in the sentences (15) and (16), judging from the subjects and verbs, *píngguǒ* ‘apple’ and *huāshēng* ‘peanut’ are most likely to be interpreted as generic ‘apples’ and ‘peanuts’ respectively.

The following examples (17) and (18), however, do not have generic readings but rather are interpreted as definite nouns, though the nouns both come in the first position of the sentence and the forms are also bare nouns in the same way as (14), (15), and (16).

(17) huǒ miè – le (Ibid., p. 197)

fire go:out – PFV

The fire went out.

(18) gàizi diào – le (Ibid.)

lid fall:off – PFV

The lid fell off.

In these sentences, the crucial difference from the generic sentences in (14), (15) and (16) is the use of *–le* after the verbs, which shows perfective aspect. The verbs ‘go out’ and ‘fall off’ in the perfective aspect suggest that the subjects ought to be something definite. The bare noun form *qiānbǐ* ‘pencil’ in the sentence (19) reads as an indefinite noun, judging from the position, the verb and the aspect.

(19) wǒ méi yǒu qiānbǐ

I not exist pencil

I don’t have a pencil.

Generics in Chinese are also expressed by the noun phrase following *bǎ*. The *bǎ* noun phrases occur with verbs which give some disposal effects or give some strength to the objects directly such as *twist, hurt,* and *sell*, and do not occur with such verbs as *like* or *have.* The *bǎ* noun phrases can be definite or generic as shown in (20) and (21). *Bǎ yǎn* ‘BA salt’ in (20) is generic and *bǎ chá–bēi* ‘BA tea cup’ in (21) is definite.

(20) tā yǒu-de-shíhou bǎ yǎn dāng tang chī (Ibid.m p. 464)

3sg sometimes BA salt take:as sugar eat

S/He sometimes eats salt thinking it’s sugar.

(21) wǒ bǎ chá – bēi nòng – pò le (Ibid., p.466)

I BA tea – cup make – broken PFV/CRS

I broke the teacup.

Thus, interpretation of nouns depends deeply on the context and the situation where the utterance is made. Thus, generics do not have a specific noun form in Chinese and its interpretation depends on the context rather than the linguistic form. Judging from what is described about noun phrases in Chinese so far, in a sense, Nisbett (2003) is correct in saying that Chinese does not clearly distinguish *a duck, the duck, the ducks,* or *ducks* in the way English does. It should be added, however, that Chinese does have ways to express *a duck, the duck, the ducks* and *ducks* when it is necessary, and that the speakers do interpret noun phrases in appropriate and expected ways from the context even though they are not explicitly expressed.

3.6 Generic Expressions in Japanese

Japanese is also one of the numeral classifier languages (Allan 1977). Classifiers are obligatory when quantity is expressed, but they are not used in the same way as in Chinese. Classifiers are obligatory in Chinese when demonstratives such as *zhèi* 'this' and *nèi* 'that', and some quantifiers such as *zhěn* 'whole' and *měi* 'every' are put before nouns. But in Japanese classifiers are not used in such linguistic contexts, so the use of classifiers is less frequent in Japanese than in Chinese. When a noun is quantified with a number as in (1) and (2) below, the form of the noun phrase is similar to that of quantified mass nouns in English rather than the noun phrases in Chinese.

However, for example, the noun *hon* ‘book’ and *hai* ‘CL-cup’ are not pluralised as shown in (1) and (2), which also occurs in Chinese, when the nouns takes the plural form ‘books’ and ‘cups’ in English. The phrases in (3) and (4) show that demonstratives and some quantifiers do not require classifiers in the way Chinese does.

(1) san satsu –no hon
three CL –GEN book
three books

(2) ni hai –no koo-hii
two CL –GEN coffee
two cups of coffee

(3) kono hon
this book
this book

(4) subete –no hon
every(all) – GEN book
every/all book/books

Japanese plurals are optional (Tsujimura 2006; Muzuguchi 2004) and marked with the plural marker *–tachi* or *–ra* after nouns referring to people and some animals such as *kodomo–tachi* ‘children,’ and *tori–tachi* ‘birds’ as shown in (5) and (6) below,

but they are not used for inanimate to make phrases such as **hon–tachi* ‘books’ or **enpitsu–tachi* ‘pencils’.

(5) kodomo–tachi ga niwa –o hashitteiru
child –PL NOM garden –ACC be running
Children are running in the garden.

(6) tori–tachi –no saezuri –ga kikoeru
bird–PL –GEN chirping –NOM be heard
Birds’ chirping is heard.

–Tachi and *–ra* are also put after pronouns and demonstratives to make noun phrases below in (7). *–Tachi* is neutral, but *–ra* implies humbleness or contempt, therefore, *boku–ra* ‘male we’ and *watashi–ra* ‘female we’ are often used by younger people referring to themselves. For the same reason, *anata-ra* is not used when speaking to one’s superiors (Shinmura 1998). *-Ra* implies intimacy also. *Kare–ra* ‘male they’ and *kanojo–r*a ‘female they’ are more often used than *kare–tachi* ‘male they’ and *kanojo–tachi* ‘female they’. Though *kore–ra* ‘these’ in (8) is acceptable, *kore–tachi* ‘these’ is not acceptable at all. It is notable here that *kore–ra* ‘these’ shows plurality but the noun *hana* ‘flower’ placed after that takes a bare singular form. A similar bare singular noun occurs in the phrase of *san satsu –no hon* ‘three books’ shown in (1) above, which refers to plural items but the noun does not take a plural form. The seeming lack of number agreement from the point of view of English is observed also in Chinese as described in the previous section.

(7) boku	I(male)	boku–tachi	we (male)
		boku–ra	we (male)
watashi	I(female)	watashi–tachi	we (female)
		watashi–ra	we (female)
anata	you	anata–tachi	you (plural)
		anata–ra	you (plural)
kare	he	kare–tachi	they (male)
		kare–ra	they (male)
kanojo	she	kanojo–tachi	they (female)
		kanojo–ra	they (female)

(8) kore –ra no hana

this –PL GEN flower

these flowers

Considering that a plural basically means more than one entity that belongs to the same category, or a group of entities which are called by the same name, it is interesting to note that the plural form of *boku/watashi* 'I' means 'I and someone/some people else,' that is, it does not mean there are more than one 'I' (Corbett 2000; Kato 2006). Hearing this, some may thing of inclusive *we* in 'Let's enjoy ourselves, shall we?' (Quirk et al. 1985, p. 341), in which 'we' means 'you and I', and exclusive *we* in 'Will you stay here while we go for a policeman?' (Ibid. p. 1466), in which 'we' means 'I and the others' and does not include 'you'. However, the pronoun is pluralised by

adding *–tachi* in the case of Japanese, and English has completely different forms *I* and *we*. The point is the use of *–tachi* here.

Another use is that *–tachi* can be put after a proper noun such as *Taro–tachi* (Taro is a boy's name) as shown in (9) below. Compare it with (10), which shows that *–tachi* is added after the noun *gakusei* 'student' in exactly the same way as in (9). *Taro–tachi* in (9) means 'Taro and others', who are not explicitly referred to one by one such as 'Taro, Hanako and Jiro'. In such a case each person's name can be generally inferred from the context, or it is assumed that it is not necessary to refer to each person. *Gakusei–tachi* in (10) means '(the/some) students'.

(9) Taro –tachi ga kita.

Taro –PL NOM come –past

Taro and his group came.

(10) gakusei –tachi ga kita.

student –PL NOM come –past.

{ The students came.
{ Some students came.

Thus the concept of *–tachi* and *–ra* must not be exactly the same as the plural marker *–s/es* in English, though they are generally considered to be plural markers (Shinmura 1998). Plural forms in English such as *books*, for example, indicate 'more than one book.' On the other hand, plural markers in Japanese are not only used to mark plurality but also used to refer to 'a group of people including the person referred to.'

This quasi-plural is called the 'associative' (Corbett 2000), which is defined as 'a set comprised of the referent of the nominal (the main member) plus one or more associated members (p. 101)'.[11] Strictly speaking, English *we* is an associative plural, too, which means 'I and some others'. What is noted here is that Japanese extends the use of *–tachi* of pronouns to other common nouns. Therefore, it can be said that Japanese plurals do not show a clear-cut distinction between plurals and associatives.[12]

Plurality for inanimate objects is not very explicit in Japanese. Though it is possible to express it when a number co-occurs as in (1) 'three books', or a plural demonstrative such as *kore-ra* is used as in (8) 'these flowers' above, number is totally absent in some acceptable sentences. Look at the example below. *Kono hana* in (11) may be 'this flower' or 'these flowers', but it is not expressed, nor obligatorily required. The utterance may be made pointing to a lot of flowers, but no one feels it strange. When it should be translated into English, for example, then the translator should make the distinction. The sentence (12) actually describes a very well-known historical event which happened in 1853, when American black battle ships came to Japan and urged the Japanese government to open the country because Japan was at that time closed to the outer world and had no diplomatic relationships with the other countries. Even though it made such an important landmark in the history of Japan, and furthermore, though it would present quite different visual images whether one ship came or many ships came, the utterance commonly made does not mention the number of the ships at

[11] Kato (2006) argues that even common noun phrases such as *onnanoko-tachi* 'girls' and *salarii-man-tachi* 'salaried men' can be associatives.

[12] Corbett (2000) shows that Hungarian has a clear distinction between plurals and associatives; the plural marker *-ok* and the associative marker *–èk*.

all. Actually huge four black ships were anchored off the coast near the capital of Tokyo, so it must have been a threatening sight for the people.

(11) kono hana kirei desu –ne

this flower beautiful CPPULA –INT

{ This flower is beautiful, isn't it?
{ These flowers are beautiful, aren't they?

(12) kurofune ga kita

black ship –NOM come-past

{ A black ship came.
{ The black ship came.
{ Some black ships came.
{ The black ships came.

Definiteness of the noun in Japanese also is not as clear as that in English as shown in (10) and (12). *Gakusei–tachi* 'students' here may be definite or may be indefinite. It is often said the definiteness distinction is made by the nominative marker *–ga* and the topic marker *–wa* as shown below. When *–ga* is placed after a noun it is often indefinite and not known yet as shown in (13), while *–wa* is often used to indicate something/someone definite and already known as (14) shows (Shinmura 1998; Tsujimura 2006).

(13) laion –ga neteiru

lion –NOM sleeping

An lion is sleeping.

(14) laion –wa neteiru

lion –TOP sleeping

The lion is sleeping.

(15) sono-hon –wa watashi –ga kaimashita

the book –TOP I –NOM buy–past

As for the book, it was I who bought it.

The topic marker *–ga,* however, is also used with such definite noun phrases as *kare* 'he' and *kore* 'this', which means that *–ga* has another function of emphasis as shown in (15) besides indicating indefiniteness. Therefore, definiteness is not clear in Japanese, and it is interpreted from the linguistic contexts and the situations where the noun phrase occurs.

We have seen so far that Japanese is a numeral classifier language, and that number and definiteness in the language are not always clearly expressed. These two aspects of linguistic forms are especially relevant here because it is described in 3.4 that number and articles are important grammatical categories to interpret generic noun phrases in English. For the generic reading to occur, the distinction between singular and plural, and between definite and indefinite should be treated as less marginal (Quirk et al. 1985). Then how about generic noun phrases in Japanese?

As for generic expressions in Japanese, it is generally said that it has only one form as in (16) below for three different forms in English in 3.4: (1) *A lion is a ferocious beast*, (2) *The lion is a ferocious beast*, and (3) *Lions are ferocious beasts*. In its emphatic expression in order to clearly show that the sentence is expected to have a generic reading, a rhetorical phrase is used. That is, the subject or the topic can be followed by *–to–iu–mono–wa*, which literally means 'things called A' as in (17), or *–towa*, which literally means 'as for A'. Then the phrases are characteristically generic (Bond & Ogura 1998). Thus, *–to–iu–mono–wa* can be used to test genericity in Japanese. If a subject is followed by the phrase and the whole sentence does not change the meaning significantly, it should be a generic expression. Though the sentence (16) is neutral and the sentence (17) sounds more emphatic and may be used as an instructive statement, (16) and (17) mean quite similar to each other in meaning, then (16) should be generic.

(16) laion –wa doumouna doubutsu –da

lion –TOP ferocious beast COPULA

A lion is a ferocious beast.

The lion is a ferocious beast.

Lions are ferocious beasts.

(17) lion –to –iu –mono –wa doumouna doubutsu –da

lion –DAT called nominaliser –TOP ferocious beast COPULA

Things called lions are ferocious beasts.

Also the characteristic description of *being ferocious* must be a cue for a generic reading because the noun form does not give a clue for that. Compare (14) and (16) repeated below. Both sentences start with the same phrase *laion–wa* 'as for lion', but they have different readings. *Laion* 'lion' in (14) refers to a specific lion because of the topic marker *–wa* together with the description of an on-going and temporal event such as *being sleeping*, which is not a characteristic description of a category. The same form of *laion* 'lion' in (16) reads as generic because of its characteristic description, even though it occurs with *–wa* and makes exactly the same noun phrase as (14) repeated here.

(14) Laion –wa neteiru

lion –TOP sleeping

The lion is sleeping.

(16) laion –wa doumouna doubutsu –da

lion –TOP ferocious beast COPULA

A lion is a ferocious beast.

The lion is a ferocious beast.

Lions are ferocious beasts.

Let's look at the following examples again to see how the same noun form *ringo* 'apple' can have different readings and how they can be interpreted in the expected ways though the number and the definiteness are still ambiguous. *Ringo* 'apple' in (18) should have a generic reading because it occurs as the object of an

adjective verb *suki* ‘like’. *Ringo* ‘apple’ in (19) possibly reads as singular or plural and most likely refer to unspecified apples. When referring to a specified apple or apples, the noun phrase with *–wa* will be used and most usually moved to the beginning of the sentence as in (20).

(18) watashi –wa ringo –ga suki –da (Bond & Ogura, 1998)

I –TOP apple –NOM like

I like apples.

(19) reizouko –ni ringo –ga arimasu

refrigerator –LOC apple –NOM exist

{ There is an apple in the refrigerator.
{ There are some apples in the refrigerator.

(20) ringo –wa reizouko –ni arimasu

apple –TOP refrigerator –LOC exist

{ The apple is in the refrigerator.
{ The apples are in the refrigerator.

Thus it has been shown that the noun phrases in Japanese do not clearly show number and definiteness. The ambiguous phrases require the speakers to interpret them from the case marker, the tense and the characteristic description. Or they may not notice those ambiguities as long as, for example, they are not required to translate the sentences into English (Bond & Ogura 1998).

As for generic phrases in Japanese, therefore, the interpretation of generic phrases also depends on the context where the phrase occurs; such as topic case markers *–wa*, the non-progressive aspect and the characteristic descriptions.

3.7 Generic Expressions in the Three Languages

Different generic noun forms of English, Chinese, and Japanese are shown in Table 5 by summing up the descriptions of generic noun phrases in the previous sections 3.4, 3.5, and 3.6. The table shows that English has three different forms of nouns, while Chinese and Japanese have only one equivalent. It also shows that none of the languages has one specific way to express genericity solely, which Jespersen (1924) mentioned. It can be said, then, that generic expressions in English are as ambiguous as those in Japanese and Chinese. The zero article plural form in English, however, is most frequently used, so this form may well be given special treatment. This can be supported by the fact that Prasada and Dillingham (2006) used only zero article plural noun phrases to investigate common sense conception on properties of things. Also Cohen (2001) says zero article plural nouns are less problematic in describing properties of categories.

English	Chinese	Japanese
a lion (G/NG)	*shī* (G/NG)	*laion* (G/NG)
the lion (G/NG)		
lions (G/NG)		

Table 5. Generic noun forms in English, Chinese and Japanese (G means generic, and NG means non-generic)

The table of different noun forms in the three languages can be transformed into the figures of coordinates, which are intended to visually show where generic nouns are positioned in the whole body of concepts expressed by countable nouns. Figure 8 shows generic nouns in English and Figure 9 shows those in Chinese and Japanese.

In expressing genericity, number and definiteness will be blurred (Quirk et al. 1985). In Figure 8, the vertical line shows singular and plural distinction, which is intersected by the horizontal line which shows a continuum of definiteness. Because number and definiteness are clearly distinguished in form in English by the definite and indefinite articles and the plural marker, though the semantic distinction may not be as clear as the forms indicate, the lines are clear. The black area indicates generic concepts and it covers mostly the indefinite and plural dimension, indicating that the noun takes the zero article plural noun form. It also extends to singular areas, too, which take the forms of indefinite and definite singular noun phrases.

In Figure 9 the dotted lines indicate that number and definiteness are not clearly expressed in specific linguistic forms in Chinese and Japanese. The unshaped dotted area indicates it is not firmly positioned, but rather it is floating in an unstable way in the whole body of concept expressed by object noun phrases. These two figures show that generic expressions in English are more clearly shown than those in Chinese and Japanese.

Thus, using and interpreting generic expressions depend on linguistic and semantic cues as well as the users' general knowledge in all the three languages, but it is true to say that English is less ambiguous than Japanese and Chinese in their use. What Nisbett (2003) speculates should be examined in this limited sense: he states, the

generic noun form of zero article plurals such as *ducks* in English and the lack of such a generic noun form in Chinese may give some causal effect on different behaviours in the taxonomic-thematic categorisation task between English speakers and Chinese speakers. As far as generic expressions are concerned, Japanese and Chinese have the same linguistic traits. The two languages both do not explicitly express definiteness and number, which leads to generic expressions more ambiguous than those in English.

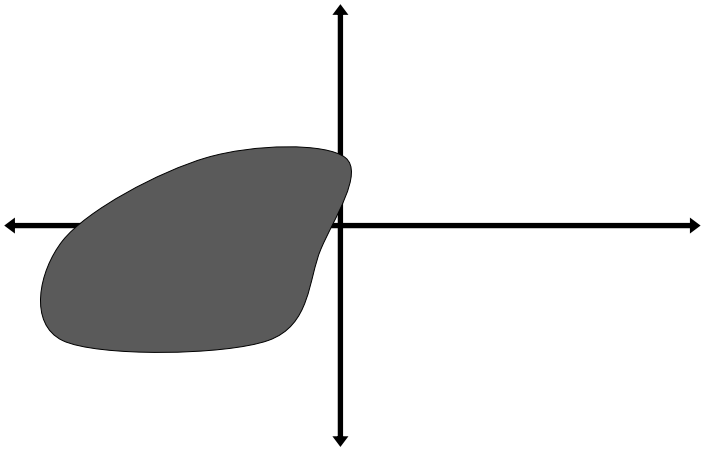


Figure 8. Generic nouns in English

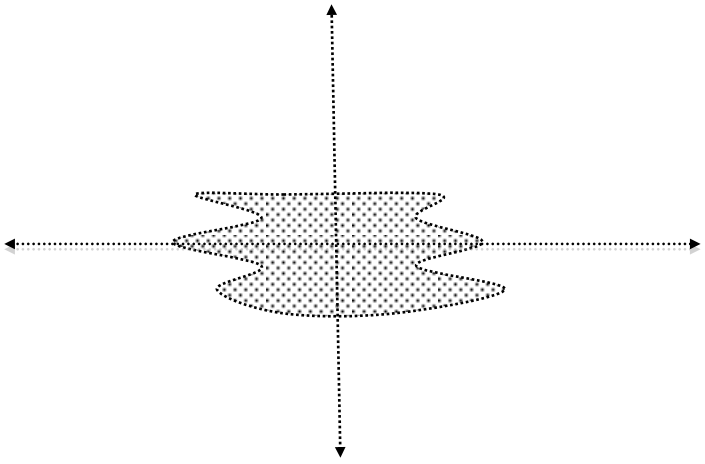


Figure 9. Generic nouns in Chinese and Japanese

Then if there would be any language effect on taxonomic-thematic categorisation judgments, it is predicted that Chinese speakers and Japanese speakers would behave in a similar way. When Japanese speakers and English speakers are compared in the same task, furthermore, it is predicted they would behave in different ways.

This study is to verify, therefore, that Japanese speakers and English speakers behave in different ways as the West-East paradigm suggests, and that Japanese learners of English tend to shift their behaviours toward those of English speakers as a consequence of learning English. It uses three different experiments: 1) the taxonomic-thematic categorisation judgments based on Ji et al. (2004) and Nisbett (2003), 2) the interpretation of generic noun phrases based on Gelman and Tardiff (1998), and 3) the object naming experiment, which was originally designed to investigate whether people call a set of objects by the same name or not. The next three chapters explain these three experiments respectively.

Chapter 4. Experiment 1

This chapter actually describes three experiments, Experiment 1A, 1B, and 1C, which were conducted on Japanese speakers and English speakers, Chinese speakers, and Japanese high school students respectively, with slightly different aims and hypotheses.

4.1 Experiment 1A: Taxonomic-Thematic Categorisation Judgments by ENSs and JNSs

4.1.1 *Aims*

This experiment examined how JNSs react to taxonomically-related objects and thematically-related objects, and further investigated whether Japanese learners of English (JLEs) would change their behaviours in categorising those objects as a consequence of learning English as an L2. As described in Chapter 2, it is found in the field of social psychology that Westerners tend to pay more attention to salient objects and their properties independently from the context, while East Asians tend to pay more attention to relationships among objects, taking the contexts into consideration (Kitayama et al. 2003; Masuda & Nisbett 2001, 2006; Nisbett 2003; Nisbett & Miyamoto 2005; Norenzayan et al. 2002). Figure 10 shows this contrastive paradigm with the example triad of *monkey-panda-banana* first appeared in Section 2.1.3 (p. 71).

These contrastive attitudes were also revealed as different behaviours in the taxonomic-thematic matching task experiment, which was done by Ji et al. (2004). According to their study, monolingual English speakers, who were American university students, showed a preference for taxonomic matching while Mandarin Chinese

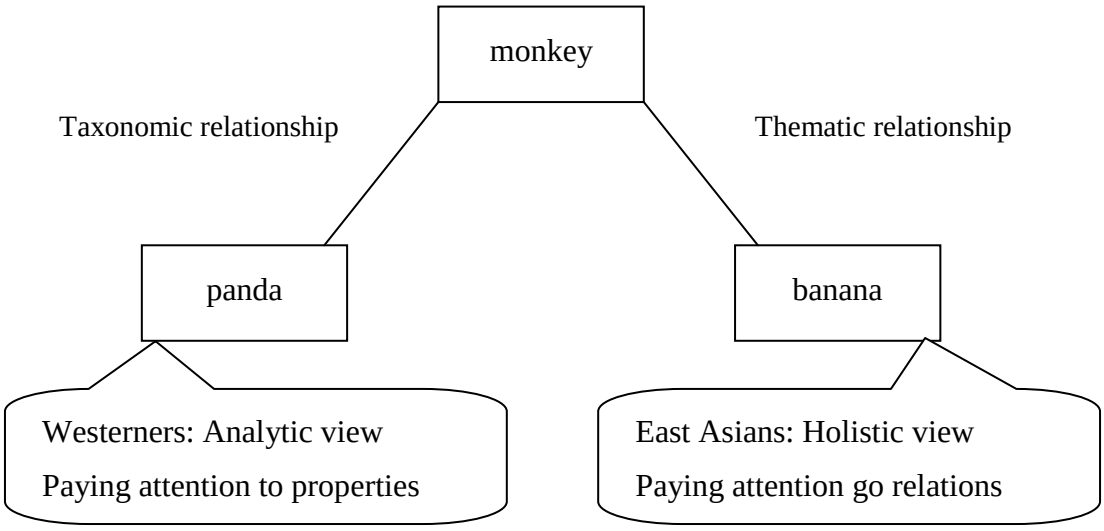


Figure 10. Taxonomic and thematic relationships and different views between Westerners and East Asians with an example of *monkey-panda-banana*

speakers, who were also university students and L1 Chinese-L2 English bilinguals, showed a preference for thematic matching. The study also revealed that Chinese-English bilinguals tended to show taxonomic matching preference more often when tested in English than when tested in Chinese. The results imply the possibility of language effects on the task, but they did not clearly claim language effects. Rather, they concluded that language only played a role in ”tuning” categorisations and “serve(d) as a cuing effect for reasoning style” (Ji et al. 2004, p. 64) and that it was culture not language that really affected the matching preferences.

Before discussing whether it is language or social factors that affect the cognitive behaviours of object categorisation, it is first of all necessary to examine whether Japanese speakers tend to categorise objects in similar ways to Chinese speakers: that is, do Japanese speakers behave differently from English speakers? The present study, therefore, has two research questions in conducting Experiment 1A:

1) Do Japanese native speakers and English native speakers show different cognitive patterns in judging the relations of taxonomically-related objects and thematically-related objects, as Ji et al. (2004) showed? If yes, in what ways are they different?
2) As a consequence of learning English, do JLEs restructure any specific area of their cognition and show any differences from Japanese monolingual speakers? If yes, in what ways are they different?

The aim of the first question is to confirm the West-East paradigm found in the previous study by Ji et al. (2004). It examines whether West-East cognitive differences can be found between ENSs and JNSs in the experiment using taxonomic-thematic triads. The second question extends the study to the framework of multi-competence, which asserts that L2 learners think and perceive things differently from monolingual L1 speakers as a consequence of learning an L2. Thus it examines whether JLEs change their behaviours as they acquire higher levels of English proficiency, and it explores effects of L2 learning on cognition. The experiment was conducted from July to September, 2007.

4.1.2 *Participants*

Eighty-four JNSs (mean age 33, age range 18-57; male 31, female 53) and 21 ENSs (mean age 27, age range 22-38; male 10, female 11) took part in the experiment. The participants were individually recruited by the author. The JNSs were divided into sub-groups, depending on their proficiency levels measured by the Nation vocabulary test (Nation, 2001), which all of the Japanese participants were required to take before the main experiment task. The Nation vocabulary test is a quick and reliable means to

measure overall proficiency in English and was also used in previous studies (Athanasopoulos 2009, 2011; Cook et al. 2006) to make different proficiency groups. The full score of the vocabulary test was 126, so that the proficiency difference was big enough to reveal cognitive differences among the JNSs, if there is any. All of the participants were asked to fill out the questionnaire form, which asked their profiles (see Appendix B for the questionnaire form, pp. 284-287). Profiles of participant groups are presented in Table 6. It shows the mean age of the five groups, and as for the four groups of JLEs, the mean scores of the vocabulary test, the mean length of studying English and staying in an English speaking country, with standard deviations in the parentheses.

The JNS participants were all living in a mid-sized city in western Japan. Among them, there were 37 undergraduate students and two graduate students at a local university, 29 school teachers from elementary, junior high and senior high schools, and 7 students at a language school, who were either government office workers or medical doctors learning English mainly for their career purposes. The English proficiency levels of JNSs varied from a beginners' level to an advanced level, so that some groups

Group	M/F	Age	Vocab.	Study (years)	Stay (months)
JNSs					
Low (*n*=19)	5/14	39.5 (14.2)	13.2 (12.8)	8.8 (2.1)	0.0 (0.0)
Low-Inter. (*n*=22)	8/14	25.0 (12.2)	58.3 (17.0)	8.2 (2.2)	0.6 (2.4)
Intermediate (*n*=22)	8/14	28.5 (11.3)	97.5 (6.9)	11.8 (5.0)	9.4 (40.6)
Advanced (*n*=21)	10/11	40.1 (9.8)	120.2 (4.8)	20.5 (6.4)	9.7 (16.3)
ENSs (*n*=21)	10/11	26.9 (4.5)	-	-	-

Table 6. Profiles of the participants in Experiment 1A: the taxonomic-thematic categorisation judgments

of different proficiency levels would be made and compared. Because of the prediction that the cognitive differences among the JLEs, if there were any, would naturally be smaller than the differences between ENSs and JNSs, participants were widely collected not only at a university but also at a language school, where students at a more advanced level were expected. Advanced learners were usually older than beginners, which would make the sub-groups unbalanced. Therefore, participants were collected from teachers at elementary and high schools. Some of them were not English teachers and would be expected to belong to the beginners' group. Some of them were teachers of English and they naturally belonged to the advanced group. They were believed to be surrounded by similar academic atmosphere to other learners of English.

Because JNSs were expected to cover a wide range of proficiency levels, their ages also varied from 18 to 57. Ideally there should have been a group of monolingual JNSs who didn't know any English, but it is extremely difficult to find such a monolingual group in Japan at present. Therefore, Japanese monolinguals were substituted by the Low Proficiency Group, following previous studies (Athanasopoulos 2006, Athanasopoulos et al. 2004; Cook et al. 2006).

All of the Japanese participants had studied English as a required school subject in Japan. One student exceptionally had lived in the US for 15 years but had been brought up in the Japanese environment, so that he could continue his education when he came back to Japan. All of the others started to study English in junior high school at the age of 12 except for four participants, who began studying English at the ages of five, eight, or nine. In addition to the student who had lived in the US, 12 Japanese participants had stayed in some English speaking country for a short period of time from one to four months and 11 had stayed for a longer period from 10 months to five

years to study English. Overall most participants had studied English in the EFL context, though the length of studying varied from six years to 36 years (the mean length of studying 12.4 years). They were all living in Japan, where English is not used for daily communication.

The ENSs were 16 assistant language teachers hired by the local board of education and five teachers of English at private language schools in the local area. They were from the UK, the USA or Australia. As confirmed by a pre-experiment questionnaire, all the ENS participants had lived in Japan for less than one year at the time of the experiment, and therefore had not been exposed to the Japanese language and Japanese culture for too long. As for ENSs, they were not English monolinguals in a strict sense. Most of them reported that they had studied other languages such as French, Spanish, German, and Japanese, but all were at a beginners' level. As such they were treated as English monolinguals in this study.

4.1.3 *Materials*

Twenty sets of triad pictures were used including four triads of distracters. Figure 11 shows a triad sample. Ji et al. (2004) did not give a list of all of the objects they used in their experiment. Therefore, a pretest was conducted to elicit taxonomically-related objects and thematically-related objects which were cross-culturally neutral. Also the categories were all at the basic level, so that both language groups were familiar with them. Twenty JNSs, who were university students in Japan, and 20 ENSs, who were university students in the UK, were given target items. Ten students in each country were asked, "Think of something which belongs to the same group as X" in order to elicit taxonomically-related objects to the targets. Another

10 students in each country were asked, “What does X make you think of?” in order to elicit thematically-related objects to the targets. Then taxonomic relationships and thematic relationships were cross-culturally confirmed, so that well-balanced and culturally neutral triads were composed. Table 7 shows the list of the triads. the actual materials used are shown in Appendix B (pp. 288-297).

While Ji et al. (2004) used words in the experiment, pictures were used in the current experiment to avoid any bias from particular lexical items. For example, the word *fish* appears in the thematically-related object *fishing rod* in the triad *fish-crab-fishing rod* in English, but this does not happen in Japanese. Therefore, *fish* and *fishing rod* might be more easily related in English than in Japanese. Furthermore, the same sound appears in *hachi* ‘bee’ and *hachi-mitsu* ‘honey’ in the triad *bee-butterfly-honey* in Japanese but not in English. In this case, *hachi* ‘bee’ and

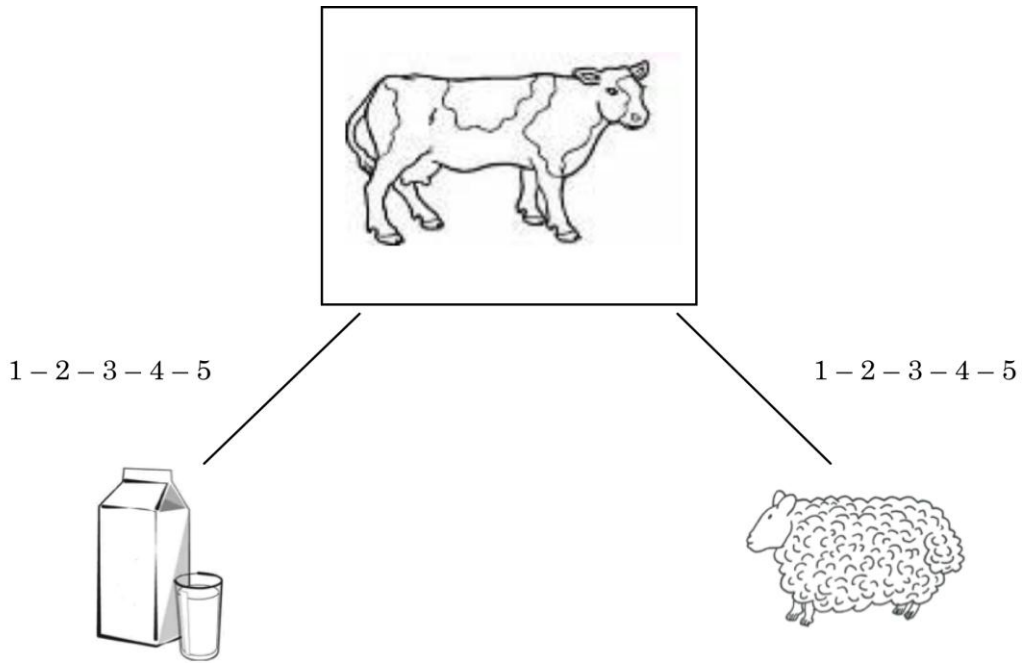


Figure 11. Sample triad picture used in the taxonomic-thematic categorisation judgments

	Target	Taxonomic	Thematic
1	Cow	Sheep	Milk
2	Pencil	Pen	Paper
3	Dog	Cat	Lead
4	Tree	Flower	Bird
5	Penguin	Seal	Ice
6	Fish	Crab	Fishing rod
7	Ring	Necklace	Wedding
8	Car	Bicycle	Road
9	Skirt	Trousers	Girl
10	Train	Bus	Railway track
11	Spider	Ant	Spider's web
12	Camel	Horse	Desert
13	Bee	Butterfly	Honey
14	Piano	Violin	Musical note
15	Monkey	Panda	Banana
16	Golf	Tennis	Golf ball

Table 7. Triad sets used in the taxonomic-thematic categorisation judgments

hachi-mitsu 'honey' may be more easily related in Japanese than in English. To avoid such relationship biases, this experiment used pictures.

The order of presenting triads was randomised and the left-right positions were also randomised. Half of the participants were tested in reverse order with reverse left-right positions to counterbalance any effect of presentation. The experiment was a paper-based one.

4.1.4 *Task*

The task was a relatedness judgment task on a 5-point scale. The participants

were required to judge the closeness of the objects both in the taxonomic relationship and in the thematic relationship in a triad as shown in Figure 11. The languages used in the experiment were Japanese for JNSs and English for ENSs. They were asked "how close the two objects are in your mind" and had to show their judgment on a scale of from 1 to 5, with 1 meaning far and 5 meaning close. Therefore, the closer they felt the objects were, the higher scores they gave. In Japanese this was literally translated, *Futatsu-no mono-ha anata-no atamano-nakade dore-kurai chikai desuka*. The Japanese instruction was back-translated again by two other bilingual speakers in addition to the author to confirm they were as similar as possible.

Ji et al. (2004) used a grouping task which asked the participants "to select two of the three that were most closely related" (p. 59). A 5-point scale judgment task was used in this study, which required the participants to judge the strength of relationships, so that the disposition of the participants toward both kinds of the relationship would be reflected in the scores. There was no time constraint on the judgment task, nor on the vocabulary test in the case of JNSs. Usually it took a few minutes to finish the task, and 30-35 minutes to complete the vocabulary test.

4.1.5 *Hypotheses*

There were two hypotheses:

1) JNSs (Japanese monolinguals) and ENSs (English monolinguals) categorise objects in different ways: ENSs show more taxonomically-oriented judgments as shown in Ji et al. (2004), while JNSs show more thematically-oriented judgments.

2) JLEs at different English proficiency levels categorise objects in different ways: advanced learners' judgments are between those of beginners and ENSs, i.e., shifting their categorisation traits toward those of ENSs.

4.1.6 *Results*

Comparison of JNSs and ENSs

First, the judgment scores of JNSs and ENSs were compared. Higher scores mean closer relationships in their mind with the maximum being five. The JNS group was the lowest English proficiency group and consisted of 19 out of the 84 Japanese participants. Table 8 shows the group mean scores for the taxonomic and the thematic relationship judgments.

A 2 (relation) x 2 (group) ANOVA (with relation as a within-subjects factor and group as a between-subjects factor) was conducted. There was a significant main effect of relation, indicating that JNSs and ENSs responded in a significantly different way across the two relationship judgments, F (1, 38) = 113.892, p = .000. That is, both groups scored significantly higher in the judgments of thematic relationships than in the judgments of taxonomic relationships. The effect of group was near significant, F (1, 38) = 3.445, p = .071. Crucially, the group x relation interaction was statistically significant, F (1, 38) = 8.327, p =.006. This means that the two groups behaved

Group	Taxonomic	Thematic
JNSs (n=19)	2.84 (0.67)	4.45 (0.57)
ENSs (n=21)	3.41 (0.52)	4.34 (0.41)

Table 8. Group mean scores (and standard deviations) for the taxonomic and the thematic relationship judgments by JNSs and ENSs

significantly differently in making judgments on the relationships of taxonomically- and thematically-related objects.

Further comparisons were made to specifically examine whether ENSs showed more taxonomically-oriented judgments and JNSs showed more thematically-oriented judgments as hypothesised. Separate independent samples *t*-tests showed that JNSs and ENSs differed significantly in the scores of the taxonomic-relationship judgments, t (38) = -3.057, p = .004 (two-tailed), but there was no significant difference in the scores of the thematic-relationship judgments, t (38) = .706, $p > .05$ (two-tailed).

Comparison among different proficiency groups of JLEs

Next the 84 Japanese participants were split into four different proficiency groups according to the scores of the Nation vocabulary test (Nation, 2001), the Low, the Low-Intermediate, the Intermediate, and the High Proficiency groups with approximately the same sample size in each group, to examine whether or not L2 English learning has any effects on the relationship judgments. Table 6, already appeared on p. 156 above, shows profiles of the five groups. Table 9 shows the mean scores for the judgments of the four groups. The graph in Figure 12 is the mean scores, so that the differences can be clearly seen.

A 2 (relation) x 5 (group) ANOVA was conducted to examine judgment patterns on taxonomic and thematic relationships by the four Japanese groups and the ENS group. There was a significant main effect of relations, which indicates that the five groups responded in a significantly different way across the two relationship judgments, F (1, 100) = 194.375, p = .000. There was no significant effect of group: F

Group	Taxonomic	Thematic
Low (*n*=19)	2.84 (0.67)	4.45 (0.57)
Low-Inter. (*n*=22)	3.24 (0.82)	4.26 (0.77)
Intermediate (*n*=22)	3.32 (0.65)	4.25 (0.74)
Advanced (*n*=21)	3.33 (0.47)	4.43 (0.70)
ENSs (*n*=21)	3.41 (0.52)	4.34 (0.41)

Table 9. Group mean scores (and standard deviations) for the taxonomic and thematic relationship judgments by the four Japanese groups and ENSs

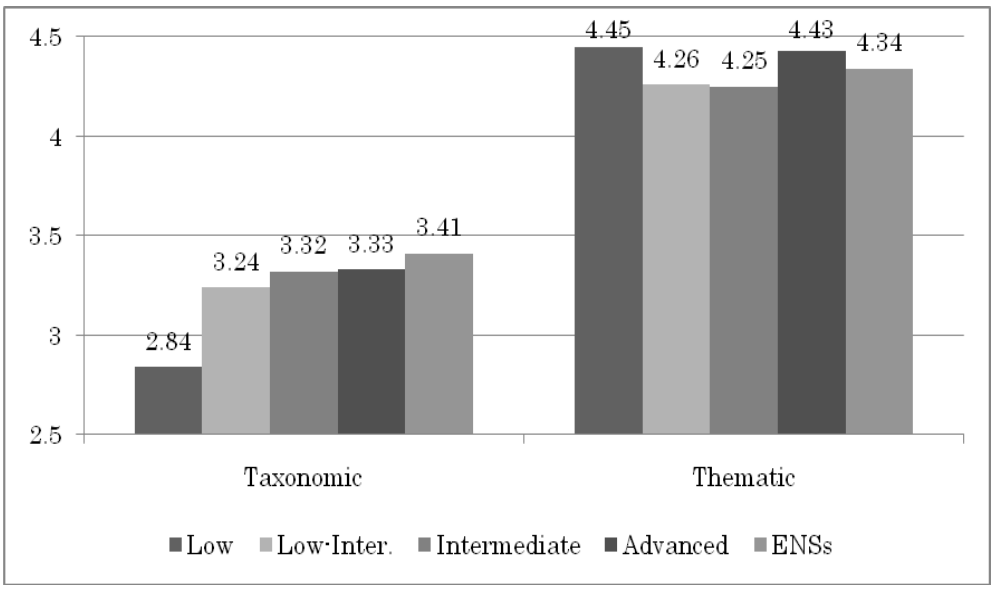


Figure 12. Mean scores for the taxonomic and thematic relationship judgments by the five groups

(4, 100) = .742, $p > .05$. However, the group x relation interaction was significant; F (1, 100) = 2.480, $p < .05$.

Therefore, in order to examine more closely how differently the five groups scored in the judgments of each relationship, One Way ANOVAs were conducted. These showed a significant main effect of group in the mean scores of taxonomic-relationship judgments; F (1, 100) = 2.484, $p < .05$. However, there was no significant difference among the mean scores of the five groups in thematic-relationship

judgments: F (1, 100) = .44, p > .05. Post Hoc Tests showed a significant difference between the Low Proficiency Group and the NES group in their mean scores of taxonomic relationships, p < .05, but the other comparisons between groups in both relationship judgments showed no significant differences.

Comparison among different age groups of JLEs

Among the different proficiency groups of JLEs, one big concern was that the Low-Intermediate Proficiency Group and the Intermediate Proficiency Group were much younger than the other two groups. The mean age of the two groups were 25.0 and 28.5 respectively, while the mean age of the Low Proficiency Group was 39.5 and that of the High Proficiency Group was 40.1. Therefore, in order to examine any age effect more cautiously, two JNS groups were made, the younger group consisting of Japanese participants aged 29 and under, and the older group consisting of Japanese participants aged 30 and over. A Low Proficiency group and a High Proficiency group for each age group were further formed as Table 10 shows, and the mean scores of the five groups were compared. A 2 (relation) x 5 (group) ANOVA was conducted to examine judgment patterns on taxonomic and thematic relationships by the five groups:

Group	M/F	Age	Vocab.	Taxonomic	Thematic
Low 29- (*n*=21)	9/11	19.7 (2.7)	51.5 (24.6)	2.95 (0.9)	4.34 (0.8)
High 29- (*n*=21)	7/14	22.0 (3.4)	99.3 (10.9)	3.23 (0.5)	4.06 (0.9)
Low 30+ (*n*=21)	7/14	46.5 (6.6)	30.1 (34.3)	3.14 (0.6)	4.45 (0.6)
High 30+ (*n*=21)	6/15	43.8 (7.7)	116.8 (9.1)	3.48 (0.6)	4.50 (0.5)
ENSs (*n*=21)	10/11	26.9 (4.5)		3.41 (0.5)	4.34 (0.4)

Table 10. Profiles of the different age and language proficiency groups and their mean judgment scores

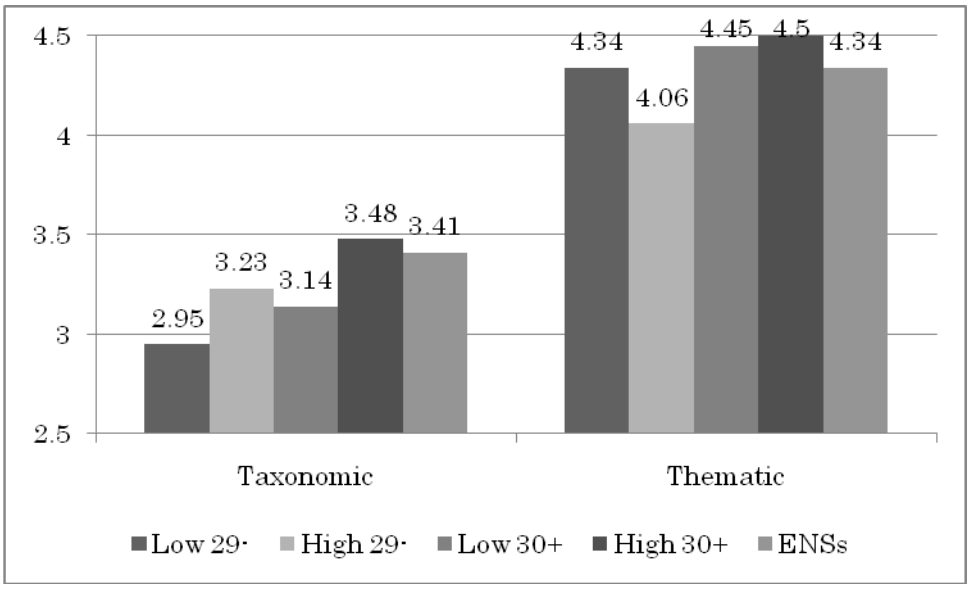


Figure 13. Mean scores for the taxonomic and thematic relationship judgments by the five groups

the Low Proficiency 29-, the High proficiency 29-, the Low Proficiency 30+, the High Proficiency 30+, and the ENS group.

There was a significant main effect of relation: F (1, 100) = 184.150, $p < .000$. But there was not a significant effect of group: F (4, 100) = 1.929, $p > .05$. Also, the group x relation interaction was not significant: F (1, 100) = 1.843, $p > .05$.

In order to have a closer look at the effects of age on relationship judgments more specifically, partial correlation analyses were conducted among four variables: taxonomic-relationship judgment scores, thematic-relationship judgment scores, vocabulary test scores, and age. While controlling for age, the correlation between the taxonomic-relationship judgment scores and the vocabulary test scores was significant (r = .260, p = .018), but the correlation between the thematic-relationship judgment scores and the vocabulary test scores was not significant (r = - .003, p = .978). While controlling for language proficiency (i.e., vocabulary test scores), the correlation between age and the taxonomic-relationship judgment scores, and that between age and

the thematic-relationship judgment scores were not significant, $r = .161$, $p = .146$ and $r = .167$, $p = .130$ respectively. Thus language did have effects on taxonomic relationship judgments among JLEs regardless of age, but not on thematic relationship judgments, and age did not have any effects on either relationship judgments.

4.1.7 *Discussion*

First of all, all the participant groups scored significantly higher in thematic relationship judgments than in taxonomic relationship judgments. The high scores in thematic-relationship judgments among ENSs were against the prediction that ENSs would score higher in taxonomic-relationship judgments than in thematic-relationship judgments, based on the West-East paradigm. However, the ENSs scored significantly higher than JNSs in taxonomic-relationship judgments, which partially supports Hypothesis 1) JNSs and ENSs categorise objects in different ways. As such, it demonstrates that ENSs are more taxonomically oriented than JNSs, in line with the study by Ji et al. (2004) on ENSs and Chinese-English bilinguals.

As for the thematic relationship judgments, the scores of JNSs and ENSs did not show any significant differences, though it was predicted that JNSs would show more thematically-oriented judgments than ENSs. This uncertain result may be attributed to the different tasks. Ji et al. (2004) used a grouping task, in which participants were asked to indicate which two of the three, for example *monkey-panda-banana*, were most closely related, and English speakers grouped taxonomically-related objects, that is *monkey-panda,* more often than thematically-related objects, that is, *monkey-banana*. In the present study, participants were required to judge the closeness of both taxonomically-related objects and

thematically-related objects. 'Not grouping' does not indicate 'being unable to perceive' the relationship. As the attention of the participants was directed to the thematically-related objects, their relatedness concepts were activated (Unsworth & Pexman 2005). Then both groups scored high for the thematically-related objects which were very often seen in familiar contexts. Thus the ENSs and JNSs may not have revealed a significant difference in thematic-relationship judgments in this study.

Another interpretation is simply that thematic relationships among objects were perceived without any significant differences across speakers of the two different languages, which was against the results of the previous studies on different behaviours shown in the West-East paradigm (Chiu 1972; Gutchess et al. 2006; Ji et al. 2004; Unsworth et al. 2005). As for categorisation behaviour of thematically-related objects, therefore, further research is necessary to confirm similar behaviours of ENSs and JNEs. Additionally, it is necessary to investigate specifically under what conditions similar behaviours of ENSs and JNSs will be observed, as Waxman and Namy (1997) and Lin and Murphy (2001) report different instructions generated different results.

Secondly, JLEs with different proficiency levels in English behaved significantly differently in judging the taxonomically-related objects: JLEs with higher proficiency in English scored higher in taxonomic relationship judgments. But they did not show any different behaviours in judging the thematically-related objects. In comparing different proficiency groups, however, one aspect to note is age. Because JLEs covered a wide range of age from 18 to 57, the mean age of the four proficiency groups were quite different (see Section 4.1.2). As for the age effects on categorisation, Gutchess et al. (2006) found that elderly Chinese in their 60s to 80s showed a stronger culture-specific cognitive pattern than younger Chinese. Partial correlation analyses,

however, showed that age did not give any significant effects on either type of relationship judgments when controlling for language proficiency levels. The analyses also showed language did give effects on taxonomic relationship judgments, but not on thematic relationship judgments when controlling for age. Thus age difference among the Japanese participants in this study did not seem to be big enough to bring about some effects on their judgments as shown in the study by Gutchess et al. (2006).

This study demonstrated, after figuring out age differences among the Japanese participants, that JLEs with comparatively higher proficiency in English were between the Japanese monolinguals (JLEs at a beginners' level) and ENSs. In other words, the scores of the JELs on taxonomic-relationship judgments became higher and closer to those of ENSs as they developed proficiency in English. This result partially supports Hypothesis 2) JLEs at different English proficiency levels categorise objects in different ways, though the differences were not generated in thematic relationship judgments. It further supports multi-competence, which asserts that L2 learners think and perceive things differently from monolingual L1 speakers as a consequence of learning an L2.

Thirdly, an obvious question arises here: that is, is it culture, or social practices (see Section 2.3.2, pp. 94-95, for the definition of 'culture'), or language that causes effects? Though social psychologists argue that culture influences cognition (Miyamoto & Nisbett 2005), it is not plausible to expect that JLEs in this study had been exposed to Western society frequently enough to experience social effects on their cognition, considering that the Japanese participants in this experiment were all living in Japan using the Japanese language in their daily life. They had mostly learned English as a school subject in Japan and were surrounded with Japanese social environments.

Then it must be the case that language alone has something to do with this cognitive shift. In addition, this language effect seems to appear on taxonomic relationship judgments but not on thematic relationship judgments.

Interestingly Nisbett (2003) referred to different generic noun forms between English and East Asian languages as a reason for different behaviours in taxonomic-oriented categorisation, but did not specify any linguistic forms as a reason for thematic-oriented categorisation of East Asians. Pragmatic evidence supporting the thematic-oriented tendency of Japanese speakers can be found in Fernald and Morikawa (1993). They compared Japanese and American mothers' speech and revealed that Japanese mothers used more expressions related to social interactions than American mothers, who used more object nouns than Japanese mothers. Grammatical sensitivity to noun forms is more explicitly required from the very beginning stage of learning an L2 than pragmatic features of the L2 use. Also differences in grammatical features are more salient than pragmatic features. For speakers whose L1 does not have articles and does not distinguish singularity and plurality, to learn an L2 which has articles and plural noun forms may well introduce a new concept of objects and lead to an eye-opening experience.

Thus, this study concludes that the behavioural shift revealed among JLEs in taxonomic relationship judgments is attributed to the language they have learned as an L2, and not to the culture, or social practices, accompanying the language.

4.2 Experiment 1B: Taxonomic-Thematic Categorisation Judgments by CLJs

4.2.1 *Aims*

The next experiment was carried out to examine how Chinese learners of Japanese (CLJs) would react to the object categorisation judgment task using the same taxonomic-thematic triads. In the previous experiment, the results showed that JNSs and ENSs judge the relationships of objects in the taxonomic-thematic triads differently and JLEs relate taxonomically-related objects more strongly as they acquire higher proficiency of English. Thus it was confirmed that JNSs would behave as predicted according to the West-East paradigm asserted by Nisbett (2003) and others (see Chapter 2): the figure is repeated on p. 154 in this chapter.

In order to confirm the plausibility of the West-East paradigm furthermore, this study examined how CLJs would shift their responses as a consequence of learning Japanese, that is, what would happen if speakers of Chinese who belong to the East Asian group acquire an L2 Japanese which also belongs to the same group. Chinese and Japanese have similar traits in generic noun phrases as described in Chapter 3. Marking of generics in both languages is not as obligatory and overt as in English. If the paradigm works, therefore, it was predicted that CLJs would not change their responses as a consequence of learning Japanese.

Experiment 1B used CLJs who had learned English before learning Japanese, and had two research questions:

1) As a consequence of learning Japanese, do CLJs restructure any specific area of their cognition and show any differences among learners at different proficiency levels in Japanese? If yes, in what ways are they different?

2) As a consequence of learning English before learning Japanese, have CLJs restructured any specific area of their cognition and do they show any differences among learners at different proficiency levels in English? If yes, in what ways are they different?

The aim of the questions is to further confirm the West-East paradigm which was confirmed by Experiment 1A between ENSs and JNSs, and among JLEs. The experiment was carried out in a university in north-eastern China as a non-requirement of the class in December, 2007.

4.2.2 *Participants*

Sixty CLJs (mean age 22.3, age range 19-24; male 20, female 40) participated in the experiment. They were all Japanese majors of a university located in a city in north-eastern China. They were asked to join the experiment by their Japanese language teacher after class. It was not a class requirement but all of the students agreed to participate. They were asked to take a Japanese language test before the experiment, and divided into three proficiency groups according to their scores on the Japanese test. The test was made from practice test problems at different levels chosen at random from several issues of *Japanese Journal*, a monthly journal for learners of Japanese published in Japan. All of them started to study Japanese when they entered the university. Because they were all third-year Japanese majors, they were mostly in a Japanese learning environment, and more importantly they were not required to take any English classes at the university. Though most of them had studied English before Japanese, they were not studying English and had been away from English for some time at the

time when the experiment was conducted. Two of them said in the pre-experiment questionnaire that they had been trying to study English by themselves besides Japanese for their future career.

Most of them had learned English more than two years before they entered the university, so they were also asked to write the score on the English test at the entrance examination they took to enter the university. Learning English before Japanese may have made some effects on their cognition and it may have been retained even after learning Japanese. Therefore, the Chinese participants were also divided into three groups at different proficiency levels in English, though the English scores were almost three years old.

4.2.3 *Materials*

The same picture triads as those used in Experiment 1A for ENSs and JNSs were used in Experiment 1B for the CLJs. The order of presenting triads was randomised and the left-right positions were also randomised. Half of the participants were tested in reverse order with reverse left-right positions to counterbalance any effect of presentation. The experiment was paper-based.

4.2.4 *Task*

The task was the same as Experiment 1A, i.e., a relatedness judgment task on a 5-point scale. The participants were required to judge the relationship both in the taxonomically-related objects and in the thematically-related objects in a triad. The language used in the experiment was Chinese. The instruction was “你觉得，四角里的东西，和其他两个，结合多强？请你用 1 至 5 的数字来表示” literally “How strongly

is the object in the square related to the other objects in your mind? Please show your judgment on a scale of from 1 to 5", with 1 meaning weakly related and 5 meaning strongly related. The Chinese instructions thus differed from the instructions in Experiment 1A, which used the expression 'How close are the two objects in your mind?' but the Chinese instruction was the most suitable expressions for the Chinese. Two L1 Japanese-L2 Chinese bilinguals and one L1 Chinese-L2 Japanese bilingual translated the Japanese instruction into Chinese, and another Japanese-Chinese bilingual and another Chinese-Japanese bilingual chose the most appropriate Chinese expression and was confirmed that they were as clear as possible.

4.2.5 *Hypothesis*

There were two hypotheses:

1) CLJs at different proficiency levels of Japanese show significantly different judgments in the taxonomic-thematic categorisation judgment task.
2) Chinese native speakers (CNSs) who have reached different proficiency levels of English even before they started to learn Japanese show different judgments in the taxonomic-thematic categorisation judgment task.

4.2.6 *Results*

The Chinese participants were first divided into three groups according to the Japanese test scores: the Low, the Intermediate and the Advanced Group. Table 11 shows profiles of the three groups, and their test scores and mean scores of the judgments. Then the group mean scores of the taxonomic- and thematic-relationship

Group	*n*	M/F	Age	Jap. test score	Taxonomic	Thematic
Low	20	9/11	22.5	29.7 (4.2)	2.55 (0.5)	3.93 (0.4)
Intermediate	20	5/15	22.1	40.9 (3.5)	2.64 (0.5)	4.12 (0.4)
High	20	6/14	22.3	50.2 (2.6)	2.65 (0.6)	4.07 (0.8)

Table 11. Profiles and group mean scores of judgments (and standard deviations) of the CLJs at different proficiency levels of Japanese

Group	*n*	M/F	Age	Eng. test score	Taxonomic	Thematic
Low	20	8/12	22.7	61.3 (17.7)	2.46 (0.6)	4.04 (0.4)
Intermediate	20	7/13	22.7	94.0 (9.3)	2.58 (0.5)	4.07 (0.5)
High	20	5/15	21.6	118.5 (7.6)	2.81 (0.5)	4.00 (0.7)

Table 12. Profiles and group mean scores of judgments (and standard deviations) of the Chinese participants at different proficiency levels of English

judgments were compared as Table 12 shows. A 2 (relation) X 3 (group) ANOVA (with relation as a within-subject factor and group as a between-subject factor) was conducted. The effect of relation was significant, F (1, 57) = 197,046, p = .000. But the group effect was not significant, F (2, 57) = 0.754, p > .05. Also the relation x group interaction was not significant, F (1, 57) = 0.950, p > .05.

Next, the Chinese participants were divided into three groups according to the test scores of the entrance examination in English; the Low, the Intermediate and the Advanced Group. Eight students did not give the English test score, so they supposedly had not studied English enough to take the test. The author was told that there were cases where candidates for Japanese majors did not take the entrance examination in English if they were not well-prepared for it. They were, therefore, grouped in the Low Proficiency Group. Then the group mean scores of the taxonomic- and thematic-relationship judgments were compared as shown in Table 12.

A 2 (relation) X 3 (group) ANOVA (with relation as a within-subject factor and group as a between-subject factor) was conducted. The effect of relation was significant, F (1, 57) = 206,237, p = .000. But the group effect was not significant, F (2, 57) = 0.799, p > .05. Also the relation x group interaction was not significant, F (1, 57) = 1.429, p > .05.

4.2.7 *Discussion*

This experiment was conducted to examine how Chinese speakers would behave in judging taxonomic and thematic relationships as a consequence of learning Japanese and English. Based on the contrasting behaviour of the West, which pays attention to properties of individual objects and relates taxonomically-related objects more strongly, and of the East, which pays attention to relations between objects and relates them less strongly, it is reasonable to expect that learning Japanese would not give effects on the categorisation judgments by CLJs because both Japanese and Chinese belong to the same group. In the previous experiment in this study, it was verified that there were some effects of learning English on categorisation judgments by JLEs, and the experiment results showed that JLEs tended to relate taxonomically-related objects more strongly as they acquired higher proficiency in English. That is, learning an L2 which belongs to the other group of the East-West paradigm gives some effects on the categorisation judgments. In this experiment, both Chinese and Japanese belong to the same group, which tends to pay more attention to relationship than properties of individual objects, and the question was how CLJs at different proficiency levels in Japanese would behave in the object categorisation judgment task.

The results showed that the three groups of CLJs at different proficiency levels in Japanese did not show any difference in the judgment scores, either in the taxonomic relationship or in the thematic relationship (see Table 11). These results rejected Hypothesis 1) that CLJs at different proficiency levels of Japanese show significantly different judgments in the taxonomic-thematic categorisation judgment task. They support the idea that, as Chinese speakers and Japanese speakers belong to the same East-Asian group, Chinese speakers do not shift their categorisation behaviours as a consequence of learning Japanese.

When the Chinese speakers were divided into groups of different English proficiency levels, their scores of taxonomic relationship judgments grew as their proficiency developed: the scores of the Low, the Intermediate, and the High Proficiency Group were 2.46, 2.58, and 2.81 respectively. Statistically, however, there was no significant difference among the three groups. Most of the Japanese majors in this experiment had studied English before they started to major Japanese in the university three years before. Also some of them achieved high scores in the entrance examination in English (score range 33-130). The results did not show the effect of English learning on categorisation behaviours in CLEs.

If we look back to previous cross-cultural research on different categorisation behaviours between Chinese native speakers (CNSs) and ENSs introduced in Section 2.3 above, it was repeatedly reported that CNSs showed different ways of taxonomic-thematic categorisation from ENSs (Chiu 1972; Ji et al. 2004; Unsworth et al. 2005; Gutchess et al. 2006). CLEs at different proficiency levels in English were expected to show different responses, but statistically they did not show differences in this experiment. At least we can see the trace of English learning effects in the gradual

growth of scores in taxonomic relationship judgments (see Table 12). The results can be interpreted, therefore, as effects of learning L3 Japanese. That is, the effects of English were weakened after learning L3 Japanese. Thus, Hypothesis 2) CNSs who have reached different proficiency levels of English even before they started to learn Japanese show different judgments in the taxonomic-thematic triad categorisation task was not supported. The results suggest a possible and necessary direction for future research on effects of an L3 on an L2.

It might be argued that the Japanese proficiency differences were not large enough among the CLJs in this experiment, and the participants had not studied Japanese long enough, so that they did not show any difference in the judgments. It is difficult to estimate the difference of proficiencies among the groups. But the difference of group mean test scores between the Low Proficiency Group and the High Proficiency Group were 57.2 (full marks 120) in English and 20.5 (full marks 60) in Japanese. In the case of JLEs, statistically significant results were found between the two proficiency groups of JLEs with difference of 84.3 points in the group mean scores in the English vocabulary test (full marks 126). Furthermore, the Chinese participants had studied English for 6.92 years on the average before they started Japanese only about three years before the experiment was conducted. The Japanese participants in Experiment 1A had studied English much longer, for 12.26 years on average. Three years of Japanese study may not be long enough to produce any difference in categorisation judgments.

Naturally, it was expected to collect data from CLJs with much longer experience of learning Japanese and with much higher proficiency in Japanese. Theoretically, however, CLJs are not predicted to show different behaviours however

long they study Japanese and however high proficiency they acquire, so that it is difficult to decide whether their Japanese learning experience is long enough to examine the language learning effects or not. Thus, in order to seek out difference in categorisation judgments among younger L2 learners with rather limited learning experience, the same experiment was conducted again among high school students in Japan.

4.3 Experiment 1C: Taxonomic-Thematic Categorisation Judgments by Young JLEs at a Beginners' Level

4.3.1 *Aims*

This experiment examined whether JLEs with less English study experience would still show any difference in object categorisation between different proficiency groups. In other words, it examined whether L2 learning effects would appear in their categorisation behaviours even after a few years of learning an L2. For this aim, a group of high school students were chosen. They were first year students in a senior high school located in the same local area of the previous study Experiment 1A in Japan. Students usually start to study English when they enter junior high school at the age of 12 in Japan. So they had studied English for approximately four years (the details of the participants are described below in Section 4.3.2). Because they took entrance examinations to enter the high school, English proficiency among them was not expected to be extremely high.

The research question for Experiment 1C was:

1) Do JLEs with a comparatively short period of studying English still show any difference in object categorisation among different proficiency groups? If yes, how are they different?

The aim of the experiment was to confirm the previous results revealed among CLJs. It could be argued that the failure to reveal cognitive differences among CLJs may have attributed to their relatively short experience of learning Japanese. Therefore, this experiment was carried out to see whether L2 English effects would be found among Japanese high school students after approximately four years of studying English at school. The experiment was carried out in January, 2008.

4.3.2 *Participants*

Seventy-two high school students participated in this experiment during an English class at their own school. They were first year students at a senior high school in Japan, so 15 or 16 years old. There were 36 boys and 36 girls. Students in Japan are required to study English at school at the age of 12, so they had studied English at least three years and ten months, when they joined the experiment. A questionnaire survey showed that some of them had started to take English lessons earlier than that. Eight students started English at the ages of 3, 6, 9 or 10, but it was only once a week, for one hour per lesson. None of them had stayed in an English speaking country before. They had been all born in Japan and brought up completely in the Japanese language environment.

They were briefly told by their teacher of English that they were expected to cooperate for a study on how people look at things, which was being conducted by

someone the teacher knew. They were required to take an English test, made up of sample problems taken from a nationwide English proficiency test (the test of the Society of Testing English Proficiency, widely known as *Eiken* in Japanese, or the STEP test). Test time and the amount of items in the test were considered to be moderate. They had 15 minutes to do the test and the full score of the test was 20, so that the high school students would not feel it a heavy burden, and at the same time that it would not be much disturbance for the rest of the English lesson. They were also asked a few questions about their English learning experience in a questionnaire. The main experiment of object categorisation judgments took a few minutes, and there was no time constraint imposed.

Four students did not take the English test for some reason, and their judgment scores were excluded from the analysis.

4.3.3 *Materials*

The same picture triads as those used in Experiment 1A and 1B were used for the high school students. The order of presenting triads was randomised and the left-right positions were also randomised. Half of the participants were tested in reverse order with reverse left-right positions to counterbalance any effect of presentation. The experiment was a paper-based one.

4.3.4 *Task*

The task was exactly the same as Experiment 1A, namely a relatedness judgment task on a 5-point scale. The participants were required to judge closeness of objects both in the taxonomic relationship and in the thematic relationship in a triad;

with 1 meaning far and 5 meaning close. The language used in the experiment was Japanese. The whole procedure took about 20 minutes including the English test and completing the questionnaire.

4.3.5 *Hypothesis*

The hypothesis was;

1) JLEs with four years' experience of studying English at different proficiency levels will show some differences in taxonomic-thematic object categorisation judgments as a consequence of learning English.

The hypothesis is based on the prediction that, though their English was still at a beginners' level, having taken an English class as a school subject three times a week for nearly four years, some of them at relatively a higher level within the participants may show some different judgments in categorisation from those at a lower level within this experiment group. If this hypothesis was confirmed, it further supports the results of Experiment 1B, which claim CLJs do not show difference as a consequence of learning Japanese. Thus it will refute the argument that CLJs did not show any difference in judgments because their length of studying Japanese was not long enough and their proficiency level of Japanese was not high enough.

4.3.6 *Results*

The high school student participants were divided into three groups according to the English test scores: the Low, the Intermediate and the Advanced Group. Then the

Group	M/F	E. test	Taxonomic	Thematic
Low (n=25)	16/9	11.4 (1.8)	2.78 (0.8)	4.25 (0.8)
Intermediate (n=22)	11/11	14.5 (0.6)	2.91 (0.6)	4.15 (0.6)
High (n=21)	9/12	17.7 (1.7)	3.20 (0.6)	4.37 (0.8)

Table 13. Group mean scores (and standard deviations) of English test, taxonomic and thematic relationship judgments of high school students in Japan

group mean scores of the taxonomic- and thematic-relationship judgments were compared. See Table 13.

A 2 (relation) x 3 (group) ANOVA (with relation as a within-subjects factor and group as a between-subjects factor) was conducted. There was a significant main effect of relation, indicating that the high school students responded in a significantly different way across the two relationship judgments, F (1, 65) = 118.098, p = .000. That is, they scored significantly higher in the judgments of thematic relationships than in the judgments of taxonomic relationships. The effect of group was not significant, F (2, 65) = 1.933, p > .05. The group x relation interaction was not significant either, F (1, 2) = 0.550, p > .05.

4.3.7 *Discussion*

The statistic results did not support Hypothesis 1) JLEs at a comparatively beginners' level at different proficiency levels show some differences in object categorisation judgments as a consequence of learning English. Thus it did not further confirm the results of the experiment done on CLJs in the previous section. If, however, we pay attention to the scores of taxonomic relationship judgments, which are expected to grow as JLEs gain higher proficiency in English, the scores of the Low, the

Intermediate, and the High Proficiency Group were 2.78, 2.91, and 3.20 respectively. The scores slightly grew gradually as participants' proficiency became higher, which may be a sign that they were about to reveal differences as a consequence of learning English for nearly four years.

One thing to mention here is that the high school students in the experiment were screened to enter the high school through entrance examinations after they finished junior high school. The students were, therefore, comparatively homogeneous in terms of their school performances. If the participants were selected from various high schools, the results may have been different.

The results of this experiment on younger JLEs did not further support the results of Experiment 1B on CLJs and did not convincingly refute the argument that CLJs may not have had enough exposure to Japanese. They suggest, however, further important research on when L2 learning starts to have some effects on L2 learners' cognition and when L2 learners start to reveal behavioural differences specifically in object categorisation activities.

4.4 General Discussion

The experiments showed that JNSs and ENSs do behave in different ways in object relationship judgments, and furthermore JLEs at an advanced level behaved in-between the low proficiency group and the ENS group and showed a cognitive shift toward ENSs. Specifically the differences were found in judgments on taxonomic relationships such as *monkey-panda*, not on thematic relationships such as *monkey-banana*. These cognitive differences and cognitive shift revealed in object categorisation judgments confirmed the West-East paradigm proposed in the field of

social psychology by Nisbett (2003) and others (Kitayama et al. 2003; Masuda & Nisbett 2001, 2006; Nisbett & Miyamoto 2005; Norenzayan et al. 2002). JNSs judged that taxonomically-related objects were less strongly related than ENSs, and as they acquired higher proficiency of English they tended to judge that the taxonomically-related objects were more strongly related, and thus more like those of ENSs. The results support the notions of multi-competence of JLEs, which assert that L2 users who know more than one language think or perceive things differently from monolingual speakers (Cook 2002a, 2003). The words 'think' and 'perceive' have broad scopes of meaning, but include wide range of cognitive activities such as inference, memory, judgment, and classification (Fishman 1960; Lucy 1997; also see Section 1.1.2 of this thesis), and object categorisation is one of the important cognitive activities of human beings (Murphy 2004). In this experiment, JLEs showed their multi-competence by categorising taxonomically-related objects in different ways from both monolingual English speakers and monolingual Japanese speakers (or the low proficiency group in this experiment).

The cognitive traits shown in the West-East paradigm were also confirmed by Chinese participants in Experiment 1B. They showed very interesting results in this experiment. CLJs at different proficiency levels of Japanese did not show differences in judging the relationships of taxonomically-related objects. Because Japanese and Chinese both belong to the East Asian group in the West-East paradigm, it was predicted that CLJs would not change their judgment patterns after learning Japanese. The results turned out as predicted. Interestingly, furthermore, when they were grouped according to their English test scores, they showed certain differences in taxonomic relationship judgments but the differences were not statistically significant. The results

may be attributable to the effects of L3 learning. Most of the Chinese participants had learned l2 English before learning L3 Japanese. Their cognitive patterns may have shifted to those of ENSs as a consequence of learning L2 English, but may have re-shifted as a consequence of learning L3 Japanese. This indicates further research is necessary to investigate effects of L3 on cognition.

As for the thematically-related objects, this experiment did not reveal any significant differences between JNSs and ENSs and among JLEs at different proficiency levels. If the West-East paradigm works in the thematic relationship judgments, JNSs tend to relate thematically-related objects more strongly than ENSs and JLEs will relate them less strongly as they acquire higher proficiency in English. The group mean scores of the thematic relationship judgments, however, did not reveal such differences. They did not support the results of the previous studies in the field of social psychology (Chiu 1972; Gutchess et al. 2006; Ji et al. 2004; Unsworth et al. 2005). This may be attributed to different tasks used in the experiments. Ji et al. (2004) used a grouping task and the present research used a relatedness judgment task. As for categorisation behaviour of thematically-related objects, therefore, further research is necessary to investigate specifically under what conditions similar behaviours of ENSs and JNSs are observed or different behaviours are observed, as Waxman and Namy (1997) and Lin and Murphy (2001) report different instructions generated different results.

An important point to be discussed at this stage is whether the behavioural differences between the speakers of different languages are attributable to the languages they speak. The fact that JNSs and ENSs behave differently alone would not be enough to conclude that there is an effect of language. Differences between speakers of different languages could be ascribed to such other factors than language as different

life styles and environments: for example, one group was surrounded by a much larger amount of artefacts than the other group (Carroll & Casagrande 1958), and the levels of education between the groups were obviously different (Li & Gleitman 2002; Levinson 2003). Also there could be a counterargument that expectations of the two different societies, the West and the East, should render such different behavioural patterns. In this study, however, there is strong support for language effects, which is generalised from the profile of the Japanese participants.

First, the cognitive shift was found among the speakers of the same L1, so that factors such as life styles, living environments, geographic contexts, educational background, and social background are excluded. Thus different cognitive patterns among L2 learners at different proficiency levels of the target language will more clearly show language effects than by showing differences between speakers of two languages. In other words, language effects can be more clearly and easily detected by investigating L2 learners because the language proficiency will be the major factor of the differences with other factors such as life styles, educational background, and geographic contexts remained the same. Furthermore, the Japanese participants in this study have been studying English in Japan, where Japanese is used as almost the only means of communication, with very limited experience or no experience at all of staying in English speaking environments. Naturally advanced learners of English have learned a lot about English speaking societies and may have acquainted with expected behaviours of English speakers to some extent, but it is very difficult to consider that they had been exposed to English speaking culture for a long time. Also there was a significant correlation between scores of taxonomic relationship judgments and scores

of English vocabulary test. It is concluded, therefore, that there must be some language effects on JLEs' categorisation behaviours.

The language effects on cognition are also supported by the results of the experiment using Chinese participants. They also had studied Japanese and English in China without visiting or staying in the countries where they are spoken. Thus, it is possible to argue that the experiment examined language effects on cognition in L2 learners. The ideas of multi-competence, therefore, greatly contribute in this cognitive research.

After verifying that JLEs at different proficiency levels do give different judgments on object categorisation and that there seem to be some language effects on this part of cognition, Experiment 2 examines whether generic noun phrases are relevant in some way or not.

Chapter 5. Experiment 2: Interpretation of Generic Expressions in Japanese and English

5.1 Aims of the Experiment

This experiment investigated whether JNSs and ENSs would interpret generic noun phrases differently or not. Chapter 4 showed the results of the taxonomic-thematic categorisation judgment tests and observed that JNSs and ENSs behaved differently in making judgments on relationships between taxonomically-related objects. Categorisation based on taxonomy is considered to be relevant to generic expressions in that it involves determining and understanding essential and common properties of objects (Gelman 2004; Prasada 2000; Waxman & Markow 1995). In other words, acquiring generic nouns indicates being guided to commonalities among objects and being able to categorise objects (Gelman 2004). Nisbett (2003) speculates that different behaviours in this kind of taxonomic categorisation may be attributed to differences in generic noun phrases between English and some Southeast Asian languages. Therefore, Experiment 2 examined whether ENSs and JNSs would show any different interpretation on generic noun phrases in English and Japanese respectively. The experiment also examined multi-competence of JLESs by exploring whether JLEs at different proficiency levels would interpret generic noun phrases differently.

As for the causal factors of the behavioural differences between Westerners and East Asians, sociologists mostly attribute them to cultural differences (Nisbett & Miyamoto 2005). If any differences were revealed in the present experiment, however, it means that JLEs would acquire some ways to categorise objects differently from

monolingual JNSs as a consequence of learning English, because they have been learning English mostly in Japan without exposure to Western social environment.

The present experiment was a slightly modified version of an experiment conducted by Gelman and Tardif (1998). They identified generic noun phrases in utterances of both English and Chinese mothers talking to their children and found that English speaking mothers would use generic nouns significantly more frequently than Chinese speaking mothers. They also found that ENSs and CNSs would interpret generic/non-generic noun phrases in statistically different ways, though they interpreted them mostly in similar ways: that is, CNSs had more varied ways of interpretation on number and definiteness of noun phrases. So, the present study replicated the survey of interpretation of generic noun phrases and investigated whether different interpretations of generic/non-generic noun phrases would be found between ENSs and JNSs, and further whether JLEs at different proficiency levels in English would interpret them differently. The data were collected from July to September, 2008.

5.2 Participants

Sixty-six JNSs (mean age 20.5, range 18-38; male 26, female 40) who were undergraduate and graduate students from a local university in Japan, and 26 ENSs (mean age 21.1, range 18-30; male 12, female 14) who were undergraduate students in the UK participated in this experiment. The participants were all asked individually by the researcher to take part in an experiment to show how they would understand and interpret sentences written in their native language. Japanese participants were required

to take a 20-minute English proficiency test (Oxford Quick Placement Test[13]), so it took 30-40 minutes for them to complete the whole experiment. They were later divided into two groups according to the test scores. British participants answered only the sentence interpretation questions, taking about 10-15 minutes to complete it. There was no time constraint on the interpretation task.

The Japanese participants in Experiment 1A, the taxonomic-thematic categorisation judgments, covered a wide range of age and proficiency in English. This was intentional as behavioural differences among JLEs were expected to be much smaller than the differences between monolingual JNSs and ENSs, so data were collected from JLEs with large differences in English proficiency. Differences in proficiency naturally produced differences in age, since advanced learners tended to be older than the beginners. Experiment 1C, however, showed that young JLEs at a beginners' level had already started to show cognitive differences though statistically there was no significant difference. That is, the Japanese participants do not have to be so different in proficiency to reveal differences in this kind of cognitive activity. The Japanese participants for this experiment, therefore, were mostly university students aged from 18 to 24, including one male aged 30 and one female aged 38. In this way, age effects were excluded. The profiles of the participants in Experiment 2 are shown in Table 14.

[13] Oxford Quick Placement Test (OUP 2003) was used to measure the proficiency levels of JLEs' in this experiment, though Nation's (2001) vocabulary test was used in the previous experiment. This is because OQPT is shorter and takes less time.

Group	M/F	Age	E-test score
Low Group (n=35)	19/16	20.6 (2.5)	22.1 (2.8)
High Group (n=31)	7/24	20.6 (3.5)	29.8 (4.1)
ENSs (n=26)	12/14	21.1 (4.2)	-

Table 14. Profiles of the participants; mean age and mean score of each group (with standard deviations)

5.3 Materials

The stimulus sentences were taken from Gelman & Tardif (1998) as shown in Table 15 with minor modifications to three sentences. The original sentences *Bud likes dinosaurs, Do you like buttons?* and *The frog is not dancing any more* were changed into *My brother likes dinosaurs, Do you like roses?* and *The butterfly is not dancing any more* respectively. The reasons were that *Bud* may not sound appropriate to some British people and also it does not have an appropriate Japanese equivalent. *To like buttons* may be an unusual statement in everyday life, and should sound a little puzzling. So it was replaced with an inanimate noun *roses*. *The frog* appears twice in the stimulus sentences, so the animate object *butterfly* replaced it with other parts of the sentence unchanged.

Sixteen sentences in the table were used, which cross the four independent factors: genericity (generic/non-generic), number (singular/plural), syntax (subject/non-subject) and animacy (animate/inanimate). In the case of *What do you do with a <u>teapot</u>?*, the target noun is not the subject and appears at the end of the sentence, while in its Japanese equivalent it appears at the beginning of the sentence as *<u>Kyuusu</u> wa nanni tuskai masuka?*, though it is not the subject but the topic. Therefore, nine sentences have the target noun at the beginning in Japanese, and eight sentences do in

	Genericity	Number	Syntax	Animacy	Sentences
1	G	S	S	A	A horse says neigh. *Uma wa hihiin to inanaku.*
2	G	S	S	I	A kite goes flying in the sky. *Tako wa sora wo mau.*
3	G	S	N	A	You roar like a lion. *Anatano donari-goe wa raion no youda.*
4	G	S	N	I	What do you do with a teapot? Kyuusu wa nanni tsukai masuka?
5	G	P	S	A	Bunny rabbits don't make noises, do they? *Usagi san wa nakigoe wo dasanai yone?*
6	G	P	S	I	Hammers are for pounding (nails). *Kanazuchi wa kugi wo utsumono desu.*
7	G	P	N	A	My brother likes dinosaurs. *Otouto wa kyouryuu ga sukida.*
8	G	P	N	I	Do you like roses? *Anata wa bara ga suki desuka?*
9	NG	S	S	A	The butterfly is not dancing anymore. *Choucho wa mou odotte iasen.*
10	NG	S	S	I	The tractor doesn't have a nose. *Torakutaa niwa sentanbu ga tsuite imasen.*
11	NG	S	N	A	Hey, silly frog! *Ooi, obaka na kaeru san yo.*
12	NG	S	N	I	Come and sit down in your chair. *Kochira ni kite isu ni kakenasai.*
13	NG	P	S	A	The little billy goats lived on the side of the valley. *Chiisana yagi wa tani no shamen ni sun-de imashita*.
14	NG	P	S	I	These little wheels go round and round. *Chiisana sharin ga guruguru mawaru nodesu.*
15	NG	P	N	A	Did you see the bugs? *Mushi ga mie mashitaka?*
16	NG	P	N	I	Can you hand me the purple blocks? *Murasaki iro no burokku wo totte kudasai.*

Table 15. Sentences used in the Experiment 2. Japanese equivalents are provided under each of the English sentences

English. This imbalance in the position of the nouns cannot be avoided. Because of this reason, the syntactic factor of subject/non-subject was excluded from the data analysis.

These sentences had been taken from the actual English-speaking database (Gelman & Tardif 1998). They were translated into Japanese by two Japanese-English bilinguals including the author. In translation from English to Japanese, following the Chinese translation listed in Gelman and Tardif (1998), all of the nouns in question were put into the bare singular noun form in Japanese. Therefore, number and definiteness completely disappeared. That is, the interpretation of the expressions did not depend on the noun form, and instead, it was thoroughly dependent on the other factors such as tense, aspect, context of the situation, and general knowledge of the readers.

The order of the presentation was randomised twice and the half of the participants in each language group took the experiment using one order of items and the other half took it in the other order. The experiment was a paper-and-pencil based experiment and resembled a questionnaire survey. Possible interpretation of each sentence is discussed in the discussion in Section 5.7.

5.4 Task

The stimulus sentences were presented in Japanese to the Japanese speaking participants and in English to the English speaking participants. They were asked to read each sentence and understand. They were further asked to 'think about what the underlined part refers to' and required to choose one from four choices *one*, *a few*, *many* and *in general*. For example, in the case of sentence 1 *A horse says neigh*, there are four

choices right under the sentence; A. *It refers to one horse*, B. *It refers to a few horses*, C. *It refers to many horses*, and D. *It refers to horses in general*. In Gelman and Tardif (1998), the participants were asked to judge each noun as referring to 'one individual member of the category, some members of the category, or most/any members of the category'. In conducting the present experiment, however, the translation of those phrases into Japanese makes them too wordy and sound unnatural. Furthermore there was a concern that the choice *most/any members of the category* does not precisely indicate the category as a whole, which should be the most important point of the experiment. Therefore, four choices were given including *in general* in this experiment, instead of three choices used in Gelman and Tardif (1998), as in the sample below. The whole experiment sheets are attached in Appendix C, pp. 298-306.

<Sample>

[Instruction] Read the following sentences from 1 to 16, and think about what the underlined part refers to. Please choose one description that you think best describes the part and circle it.

(1) A horse says neigh.

A. It refers to one horse. B. It refers to a few horses.

C. It refers to many horses. D. It refers to horses in general.

(2) Did you see the bugs?

A. It refers to one bug. B. It refers to a few bugs.

C. It refers to many bugs. D. It refers to bugs in general.

Obviously, the sample sentence (2) in English has two grammatically correct choices B and C. In this case, both of them were counted as appropriate choices when analysing the data below in Section 5.7.

5.5 Hypotheses

There were two hypotheses for this experiment:

1. ENSs are more likely to interpret generic phrases as generic and non-generic phrases as non-generic than Japanese speakers, because generic expressions are more explicit and less ambiguous in English than those in Japanese.
2. JLEs at an advanced level will show patterns of interpretation closer to ENSs, therefore, their responses are in-between JLEs at a beginners' level and ENSs

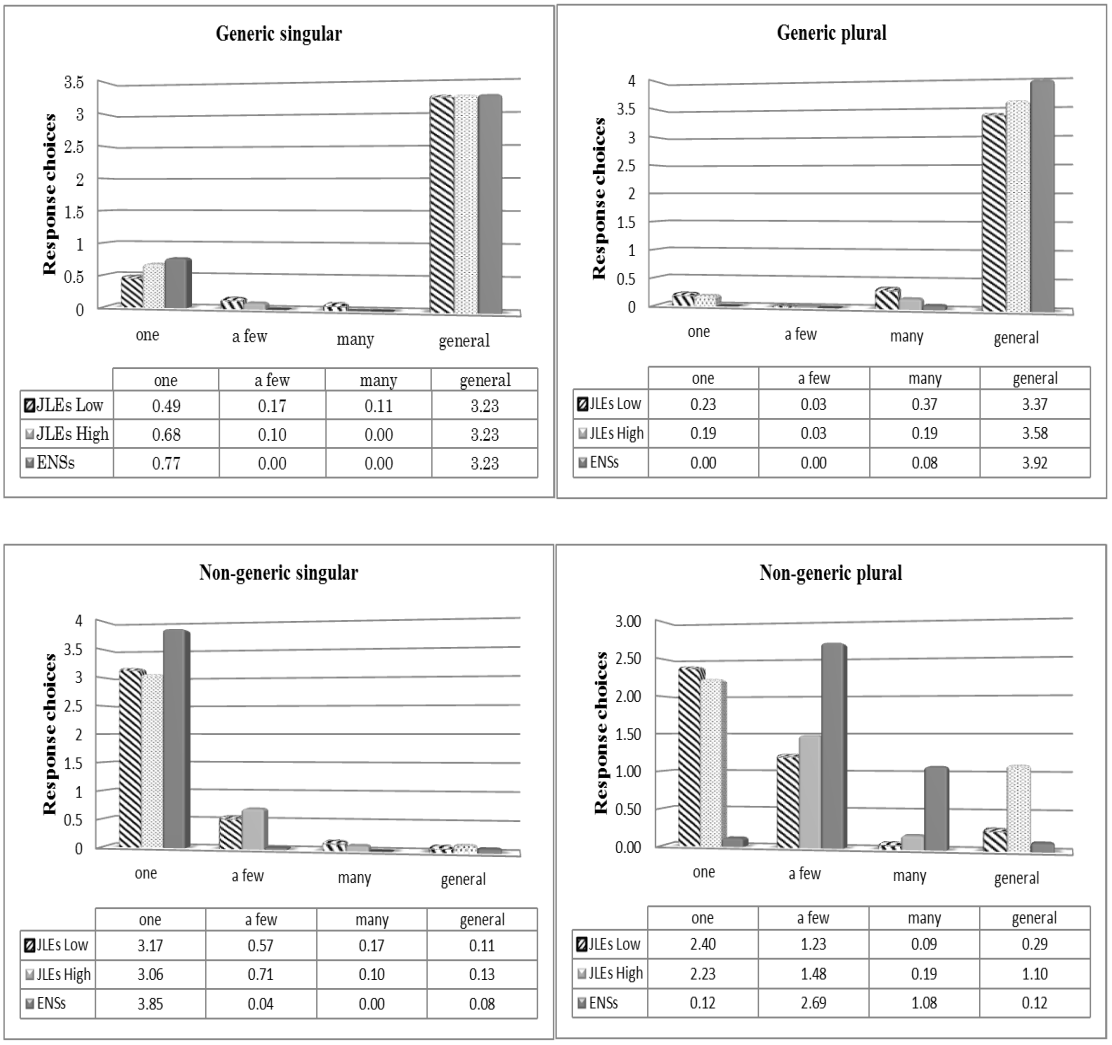
5.6 General Results

The Japanese participants were divided into two groups according to the English test scores (Oxford Quick Placement Test); the Low Proficiency Group (*n*=35, mean age 20.63, mean score of English test 22.1) and the High Proficiency Group (*n*=31, mean age 20.58, mean score of English test 29.8). As it is extremely difficult to find Japanese monolingual speakers in order to compare the responses of Japanese native speakers (JNSs) and those of English native speakers (ENSs), the lower proficiency group replaced monolingual JNSs and was compared to the ENS group as was the case in Experiment 1.

The figures in Table 16 show the mean number of response choices out of 4.0. That is, they show how often the participants interpreted, for example, the four generic singular nouns, *a horse*, *a kite*, *a lion*, and *a teapot* in the stimulus sentences, as referring to each of the choices; *one* object, *a few* objects, *many* objects or objects *in general*. The maximum is four. Predicted responses are in bold. The table shows how each group responded to each noun form on the average. At a glance, the various figures in rows for the Low Proficiency Group and the High Proficiency Group of JNSs indicate that they chose various choices, compared to a lot of noughts in the rows of ENSs. That means the responses have suggested more agreement among ENSs. A

Group	Response choices			
Noun form	one	a few	many	in general
JLEs Low (*n*=35)				
Generic singular	0.49 (0.6)	0.17 (0.4)	0.11 (0.3)	**3.23 (0.7)**
Generic plural	0.23 (0.4)	0.03 (0.2)	0.37 (0.5)	**3.37 (0.7)**
Non-generic singular	**3.17** (0.9)	0.57 (0.7)	0.17 (0.5)	0.11 (0.5)
Non-generic plural	2.40 (1.0)	**1.23** (0.7)	**0.09** (0.4)	0.29 (0.8)
JLEs High (*n*=31)				
Generic singular	0.68 (0.7)	0.10 (0.3)	0.00 (0.0)	**3.23 (0.7)**
Generic plural	0.19 (0.4)	0.03 (0.2)	0.19 (0.4)	**3.58 (0.5)**
Non-generic singular	**3.06** (0.9)	0.71 (0.7)	0.10 (0.3)	0.13 (0.3)
Non-generic plural	2.23 (1.1)	**1.48** (1.0)	**0.19** (0.5)	0.10 (0.3)
ENSs (*n*=26)				
Generic singular	0.77 (0.8)	0.00 (0.0)	0.00 (0.0)	**3.23 (0.8)**
Generic plural	0.00 (0.0)	0.00 (0.0)	0.08 (0.3)	**3.92 (0.3)**
Non-generic singular	**3.85 (0.4)**	0.04 (0.2)	0.00 (0.0)	0.08 (0.3)
Non-generic plural	0.12 (0.3)	**2.69 (1.1)**	**1.08 (1.0)**	0.12 (0.3)

Table 16. Mean number of response choices (out of 4.0) (and standard deviations) for three groups. Predicted responses are shown in bold



	one	a few	many	general
JLEs Low	0.49	0.17	0.11	3.23
JLEs High	0.68	0.10	0.00	3.23
ENSs	0.77	0.00	0.00	3.23

	one	a few	many	general
JLEs Low	0.23	0.03	0.37	3.37
JLEs High	0.19	0.03	0.19	3.58
ENSs	0.00	0.00	0.08	3.92

	one	a few	many	general
JLEs Low	3.17	0.57	0.17	0.11
JLEs High	3.06	0.71	0.10	0.13
ENSs	3.85	0.04	0.00	0.08

	one	a few	many	general
JLEs Low	2.40	1.23	0.09	0.29
JLEs High	2.23	1.48	0.19	1.10
ENSs	0.12	2.69	1.08	0.12

Figure 14. General response patterns of the three groups to each noun form

graphic representation of mean scores is shown in Figure 14.

On the whole, the bar graphs in Figure 14 show that both ENSs and JNSs interpreted the generic singular, generic plural and non-generic singular phrases in a similarly predicted way, though they showed rather different response patterns to non-generic plural phrases. More specifically, as shown in Table 16, the Low proficiency group, the High proficiency group of the Japanese participants and the ENS group showed the same mean response choices of 3.23 in interpreting generic singular nouns as generic. The three groups also showed similar response choices in interpreting generic plural nouns as generic; 3.37, 3.58, and 3.92 respectively.

As for interpretation of non-generic singular nouns, the three groups mostly interpreted them as singular and the group mean scores were 3.17, 3.06 and 3.85 respectively. These similar response patterns among the three groups are surprising when considering the noun phrases do not show number and definiteness in Japanese. In interpreting non-generic plural nouns, however, the responses varied. Few ENSs interpreted non-generic plural nouns as referring to *one* nor referring to *in general*, and they mostly chose *a few* and *many* as predicted; the scores for them were 2.69 and 1.08. Only for this group of nouns, the predicted choices were two; *a few* and *many*. The two groups of JNSs chose *one* the most frequently though they were plural in English.

To examine statistically, a 2 (genericity: generic, non-generic) × 2 (noun phrase number: singular, plural) × 3 (Group: Low proficiency, High proficiency, ENSs) ANOVA (with noun phrase number and genericity as within-subjects factors and group as a between-subject factor) was conducted. Animacy was not taken into account because number and definiteness were the most relevant here. As for statistic procedures, the number of the choices for predicted interpretation, which were in other words appropriate choices in terms of English syntactic forms, was counted. As for the interpretation of non-generic plural, since two choices (*a few* and *many*) were considered appropriate, they were added and processed. For example, when a participant interpreted all the generic singular phrases as generic, he/she was allocated four points. Then the mean points of each group for generic/non-generic nouns and singular/plural nouns were compared.

As predicted, there was a significant main effect of genericity, F (1, 89) = 80.390, p = .000. This means that the participants made significantly different responses to generic phrases than to non-generic phrases. The interaction between genericity and

group was significant, F (2,89) = 34.547, p = .000. Therefore, the three groups interpreted generic phrases in significantly different ways.

There was also a significant main effect of noun phrase number, F (1, 89) = 19.448, p = .000. That is, participants did respond to singular noun phrases and plural noun phrases in significantly different ways. The interaction between number and group was also significant, F (2,89) = 16.413, p = .000. That is, the interpretation of singular nouns and plural nouns were significantly different across the three groups.

For further analysis of responses for each response choice (*one*, *a few*, *many* and *general*) as a function of each noun forms (generic singulars, generic plurals, non-generic singulars and non-generic plurals), One Way ANOVAs were conducted to see how differently the three groups responded. Significant differences were revealed in interpreting generic singulars as referring to *many* (F (2,89) = 3.558, p = .033), in interpreting generic plurals as referring to *one* (F (2,89) = 3.474, p = .035), *many* (F (2,89) = 3.565, p = .032), and *general* (F (2,89) = 7.926, p = .001), in interpreting non-generic singulars as referring to *one* (F (2,89) = 8.512, p = .000) and *a few* (F (2,89) = 9.734, p = .000), and in interpreting non-generic plurals as referring to *one* (F (2,89) = 57.465, p = .000), *a few* (F (2,89) = 19.968, p = .000), and *many* (F (2,89) = 20.966, p = .000). Post Hoc Tests by Bonferonni were further conducted to see the differences between groups. Table 16 was modified into Table 17, so that responses of the groups were more easily compared. The asterisks in Table 17 show the response choices were significantly different from the choices of the control group, the ENSs. The results are further analysed in detail in the next section.

	Generic singular				Generic plural				Non-generic singular				Non-generic plural			
	one	few	many	general	one	few	many	general	one	few	many	general	one	few	many	general
Low	0.49	0.17	0.11	**3.23**	0.23*	0.03	0.37*	**3.37****	**3.17****	0.57**	0.17	0.11	2.40**	**1.23****	**0.09****	0.29
High	0.68	0.10	0.00	**3.23**	0.19	0.03	0.19	**3.58**	**3.06****	0.71**	0.10	0.13	2.23**	**1.48****	**0.19****	0.10
ESs	0.77	0.00	0.00	**3.23**	0.00	0.00	0.08	**3.92**	**3.85**	0.04	0.00	0.08	0.12	**2.69**	**1.08**	0.12

*p < .05, **p < 0.01

Table 17. Comparison of response choice between groups

5.7 **Results in Detail**

5.7.1 *Generic singular nouns*

The four stimulus sentences are:

1. A horse says neigh. (*Uma wa hihiin to inanaku.*)

2. A kite goes flying in the sky. (*Tako wa sora wo mau.*)

3. You roar like a lion. (*Anatano donari-goe wa raion no youda.*)

4. What do you do with a teapot? (*Kyuusu wa nanni tsukai masuka?*)

The figures in Table 18 show the percentages of correct responses in the three groups for each generic singular noun in the four stimulus sentences. 'Correct response' in this section means 'as expected in terms of English noun forms' but not in Japanese. The table shows, therefore, what percentage of the group interpreted the noun forms

	Correct responses for generic singular nouns (%)			
	horse	kite	lion	teapot
JLEs Low (*n*=35)	94.3	77.1	85.7	88.6
JLEs High (*n*=31)	100.0	41.9	93.5	87.1
ENSs (*n*=26)	88.5	57.5	84.6	92.3

Table 18. Correct responses for each of the generic singular nouns

correctly as generic. It is quite natural to expect that ENSs should interpret generic singular phrases in a more predicted way than JNSs. 'The indefinite article + singular countable noun' is one of the accepted forms of generic expressions in English as explained Chapter 3. On the other hand, there is no syntactic cue in the noun forms in Japanese except the topic-marker post-positional particle of *wa* (Bond & Ogura, 1998).

To *say neigh* in Sentence 1 is an essential property of being a horse, so the sentence was generally understood as generic. To *go flying in the sky* is also an essential property of being a kite. However, Sentence 2 may be a little ambiguous. If the aspect is progressive, it is definitely likely to be describing a specific scene: *A kite is/was flying in the sky*. *A kite goes flying in the sky,* however, was possibly interpreted as a description of a particular scene, in which one or a few kites are flying in the sky. For this reason probably, the number of the correct responses for this noun is conspicuously smaller than those for the other sentences (see Table 19). *Like a lion* obviously does not refer to a specific lion. The Japanese equivalent does not show number, but it mostly evokes an image of one lion roaring as a representative of a class, not a lot of lions roaring. This probably is why several JNS participants chose *one*. Only one Japanese chose *many.*

What do you do with a teapot? in English could be ambiguous and possibly reads in two ways; *Where do you put a teapot?* and *What do you usually use a teapot for?* In the former interpretation, however, it would be more predictable to say *What should I do with this teapot?* or *What are you going to do with the teapot?* by referring to a specific one. Therefore, the latter interpretation is more likely to be made. The Japanese translation for the stimulus sentence takes this interpretation. It was interpreted as generic by most of the participants both in English and in Japanese. Several JNSs

interpreted as *one teapot*, probably because it is very rare to use more than one teapot at one time. No ENSs or JNSs interpreted it as plural.

Both ENSs and JNSs seemed to interpret single noun generic phrases as generic in a similar way. The bar graph in Figure 14 above, clearly shows this tendency. Because the stimulus nouns all take the singular form in English, no ENSs interpreted them as referring to *a few* or *many* objects of the kind, while some JNSs did interpret them as referring to *a few* or *many* horses, kites, or lions, but not in the case of *teapot.* These response patterns show how the understanding of noun phrases relies on their general knowledge and their previous experiences, as well as linguistic forms.

Though the overall response tendencies were similar among the three groups, further analysis showed that ENSs and JNSs interpreted singular generic nouns in different ways. The Low Proficiency Group and the High Proficiency Group of JLEs also interpreted them in slightly different ways from each other, but the High Proficiency Group were not in-between the Low Proficiency Group and the ENS group.

5.7.2 *Generic plural nouns*

The stimulus sentences were:

5. Bunny rabbits don't make noises, do they?（*Usagi san wa nakigoe wo dasanai yone?*）

6. Hammers are for pounding (nails).（*Kanazuchi wa kugi wo utsumono desu.*）

7. My brother likes dinosaurs.（*Otouto wa kyouryuu ga sukida.*）

8. Do you like roses?（*Anata wa bara ga suki desuka?*）

Table 19 shows the percentage of correct responses in the three groups for

	Correct responses for generic plural nouns (%)			
	rabbits	hammers	dinosaurs	roses
JLEs Low (*n*=35)	88.6	94.3	65.7	91.4
JLEs High (*n*=31)	87.1	100.0	77.4	93.5
ENSs (*n*=26)	100.0	92.3	100.0	100.0

Table 19. Correct responses for each of the generic plural nouns

generic plural nouns, *rabbits*, *hammers*, *dinosaurs*, and *roses*. 'The zero article + plural countable noun' in English is the most frequently used generic form among the three possible generic noun forms according to some grammar descriptions (Barry 1993; Jespersen 1924), so most ENS participants were expected to interpret the zero article plural nouns most easily as generic. Especially those after the verb *like* are considered to be most likely to refer to a category in the sentences 7 and 8. As for the JNSs, however, the plurality is not explicitly marked, so they were predicted to be less likely to interpret them as generic than ENSs.

ENSs showed remarkably consistent responses in interpreting the four plurals. Most of them interpreted all of the plural nous as referring to the entities in general. Two persons out of 26 chose *many* in interpreting the meaning of *hammers*. (A possible reason is discussed in the next paragraph.) The bigger percentages than those for generic singular nouns show that zero article plural generic nouns are easier to interpret as generic than generic singular nouns.

The JNS participants, on the other hand, showed a little less consistency in interpreting the four sentences. Without any linguistic cues in Japanese, the *rabbit* sentence may have evoked a specific scene of keeping a rabbit as a pet, hence eight JNS participants interpreted it as referring to one rabbit. If the stimulus sentence was the one like *Lions are ferocious animals,* which describes a more commonly known property of

the kind, more of the predicted responses might have been made. The *hammer* sentence seems to have sounded slightly ambiguous to a few ENSs and JNSs. Because there are various kinds of hammers, some may have thought of a group of a particular type of hammers, not hammers in general. Alternatively, because it is a tool, some may have thought of an image of using a hammer, not more than one at one time. In Japanese, *hammers* is translated into *kanazuchi* 'iron hammer', which is differentiated from *kizuchi* 'wooden hammer', which are usually for pounding wooden sticks or posts. It is very rare to use the word *tsuchi* (it becomes *–zuchi* after some noun to make a compound noun) as just 'hammer' without any other noun. It must be easier, therefore, for Japanese to interpret it as precisely a category. One Japanese and two English speakers chose *many* and one Japanese chose *one*.

Notably JNSs behaved differently on *like dinosaurs* and *like roses* from ENSs. These two nouns are the most likely to be taken as generic because they occur after the verb *like*, though it is an adjectival verb in Japanese (Tsujimura 2006). But they were actually not in this experiment, especially in the case of *dinosaurs*. On these two nouns, it can be explicitly said that JLEs specified generic expressions more in a predicted way as they acquired high proficiency of English: the percentage of correct responses of the Low proficiency group, the High proficiency group and the ENS group were 65.7%, 77.4% and 100.0% on *dinosaurs*, and 91.4%, 93.5% and 100.0% on *roses* respectively. *Dinosaurs* might have been problematic because they are extinct species. It might refer to some pictures of dinosaurs or some stuffed dinosaur toys, especially when *my brother* is translated into *otouto* 'little brother' as in this experiment. In Japanese, it is impossible to refer to a brother without saying he is elder or younger. Because of these two reasons, the percentages of correct responses of JLEs were presumably much lower

than that of ENSs. The responses might have been different if the stimulus sentence had been, for example, *A friend of mine likes cats*, in which *cats* is most easily interpreted as generic.

When all the responses to the zero article four plural nouns are put together, the overall responses to them gradually rise from the Low Proficiency Group, to the High Proficiency Group, and to the ENS group. Statistically the Low Proficiency Group behaved significantly differently from the ENS group, but there was no significant difference between the High Proficiency Group and the ENS group. This growth of appropriate interpretation of generic expressions shows that the High proficiency group interpreted them in a closer way to the ENSs.

5.7.3 *Non-generic singular nouns*

The stimulus sentences are:

9. The butterfly is not dancing anymore. (*Choucho wa mou odotte imasen.*)

10. The tractor doesn't have a nose. (*Torakutaa niwa sentanbu ga tsuite imasen.*)

11. Hey silly frog! (*Ooi, obaka na kaeru san yo.*)

12. Come and sit down in your chair. (*Kochira ni kite isu ni kakenasai.*)

	Correct response choice for non-generic singular nouns (%)			
	the butterfly	the tractor	silly frog	your chair
JLEs Low (*n*=35)	57.1	94.3	88.6	71.4
JLEs High (*n*=31)	58.1	96.8	87.1	67.7
ENSs (*n*=26)	96.2	96.2	92.3	100.0

Table 20. Correct responses for each of the non-generic singular nouns

Singularity is explicitly expressed in English sentences, so ENSs were predicted to interpret the four nouns as singular, and JNSs were predicted to show more various interpretations. Table 20 shows the percentage of the correct responses on the four nouns *the butterfly, silly frog, the tractor and your chair* of each group. Because 'the definite article + singular noun' is also used to indicate a class, it was predicted that there might be some choices of generics for *the tractor,* which holds the present tense without any non-generic cues such as the progressive aspect. The *tractor* in Sentence 10 is meant to indicate a specific tractor but it may give an ambiguous impression, because it can be possible to imagine a sub-class of newly designed tractors which do not have the nose part. There are some other linguistic cues to interpret the other stimulus sentences as non-generics. For example, as the *butterfly* sentence has a present progressive aspect and indicates a temporal event, it would not be generic. It is a little difficult to imagine who says *Hey silly frog* when and where in real life. But instantly it could be understood as addressing to a frog doing something foolish in a play or in a storybook for children. Because it starts with an interjection, and because it is a zero article singular noun, it cannot be generic in most of the cases. No ENS chose *a few/many* but some JNSs seemed to imagine a scene where there was more than one frog doing something silly. It is natural because number is not shown and frogs are often seen in groups. *Chair* with a possessive pronoun also cannot be generic after the imperative phrase *come and sit down*. In the *chair* sentence, *your* in English was not translated into Japanese because it sounded unnatural.

An extremely small number of the ENS participants interpreted non-generic singular nouns as more than one, as predicted from the noun form. Appropriate interpretations were mostly made by catching a linguistic cue of the present progressive

tense, by using general knowledge about what a tractor is like, and by imagining the context of calling to *a frog* in an infant-involved situation in a metaphorical way. Only one ENS incautiously read the singular noun *butterfly* as plural. Two ENSs understood *frog* as referring to the whole kind, probably because frogs are not generally considered to be smart creatures. *Your chair* was unanimously interpreted as referring to one chair.

Because there is no indication of number in Japanese sentences as repeatedly mentioned above, it is possible to interpret the nouns as referring to more than one object of the class. JNSs showed a general tendency to interpret the non-generic singular phrases as referring to *one* object. Interestingly, however, 37.9% of the JNSs interpreted *the butterfly* as referring to *a few/many butterflies*, and 27.3% interpreted *chair* as referring to *a few/many chairs*. That could be because butterflies are often seen to flutter together in a group. Also *chair* is interpreted as plural because chairs are often seen lined up in rows at school. It is very rare to see only one chair in a room. These results show that interpretation of the sentences generally depend on experiences in daily life in the case of JNSs. Their responses to *the tractor* and *silly frog* did not differ much from those of ENSs.

5.7.4 *Non-generic plural nouns*

The stimulus sentences are:

13. The little billy goats lived on the side of the valley. (*Chiisana yagi wa tani no shamen ni sun-de imashita*.)
14. These little wheels go round and round. (*Chiisana sharin ga guruguru mawaru nodesu*.)
15. Did you see the bugs? (*Mushi ga mie mashitaka?*)

16. Can you hand me the purple blocks? (*Murasaki iro no burokku wo totte kudasai*.)

'The definite article + plural noun' form usually refers to some specified entities. The four nouns of the non-generic plurals, therefore, would not be interpreted as generic descriptions or as referring to one by ENSs. The percentages of the correct responses are shown in Table 21. The past tense in the *goats* sentence would be another cue and it would prevent generic interpretation. Thus *the little billy goats* would not be generic references, and it is almost unlikely to tell that the entire class of a subset of male goats *lived on the side of the valley*, and went extinct by now. The deictic demonstrative pronoun in the phrase *these little wheels* specifies some little wheels. *The bugs* could be interpreted generic as '*the* + plural countable noun' may be found in scientific descriptions (Quirk et al. 1985). In this sentence in the past tense, however, it is hardly taken as scientific description, so it does not have a generic meaning. *The purple blocks* are also interpreted non-generically.

In Japanese, because number is not expressed, some nouns may evoke a context with more than one object but not always so. In Sentence 14, the demonstrative *these* in English was not translated into *korerano* in Japanese and the noun *sharin* 'wheel' is a bare singular noun in Japanese, which sounds more natural than the exact literal

	Correct response choice for non-generic plural nouns (%)			
	goats	wheels	bugs	blocks
JLEs Low (*n*=35)	14.3	54.3	37.1	25.7
JLEs High (*n*=31)	12.9	77.4	41.9	29.0
ENSs (*n*=26)	92.3	96.2	100.0	88.5

Table 21. Correct responses for each of the non-generic singular nouns

translation of *korera-no chiisana sharin* ‘these little wheels’. Because *going round and round* is considered to be a description of one of the essential properties of wheels, it could be interpreted as generic. However, one cue to catch non-genericity is that the nominative marker *–ga*, not the topic marker *–wa* is placed after the noun. *–wa* is often used in generic sentences but not *–ga*. *The bugs* sentence has the past tense and it is another cue. The noun *blocks* occurs after an actual movement of *to hand*, it would not be interpreted as generic but as referring to a specific object or some objects in Japanese.

Over all the results showed that most ENSs interpreted those non-generic plural nouns as referring to *a few/many* objects correctly. The two choices *a few* and *many* were considered to be correct, and they were added and calculated to show the percentage of the correct responses. Only three ENSs incautiously read the plural nouns as singular and chose *one.* A few interpreted *the purple blocks* as generic but they might have meant ‘just any indefinite purple blocks’. These results are quite natural, predictable and understandable.

On the other hand, JNSs showed more various responses. The most frequent response was referring to *one* object of the kind by both the Low and the High Proficiency group. The next frequent was *a few*, and very few chose *many*. These results suggest that JNSs usually do not think that a bare singular noun in Japanese refers to more than one entity unless the number is explicitly expressed. When they hear *Gakusei ga kita* ‘student –TOP come PAST,’ they are likely to think that one student came. Therefore, among the four different noun forms tested in this experiment, the non-generic plural noun form gave the most various responses among the JNSs, as shown in Figure 14 (p. 198). And their responses were significantly different from those

of ENSs as shown in Table 17 (p. 201). That is, the mean number of response choice for *one*, a *few* and *many* were statistically significantly different between the Low Proficiency Group and the ENSs, and also between the High Proficiency Group and the ENSs.

5.8 Discussion

This experiment investigated how JNSs and ENSs interpreted generic expressions in their own languages. Generic expressions are ambiguous by nature both in Japanese and in English as described in Chapter 3. That is, there is no specific noun form to particularly indicate genericity (Jespersen 1924). Generic noun phrases referring to a category of objects generally take three forms, '*a* + countable singular noun,' '*the* + countable singular noun,' and 'zero article + countable plural noun' in English, and one form 'the bare singular noun' in Japanese. Their interpretations could vary. JNSs and ENSs, however, interpreted generic noun phrases as intended in similar ways in this experiment, which is shown in the two bar graphs of response patterns to generic singular nouns and generic plural nouns in Figure 14 above (p. 198). This is because generic interpretations depend on the speakers' general knowledge about essential properties of members of the kind, about what the members should be like, and about commonly agreed properties of a well-established kind (Chierchia 1998; Krifka et al. 1995; Prasada 2000) as well as on noun forms. If the participants used their generic knowledge to interpret the generic noun phrases, it is likely the two language groups behaved in similar ways despite the different noun forms. Therefore, these results in a sense were brought about through the characteristics of rather unspecific and ambiguous

generic forms. In other words, paradoxically generic phrases are interpreted appropriately because of the ambiguity of generic forms.

It should be clearly stated here, that though ENSs and JNSs share common interpretation patterns, ENSs interpreted generic plural nouns more correctly than JNSs. ENSs also interpreted generic plural nouns more consistently and more expectedly than generic singular nouns. This indicates that it would be easier for them to understand plural generic nouns than singular generic nouns. The results also revealed an actual behaviour parallel to the description that the zero article generic plural noun form is said the most frequently used. Hence, it is easier to understand as generic.

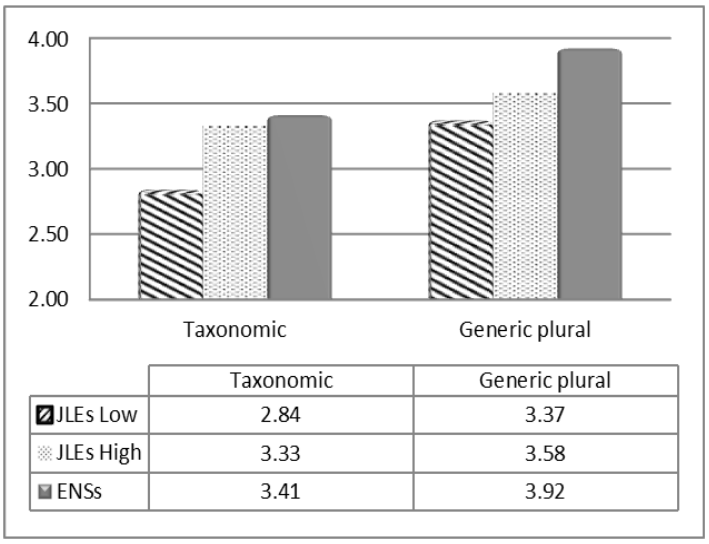
Though JNSs and ENSs also showed different responses in interpretation of non-generic noun phrases as well, ENSs responded remarkably consistently in interpreting those nouns; singular nouns as singular, and plural nouns as plural, but JNSs varied. These results are understandable because number and definiteness are obligatorily expressed in English but they are only optionally expressed in Japanese. In this experiment they were not expressed at all in the Japanese equivalents. JNSs, therefore, tended to interpret non-generic nouns as singular whether they were singular or plural in English. But some JNSs interpreted nouns such as *butterfly*, *chair* and *wheel* as plural. These are the things frequently seen in a group of more than one in our daily life. Especially *wheel* should need some other wheels to work with. Therefore, it can be said that their interpretations depend on their general knowledge of the world and past experiences. Their general images toward those nouns were revealed in the interpretation scores. These results support Hypothesis 1) ENSs will be more likely to interpret generic phrases as generic and non-generic phrases as non-generic than Japanese speakers.

As for the interpretation of generic noun phrases, despite of general similarities, it is noteworthy that ENSs and JNSs interpreted the zero article generic plural nouns in significantly different ways. See Table 17 (p. 201). That is, monolingual JNSs, or the Low Proficiency Group, responded significantly differently from the ENS group in choosing *in general* when interpreting generic plural nouns. For this choice, the High Proficiency Group did not show significant differences from the ENS group. That means the High Proficiency Group was in-between the Low Proficiency Group and the ENS group. This is exactly as predicted in Hypothesis 2) JLEs at an advanced level will show closer patterns of interpretation to ENSs, and therefore, their responses will be in-between JLEs at a beginners' level and ENSs. This result supports multi-competence that L2 users think and perceive differently from L1 monolinguals. That is, Japanese speakers tend to interpret generic expressions more in an expected way as they improve their proficiency in English. Thus JLEs at an advanced level seem to be different from JLEs at a beginners' level.

Experiment 1 found that ENSs and JNSs respond differently to the taxonomic-thematic triad task, and that JLEs at higher proficiency levels do shift their responses toward ENSs. Then Experiment 2 was designed and conducted to examine whether interpreting generic nouns showed parallel relations to the object categorisation behaviours. From the perspective of examining relevance between the taxonomic categorisation judgments and the generic noun interpretation, at least the responses of the two experiments are parallel. Especially, as Nisbett (2003) says, it is zero article plural nouns that show a certain parallel relationship to taxonomic categorisation behaviours. 'Parallel' means that, because English has such a generic expression as the zero singular plural countable noun like *ducks* and Japanese does not have such a

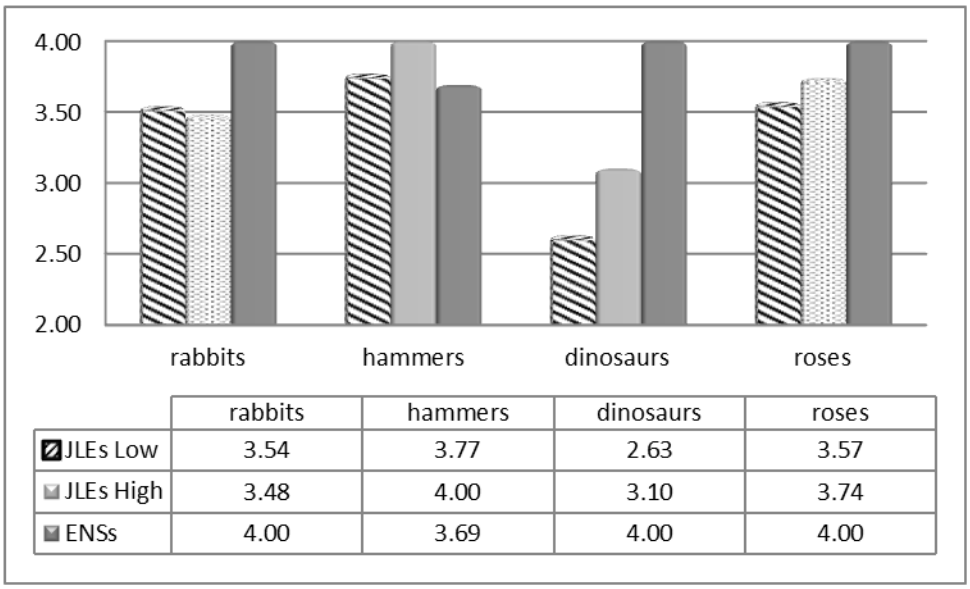
syntactic structure, ENSs tend to relate taxonomically-related objects more strongly and interpret generic nouns more correctly than JNSs do. Hence the ENSs and the JNSs (the Low Proficiency Group of JLEs) showed differences and JLEs with high proficiency in English was in-between the two. Figure 15 shows these parallel response patterns in the two experiments, though the participant groups were not the same. (For taxonomic judgment scores, the Low Proficiency Group is the lowest group, and the High Proficiency Group is the most advanced group of the four groups in Experiment 1.)

However, when looking at the results more specifically, the mean correct response for each generic plural noun, *rabbits*, *hammers*, *dinosaurs* and *roses*, did not always show similar, parallel, gradual growth from the Low Proficiency Group, the High Proficiency Group to the ENSs, as shown in Figure 16.



	Taxonomic	Generic plural
JLEs Low	2.84	3.37
JLEs High	3.33	3.58
ENSs	3.41	3.92

Figure 15. Mean scores for responses in taxonomic relationship judgments and interpretation of generic plural nouns by JLEs and ENSs



	rabbits	hammers	dinosaurs	roses
JLEs Low	3.54	3.77	2.63	3.57
JLEs High	3.48	4.00	3.10	3.74
ENSs	4.00	3.69	4.00	4.00

Figure 16. Mean response scores for each generic plural noun by the three groups

As analysed in Section 5.7.2 above, in the case of *Bunny <u>rabbits</u> don't make noises, do they?* all of the ENSs interpreted it as generic, but JNSs responded differently. Also ENSs showed a slightly deviant response pattern from the others in the case of *<u>Hammers</u> are for pounding (nails).* Furthermore, in interpretation of *My brother likes dinosaurs*, the Low Proficiency Group of JNSs showed unexpectedly lower scores than ENSs. Thus, only the sentence *Do you like roses?* seems to be reasonably parallel to the taxonomic categorisation judgments. To conclude, although the responses of the taxonomic categorisation judgments and the interpretation of the zero article generic plurals nouns seem to be perfectly parallel at a glance as Figure 15 shows, a careful look at the responses of each noun does not reveal such straightforward parallel tendencies as Figure 16 shows. There are some possible reasons for those results.

First of all, some stimulus sentences were not really appropriate for this experiment because of some characteristics described in detail above in Section 5.7.2. That is, some nouns may be closely related to personal experiences such as keeping a rabbit as a pet, using a hammer frequently, and having a stuffed dinosaur toy. These

personal experiences may have influenced their interpretation. Second, the number of stimulus sentence was not large enough. There were only four sentences involving each noun form. Therefore, it is not really clear that the interpretation of the zero article generic plural noun shows relevant responses to the previous experiment. For instance, Prasada and Dillingham (2006) used 15 sentences to investigate connections between generic knowledge and artefacts kinds, and another 15 sentences between generic knowledge and natural kinds, and so on.

Third, nouns in the sentences were not actually completely equivalent between English and Japanese in terms of meaning. *Brother* always needs to refer to elder or younger in Japanese, and *hammer* is usually called 'iron hammer' in Japanese. These differences, though they may be small, may have had some different effects on interpretations of speakers of different languages. This shows the methodological difficulty of designing and conducting a cross-linguistic experiment using language. Therefore, it is necessary to examine further from a different perspective in order to confirm any relationship between the taxonomic categorisation judgments and the generic expressions.

In order to pursue the present research on the relations between object categorisation and plural generic phrases, we will go on to Experiment 3 in Chapter 6. Experiment 3 uses drawings of unfamiliar objects to investigate how ENSs and JNSs would categorise the drawn objects. As methodological flaws in the experiment are possibly considered to lie in the stimulus sentences, it is preferable to conduct an experiment without using language in the stimuli.

Chapter 6. Experiment 3: Shape Generalisation Test

6.1 Aims and Background

6.1.1 *Aims*

This experiment investigated how differently ENSs and JNSs would categorise abstract objects by asking them whether the objects were called by the same name or not. It further examined multi-competence of JLEs by comparing the behaviours of the higher proficiency group with those of the lower proficiency group in English. The shape generalisation test of Experiment 3 was designed to further support the results of Experiment 1 and 2 by confirming the relation between the plural noun form and categorisation behaviour.

Experiment 1 showed that ENSs and JNSs behaved in different ways in the relationship judgment task using the taxonomic-thematic triads. ENSs tended to relate taxonomically-related objects more strongly than JNSs and JLEs tended to relate them more strongly as they develop their proficiency in English. Thus it verified effects of learning English on this aspect of cognitive activities in JLEs and confirmed multi-competence of JLEs. Experiment 2 investigated how ENSs and JNSs interpreted generic noun phrases. Nisbett (2003) considered generic expressions are relevant to taxonomic categorisation because, though he did not explain explicitly, generic expressions refer to categories, and generic expressions and categorisation both involve the process of paying attention to properties of objects, recognising common properties of the objects, and determining what properties make the object belong to a category of a designated name. Considering the categorisation function of generic noun phrases, we

can see that the results of Experiment 2 support categorisation traits of ENSs and JNSs found in Experiment 1. That is, Experiment 2 showed that ENSs interpreted generic noun phrases as generic more correctly than JNSs and also that JLEs with higher proficiency in English tended to show better understanding of generic expressions than the lower proficiency group.

However, further analyses of the stimulus sentences indicated that personal experiences and real life projections may have influenced their judgments in understanding generic sentences. Also there were some difficulties in providing exactly the same stimulus sentences equivalent in English and Japanese. Hence it was necessary to see how categorisation behaviours would be manifested in decontexualised situations. Experiment 3 was designed, therefore, to reexamine how they categorise objects using unfamiliar, abstract objects without depending much on language.

Experiment 3 used drawings as stimuli, and was designed by the author to explore whether ENSs and JNSs would group objects in the same/similar shapes differently or not. It was based on the two assumptions: one concerns linguistic forms of nouns, and the other is based on the experimental evidence from Welsh speakers introduced by Roberts and Gathercole (2006).

6.1.2 *First assumption: Noun forms*

As for noun forms, we now confine attention to the fact that English has plural generic nouns and Japanese does not. The plural generic noun form is what Nisbett (2002) mentioned as a plausible cause of taxonomic-oriented categorisation of Westerners and gave a footing to the present research. Having a plural noun form implies two conditions: individuation and grouping. That is, the plural form requires a

singular form as a prerequisite, and then it requires grouping more than one entity of a category.

First, having a plural form means having a singular form, which requires individualising an entity of a category (Huddleston & Pullum 2002).[14] For example, the plural *birds* in English denotes that there are at least one individuated *bird* and another individuated *bird* which are put together to form a group of *birds.* On the other hand, there is not obligatory individuation like this in Japanese at the syntactic level. Japanese has, of course, a way to express explicitly *two birds* (*ni-wa no tori* 'two + classifier marker + genitive marker + bird'), but does not have an exactly equivalent single word for *birds* in general. It is possible to put *–tachi* after nouns to make plural noun phrases, but it is not obligatory or authentic (Mizuguchi 2004; Tsujimura 2006). Some argue that *–tachi* is not a plural marker in a strictly sense, but that it is an assosiative marker (see Section 3.6). Thus it is different from generic *birds*. Therefore, from a cognitive linguistic view, the individuation of an entity *bird* is blurred in Japanese.

This is just like the case when the plural form is identical with the singular form as with *sheep, deer*, and *fish* in English, which are called 'base plurals' (Huddleston & Pullum 2002). Base plurals seem to have been developed in the domain where individuation among entities of a taxonomic category is not expected as is the case in hunting. These nouns share certain homogeneous semantic property of 'food', and in most of the cases it is not important to identify which particular individual is caught but what is more important is something edible is caught (Lee 2001). This property makes the entities designated by base nouns less explicitly individuated. The

[14] Indeed there are plural-only nouns such as *trousers, scissors,* and *binoculars* and base plurals such as *sheep* and *deer* (Huddleston & Pullum, 2002).

relationship between linguistic forms and meaning is said to be arbitrary, but cognitive linguists say "grammatical structure is more strongly motivated" (Lee 2001, p. 137) by cognitive processes than it is generally considered in the field of linguistics. Thus, having plurals such as *birds* and *rabbits*, English speakers are required to individuate objects more clearly than Japanese speakers.

Furthermore, using a plural noun form means to group more than one entity in a group of a category. In order to do that, it is necessary to pay attention to individuated entities first, then find common attributes in the entities, determine that they belong to the same category for that reason, and ultimately call them by a designated name. Thus the syntactic plural form has double functions (Chierchia 1998). The first function is to denote the category and the second function is to indicate that there are at least two members of the same category. The English word, for example *birds*, functions to mean that the objects are a group of something called *bird* and at the same time also to convey the fact that there are more than one of those. The bare nouns in Japanese do not have such a double nature.

Having plural noun forms, therefore, English speakers are assumed to be more willing to group individuated objects, and, not having plural noun forms, Japanese speakers are assumed to be less likely to do so. In other words, if the plural noun form works as a linguistic mechanism to direct speakers' attention to the area which the linguistic forms express, English speakers pay more attention to a group of individuated objects than Japanese speakers.

Additionally, more individuation-oriented dispositions among English speakers than East Asian people were found in the field of social psychology: such as salient individual descriptions (Miller 1984), independent self (Markus & Kitayama

1991), and individual responsibilities (Morris & Peng 1994). Thus the trait of paying more attention to individuated object is consistent with the fact that the plural form presupposes the singular form. Based on these syntactic features of English and Japanese, Experiment 3 was designed: ENSs and JNSs were required to judge whether objects in the same/similar shapes were called by the same name or not.

6.1.3 *Second assumption: Collective nouns in Welsh*

The second assumption of this experiment comes from Roberts and Gathercole (2006), who explored cognitive differences between Welsh and English speakers as a function of collective noun forms in their languages. Both English and Welsh have singular and plural nouns, which are an unmarked form of singular nouns and a marked form of plural nouns, and they both have collective nouns such as *army*, *class*, *family* and so on, which refer to a group of people and are treated as singular count nouns. However, one difference is that Welsh has a syntactic marking system to make collective noun forms to indicate a group of things and people, unlike English. Also Welsh has unmarked nouns which do not clearly show number. Thus, they designed an experiment to investigate whether Welsh speakers and English speakers categorise objects in different ways, when given novel words. More specifically, Welsh speakers were predicted to interpret the words as collective nouns more often than English speakers. The results showed that children of the two languages responded in similar ways, but a closer analysis showed that effects of language differences may emerge with age. It was found that Welsh speakers tended to take more time in decision making because they may think of more possible ways of understanding the novel words than English speakers. This experiment suggests that even if there are some

shared properties of noun forms, some mismatches in the noun forms between the two languages may possibly produce certain cognitive differences between the speakers of the two languages. That is, Welsh speaking children tended to show favouring collection interpretations more than English speakers because Welsh has unmarked forms of nouns which refer to collections of objects.

Following the results of the experiment conducted by Roberts and Gathercole (2006), it is expected that cognitive differences should lie where there are any differences in linguistic forms between the two languages. There are indeed certain differences in generic expressions between English and Japanese. Then, it might be possible to reveal cognitive differences in the use of generics by specifically designing an experiment involving cognitive activities relevant to the use of generic noun forms. Based on this assumption, an experiment was designed by the author. It investigates whether ENSs and JNSs can call a group of abstract objects in the same/similar shapes by the name after they are shown an object with a novel name, in such a way as to call a group of birds *birds* using the zero article plural noun after they learn what *a bird* is.

6.2 Hypothesis

The hypotheses were as follows;

1) ENSs are more likely to group objects than JNSs in an object categorisation task of whether to call a group of the same/similar objects by the same name or not, because English has a plural noun form to group objects and Japanese does not.

2) JLEs would shift their behaviours of object categorisation as a consequence of learning English: that is, the High Proficiency Group of JLEs would show responses which are in-between the Low proficiency Group and the ENS group.

Hypothesis 1) was set up because English has such a grammatical structure as the generic expression of the zero article plural countable noun, while Japanese does not have an equivalent form of a plural noun. Using a plural noun requires the speaker to identify common properties of objects, to ascertain that those objects belong to the same category, and to determine to call them by the same name. It was predicted, therefore, that speakers of a language which has a plural generic noun such as *birds* would develop a behavioural trait of grouping objects more easily than speakers of a language which does not have such a noun form.

Hypothesis 2), furthermore, predicted if there were any effects of English learning in categorisation among JLEs, those who have acquired high proficiency in English should show similar responses to those of ENSs. Thus their responses would be between those of monolingual JNSs and those of ENSs. In this experiment again, monolingual JNSs were replaced with the Low Proficiency Group of JLEs.

The data were collected from January to March, 2009.

6.3 Participants

Forty-eight JNSs (mean age 22.7, age range 19-38; male 15, female 33) and 26 ENSs (mean age 21.0, age range 19-24, male 12, female 14) took part in Experiment

	M/F	Age	Eng. Test Scores
JLEs Low (*n*=26)	9/17	20.2 (1.0)	22.7 (2.9)
JLEs High (*n*=22)	10/12	27.1 (8.3)	34.6 (5.7)
ENSs (*n*=26)	12/14	21.0 (1.7)	-

Table 22. Profiles of the participants in Experiment 3

3. The participants were individually recruited by the author at a university in Japan and a university in the UK.

The JNSs were university undergraduate and graduate students. Fourteen of them were the students at a university in the UK. These students were asked to join to make an advanced proficiency group in English. But they had studied English mainly in Japan and had been staying in the UK less than one year, so they had not been exposed to British society for a long time. The whole JNSs were divided into the Low Proficiency Group and the High Proficiency Group depending on their proficiency levels of English measured by the Oxford Quick Placement Test. All of the JNSs took the 20-minute English test before the experiment task. The ENSs took part in the experiment only. Table 22 shows the profiles of the three groups in this experiment.

6.4 Materials

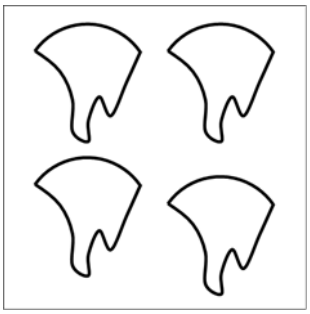
Twenty pairs of abstract drawings were prepared, which were all in arbitrary shapes. In the first picture, there was one target with a name in English, for example *nibe, kalif,* and *kidal*, for ENSs and in Japanese, for example *naiba, kalifu*, and *chidaru*, for JNSs. Some drawings were developed by the author based on abstract figures in Poulisse (1990), and others were originally drawn by the author. They were all nonsense

words in both languages. In the second picture, there were several objects in the same shape as the target or in a slightly different shape from the target. They were asked if the objects were called by the same name, such as *nibes* in the zero article plural noun form in English, or *naibu* in the bare singular noun form in Japanese. This was intended to test whether participants categorise the objects in the second picture as members of the same category as the target object and call the group of objects by the same name as the one in the first picture or not. The process of the task involves perceiving some major properties of the target object with an unfamiliar name, recognising the properties of the objects in the second picture, and extending the name to those objects, which is assumed to be the process of categorisation.

The second drawings were grouped into four types to see whether there are any differences in responses to the degrees of differences between the target figure and the stimulus figures as a function of language and proficiency in L2. For instance, in the samples below, the target picture is on the left and the stimulus picture is on the right.

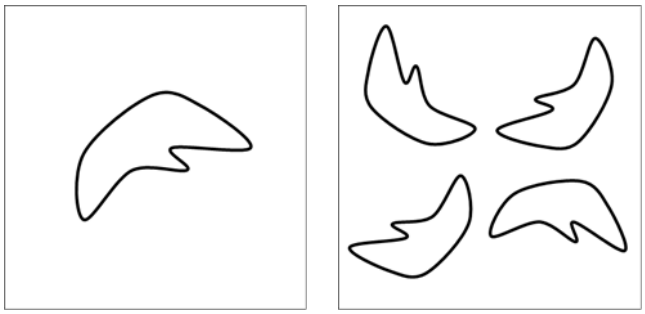
Type 1: There are three to five objects in the second picture, which are exactly the same in shape as the target.

This is a kabet. Are these kabets?



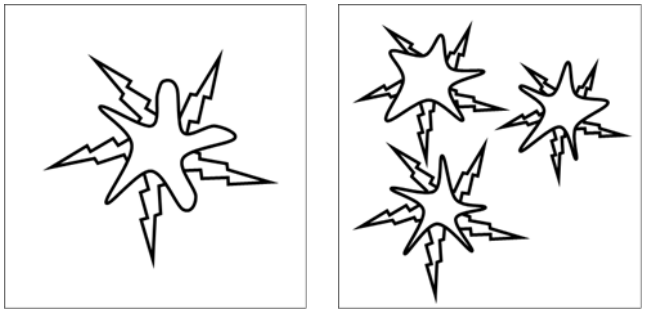
Type 2: There are three to five objects in the second picture, which are exactly the same in shape as the target, but tilted in many directions.

This is a yone. Are these yones?



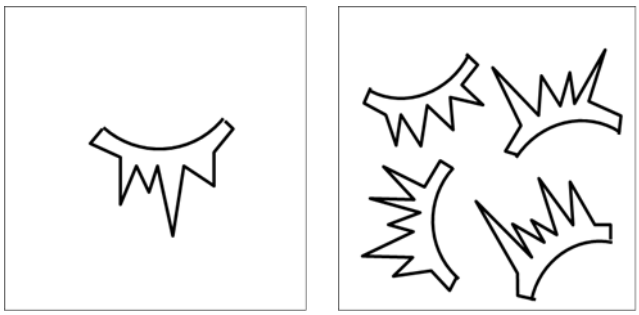
Type 3: There are three to five objects in the second picture, which are slightly different in shape from the target object and from each other, but not tilted.

This is a shtate. Are these shtates?



Type 4: There are three to five objects in the second picture, which are slightly different in shape from the target object and from each other, and tilted in many directions.

This is a terrer. Are these terrers?



There were 20 sets of drawings, and there were 5 sets in each stimulus type. The order of presenting the objects was randomised on the Microsoft Excel twice and two different orders were made. Half of the participants took the experiment with one order and the other took it with the other order to counterbalance any effect of presentation.

6.5 Task

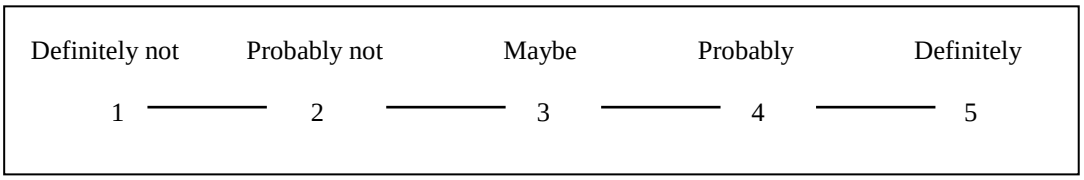
The experiment pictures and instructions were all shown on the personal computer (Macintosh: iMac G4, 14-inch display), and the pages were automatically turned except when the instruction 'If you are ready, press the return key.' appeared. ENSs took the experiment in English, and JNSs in Japanese. The program was set using PowerPoint software. The responses were written on a sheet provided.

There were 20 pairs of drawings and each picture was shown for three seconds. The PC was put approximately 50 centimetres away in front of the participant, and a response sheet was placed between the PC and the participant. Participants were only told to follow the instruction before the experiment. The researcher was near the participant when the experiment was being done, so that if there was a question, she could immediately deal with it. It was confirmed in a pilot study that the three-second exposure to each picture was appropriate and that the participants could write their responses on the right place on the response sheet through appropriate instructions.

The instructions were:

This slide show proceeds automatically. Please do not touch the PC unless you are asked to do so. Write your responses on the sheet provided.

Twenty pictures of objects will be shown. They are all in unfamiliar shapes. The objects will be given names. You will see another picture right after that. Please decide if the objects in the second picture can be called by the same name or not, and judge it on a 5-point scale as follows.



There were one example and three practices before the main experiment started. See Appendix D, pp. 307-316.

6.6 Results

Table 23 shows mean scores given by the JLE Low Proficiency Group, the JLE High Proficiency Group and the ENS group for the different types of the stimulus objects, Type 1), 2), 3), and 4), and all of the stimulus objects. Higher scores mean more explicit categorisation of the group of objects in the second picture: that is, higher scores indicate that they tended to categorise the objects in the second picture as belonging to the same category more positively.

	1	2	3	4	All
JLEs Low (*n*=26)	4.13 (1.1)	3.78 (0.8)	2.45 (0.8)	2.87 (0.8)	3.31 (0.5)
JLEs High (*n*=22)	4.25 (0.7)	4.01 (0.6)	2.59 (0.7)	3.00 (0.7)	3.46 (0.6)
ENSs (*n*=26)	4.78 (0.3)	4.19 (0.7)	3.01 (0.6)	3.23 (0.6)	3.80 (0.4)

Table 23. Mean scores of the three groups on the four types of stimulus objects and on the total stimulus objects

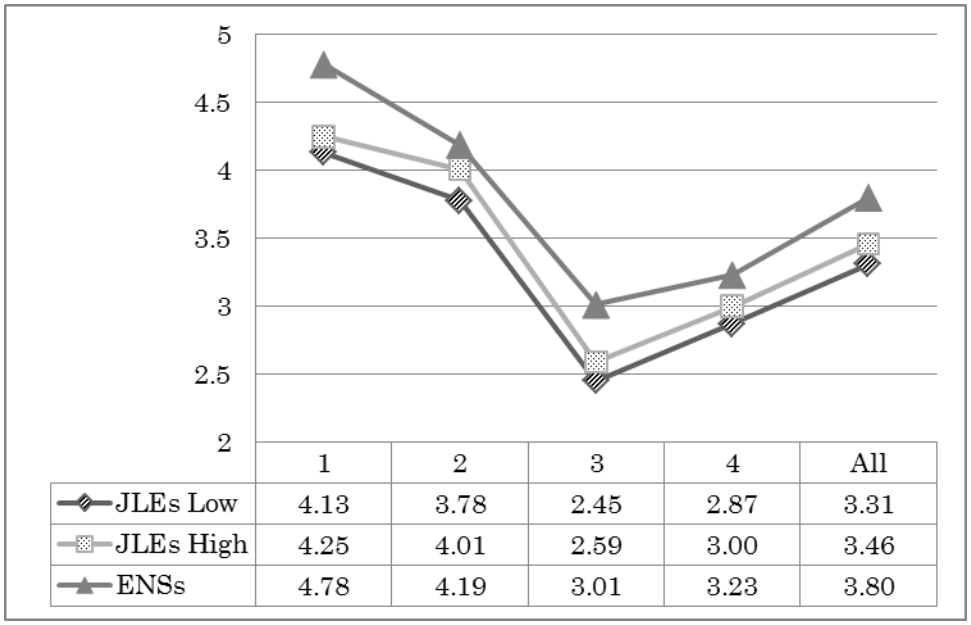
First, mean scores between JNSs (the Low Proficiency Group) and ENSs were compared. A 4 (type) x 2 (group) ANOVA (with type as a within-subjects factor and group as a between-subject factor) was conducted. There was a significant main effect of type, which indicates that both ENSs and JNSs responded in significantly different ways to different types of stimulus objects, F (1, 50) = 108.710, p = .000. The effect of group was also significant, F (1, 50) = 14.725, p = .000. That is, the responses of the two groups were significantly different. However, the type and group interaction was not significant, F (1, 50) = .446, p > .05. That is, the response patterns to the stimulus object types were not different between the two groups. They both scored highest on the stimulus pictures with the same objects as the target (Type 1), facing in the same direction, not tilted. The mean scores were a little lower on the stimulus pictures with the same, but tilted objects as the target (Type 2). On the stimulus pictures with a little different objects from the target, they scored higher when the objects were tilted in many directions (Type 4) than when they were facing the same direction (Type 3).

Furthermore, separate independent samples *t*-tests showed that the JLE Low Proficiency Group and ENSs differed significantly in scores on the stimulus objects of Type 1, t (50) = -3.015, p = .004, of Type 2, t (50) = -2.03, p = .047, and of Type 3, t (50) = -2.799, p = .007, and the two groups were near significantly different in scores on Type 4, t (50) = -1.932, p = .059. Overall, when the mean scores on the whole stimulus pictures were compared, they were significantly different from each other, t (50) = -3.837, p = .000.

Next, mean scores on the four stimulus types were compared among the Low Proficiency Group, the High Proficiency Group and the ENS Group. A 4 (type) x 3

(group) ANOVA (with type as a within-subjects factor and group as a between-subject factor) was conducted. There was a significant main effect of type, which indicates that the three groups responded in significantly different ways across different types of stimulus objects, F (1, 71) = 186.357, p = .000. The effect of group was also significant, F (2, 71) = 6.624, p = .002. That is, the mean scores of the three groups were significantly different. However, the type and group interaction was not significant, F (2, 71) = .334, p > .05. That is, the response patterns to the stimulus object types were not different among the groups. This tendency is clearly demonstrated in Figure 17, which shows the mean scores of the three groups in the line graph. The three lines are rather fairly parallel without crossing at all. The ENS group scored the highest on all the stimulus types, and the JLE Low Proficiency Group scored the lowest. The line of the JLE High Proficiency Group is always between the two.

Post Hoc Tests of multiple comparisons by Bonferroni show that the mean



	1	2	3	4	All
JLEs Low	4.13	3.78	2.45	2.87	3.31
JLEs High	4.25	4.01	2.59	3.00	3.46
ENSs	4.78	4.19	3.01	3.23	3.80

Figure 17. Graph of the mean scores of the three groups on the four types of stimulus objects and on the whole stimulus objects

scores of the Low Proficiency Group and the ENS group were significantly different on Type 1) stimulus objects, p = .009, and on Type 3) stimulus objects, p = .017. There was no statistic significance between the two groups in responses on Type 2) stimulus objects, p = .116, or on Type 4) stimulus objects, p = .171. Also the two groups were significantly different in calculating all of the scores for the stimulus pictures, p = .002. There were no significant differences between the Low Proficiency Group and the High Proficiency Group, or between the High Proficiency Group and the ENS group.

Furthermore, one-way ANOVAs were conducted to see how the three groups responded to each stimulus object in the 20 different shapes. Figure 18 shows the mean scores of the three groups on each stimulus object. The asterisks near the bars indicate the responses of the three groups were significantly different on *kabet* p = .002, *effice* p = .015, *tisee* p= .017, *falm* p= .033, *canf* p = .000, *fisle* p = .012, and *shtate* p = .000. The pluses near the bars indicate the responses were near significant among the three groups on *mamit* p = .074, *vite* p = .071, and *apog* p = .089.

6.7 Discussion

Experiment 3 aimed to examine how differently ENSs and JNSs categorised objects by using abstract drawings, and further to investigate whether learning English gave any effects on their categorisation in JLEs. This experiment was designed to apply the process of categorisation involving such cognitive activities as, after recognising a certain individualised object with a name, to identify common properties of objects, to ascertain that those objects belong to the same category, and to determine to call them by the same name or not. The task was to make judgments in calling a group of abstract

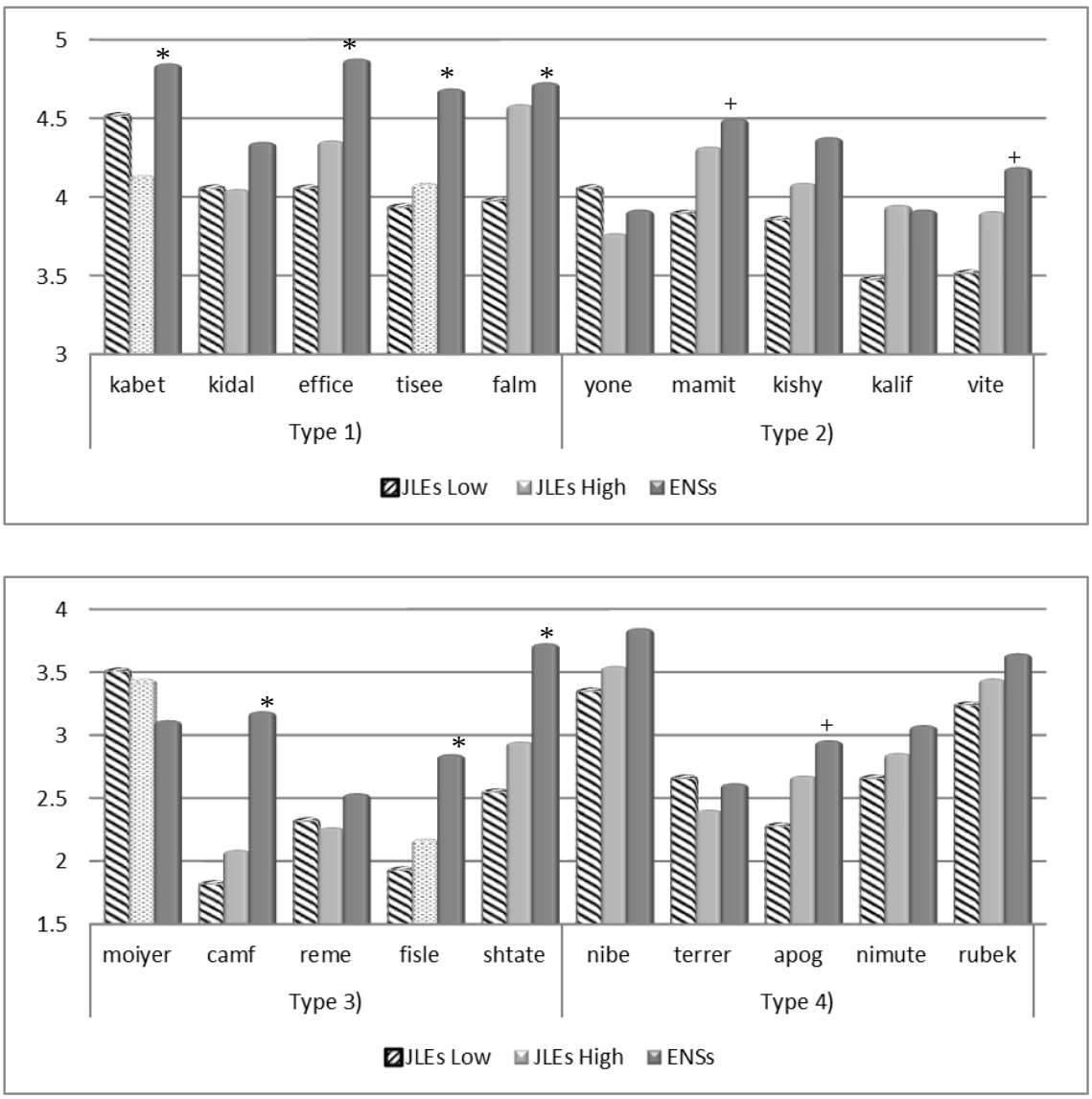


Figure 18. Mean scores of three groups for each stimulus object

objects by the same name or not, when given a new name. Therefore, they were first shown an unfamiliar target object and given a name for it, for example, '*This is a kabet,'* and next shown a stimulus picture of the same/similar objects and asked *'Are these kabets?'* in English. In Japanese, because there is no plural noun form, they were asked, '*Korewa kabeto desu. Korera-wa kabeto desuka*? (this –TOP kabeto COPULA. These –TOP kabeto COPULA –Int?)' Although the demonstrative pronoun was

pluralised, the target noun *kabeto* in this case was not pluralised. This task was exactly intended to follow the process of categorisation.

Based on the assumption that plural noun forms accelerate categorisation, it was hypothesised that ENSs and JNSs would show different responses, and further the High Proficiency Group of JLEs would show responses in-between the Low proficiency Group and the ENS group. More specifically, the categorisation behaviour was expected to be enhanced by the plural noun form in English. Hence it was predicted that ENSs would be more likely to categorise the same/similar objects than JNSs, and that JLEs would shift their behaviours of object categorisation as a consequence of learning English. The results were exactly what had been predicted. Asked whether a group of objects belong to a category, for example, *Are these kabets?* an affirmative response would yield a higher score. The ENS group gave significantly higher scores in the judgments of categorisation than the JNS group, and the High Proficiency Group scored between the Low Proficiency Group and the ENS group. Thus the results indicated that JLEs shift their categorisation tendencies toward those of ENSs as one of the consequences of learning English. Because the Japanese participants had been studying English mainly in Japan with very limited exposure to English speaking environments, the shift is considered to be of a language effect. Interestingly they showed quite parallel and similar response patterns to the stimulus pictures among the groups as the line graph in Figure 17 clearly shows.

The stimulus objects were groups into four types in order to see the participants' judgments traits: Type 1) exactly the same as the target, Type 2) exactly the same as the target but tilted in many directions, Type 3) slightly different but not tilted, and Type 4) slightly different and tilted in many directions. For these four types

of stimulus objects, the mean scores indicate that the three groups of the participants responded in quite similar ways. It was rather unexpected that they scored lower on the objects of Type 3) than Type 4). The objects of Type 4) were intended to appear more different because they were tilted, and therefore more difficult to be judged to belong to the same group. One possible interpretation is that because the objects in Type 3) looked in the same direction, it was easier to notice the differences among the objects. On the other hand, the objects in Type 4) were tilted or revolved facing in various directions, so the differences among the objects were not easily noticed. Another interpretation is that differences in Type 3) happened to be more appreciable than those in Type 4), as the differences were not strictly measured in any specific ways.

The bar graphs in Figure 18 show that though the response scores did not always show statistically significant differences among the groups across the stimulus objects, we can see the general tendencies that the ENS group scored higher than the Japanese groups. One very interesting response difference between ENSs and JNSs appeared in the judgments of *camf*, or *kumafu* in Japanese, which belongs to Type 3). The mean score of the Low Proficiency Group was 1.85, that of the High Proficiency Group was 2.09, and that of the ENS group was 3.19. The difference of the mean scores between the lowest and the highest was the biggest among the 20 sets, and furthermore the mean score of the Low Proficiency Group was the lowest among those on the 20 stimuli, as the graphs show in Figure 18. That is, they considered that the stimulus objects were the least likely to be called by the same name as the target object. Figure 19 shows the target object of *camf* and its stimulus objects.

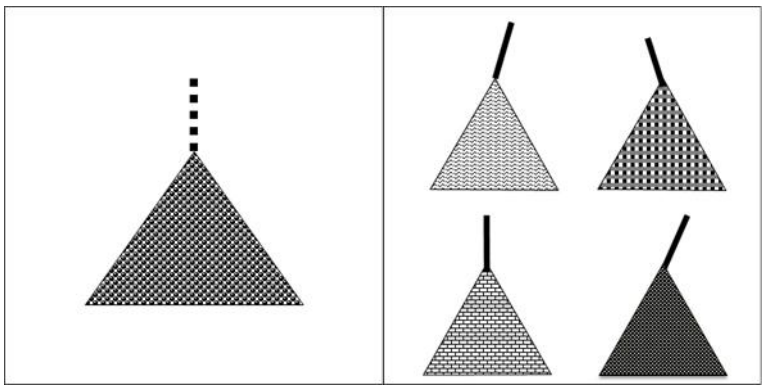


Figure 19. The target object 'camf' and its stimulus objects

The extremely low score of the JNSs and the high score of the ENS group on this pair remind us of an experiment conducted by Norenzayan et al. (2002). They investigated the kind of reasoning which Westerners and East Asians, (i.e., English speaking Americans, Chinese and Koreans in this case), preferred to use when categorising objects. They found that Westerners tend to categorise based on formal rules and East Asian tend to categorise based on general impressions and intuitions. The appearance of the objects in the stimulus picture of *camfs* on the right would give rather different appearances of the objects at a glance because of the different patterns of the triangles, and the sticks looking into various directions. The formal rules of the object construction, however, are quite simple; there are a triangle and a stick attached on top of it. In judging whether to call the objects by the same name or not, it is assumed that ENSs used these rules and tended to give more positive responses than JNSs, who probably depended more on appearances of the objects using their intuitions.

More evidence for such West-East reasoning differences in categorisation approach was found in the judgments on *moiyer*, or *moyuwa* in Japanese. The mean score of the Low Proficiency Group was 3.54, that of the High Proficiency Group was 3.45, and that of the ENS group was 3.12, which show opposite patterns from the

general disposition of the three groups. There was no statistically significant difference as for the judgments on this pair, but what attracts our attention is that the ENSs gave as high scores on *moiyer* as on *camf*, and the JNSs gave even higher scores on this item as the graphs show in Figure 18, p. 232. Figure 20 shows the target object named *moiyer* and its stimulus objects.

The three objects in the stimulus picture on the right give similar appearances to the target and to one another though a closer look reveals that they are all slightly different from each other. It is assumed, therefore, that JNSs scored quite high on this item because of this general impression. The ENSs seemed to grasp, on the other hand, the rule of salient properties that there are three bumps on both sides of the object and scored as high as *camf*, *apog*, and *nimute*.

Whatever approach to the task the participants may take in categorisation, the most important finding of this experiment was that ENSs favoured to call similar objects by the same name significantly more positively than Japanese. Also it is assumed that the plural noun form in English such as *camfs* and *apogs* will accelerate the cognitive tasks in English speakers because the language they speak gives an easier way to categorise and generalise the objects. Because the zero article plural noun form

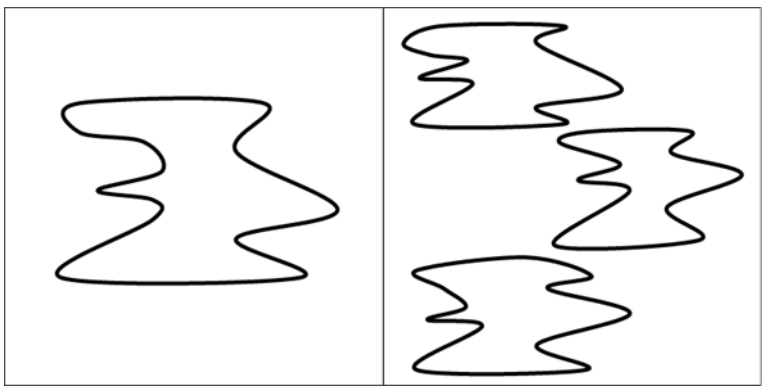


Figure 20. The target object 'moiyer' and its stimulus objects

such as *birds* in English has a double function to denote the name of the category and to indicate the plurality at the same time (Chierchia 1998), the speakers of the language are required to direct their attention to both aspects of the reality at the same time. Thus ENSs would find it easier to group objects by determining to give them the same name through habitual use of plural nouns. On the other hand, because of the lack of such a plural noun form in Japanese, JNSs do not group objects as positively as ENSs would do.

Experiment 3 was originally designed to confirm the results of Experiment 2. Experiment 2 successfully showed different behaviours between ENSs and JNSs in interpreting plural generic noun phrases, but the results were thrown into question due to some inappropriate linguistic stimuli. Now that the results of Experiment 3 are consistent with the whole prediction through the present research that JNSs would behave differently from ENSs because of the lack of the plural generic noun form in Japanese, the results of Experiment 2 on the interpretation of the zero article plural generic nouns in Section 5.7.2 can be accepted and supported.

It should be added lastly that, as Imai (2000) and Hunt and Agnoli (1991) say, language does not shape concepts in an exclusive way and constrain certain cognitive activities, but rather certain aspects of a language may lead the speakers to pay more attention to some specific part of events in rather implicit ways. From such a perspective, therefore, we can understand that the results of this experiment clearly show that speakers of two different languages with different generic expressions function in such a way as to pay attention to some particular, salient aspects of the events which the languages indicate. Thus, the plural noun form in English guides ENSs to categorise similar objects more positively than JNSs, so that ENSs feel it easier to use

the plural noun form. It does not claim lack of such a generic noun form as the zero article plural noun in Japanese prevents the speakers of the language from forming the concept of generics. But JNSs are slightly less willing to group similar objects, because they do not have a way to express it as easily as English speakers.

6.8 Summary of the Three Experiments

Three experiments were conducted in this research: the taxonomic-thematic categorisation judgments, interpretation of generic expressions, and the shape generalisation test. The series of the experiments started with an investigation of whether the West-East Paradigm (Kitayama et al. 2003; Masuda & Nisbett 2001, 2006; Miller 1984; Morris & Peng 1994; Nisbett 2003; Nisbett & Miyamoto 2005; Norenzayan et al. 2002) would apply to JNSs in carrying out the taxonomic-thematic triads categorisation task. It was first confirmed that JNSs behaved differently from ENSs, as the paradigm indicates, by relating taxonomically-related objects less strongly than ENSs, though there were not any systematic differences revealed in thematic relationship judgments between ENSs and JNSs. The first experiment also revealed that JLEs tended to shift their taxonomic categorisation patterns closer to those of ENSs as they developed their proficiency in English, thus provided supporting evidence for multi-competence of JLEs. Because JLEs had been studying English as a school subject almost exclusively in Japan without much exposure to any English speaking environments, language effects rather than cultural effects were considered to be positive.

The West-East paradigm was further examined by two more taxonomic-thematic categorisation judgment experiments which were conducted on Chinese learners of Japanese (CLJs) and Japanese high school students. As predicted, CLJs did not show any categorisation shift across groups of different proficiency levels in Japanese in the way as JLEs showed as they developed their proficiency in English. Learning Japanese which belongs to the same regional group of languages would not affect their cognition. CLEs did not show statistically significant differences among the different proficiency groups in English. The gradual growth of scores in taxonomic relationship judgments, however, could be interpreted as a trace of L2 English effects, which may have been affected by L3 Japanese. The results suggest L3 effects on cognition as a direction for further research.

No significant differences among the CLJs could be interpreted as lack of enough Japanese learning experience. Thus, the same experiment was conducted on young JLEs. They did not show significant differences, but showed a sign of growing differences in the taxonomic relationship judgments. The results did not support the results of the experiment on CLEs, but they suggest that further research on when L2 learners start to show cognitive differences as a consequence of learning an L2.

Taking Nisbett's (2003) speculation as a starting point, namely that different generic expressions between the languages may cause the different judgments in categorisation, Experiment 2 investigated whether ENSs and JNSs would interpret generic expressions in different ways, and further whether JLEs would shift their ways to interpret them as a consequence of learning English. Experiment 2 showed significant differences between ENSs and JNSs in interpreting the zero article plural nouns. That is, ENSs interpreted generic plural nouns as generic significantly more often than JNSs,

and JLEs with higher proficiency in English showed interpretation closer to ENSs than JLEs with lower proficiency in English. Thus, the results of Experiment 2 revealed that ENSs and JNSs interpret generic expressions in different ways presumably because of differences in generic expressions between the languages. Using language in this kind of experiment on cognition, however, brought up problems in perfectly providing equivalent stimulus sentences. Therefore, further research was conducted using abstract objects to confirm the results.

Experiment 3 was designed so that the participants would have to take the process of categorisation: that is, they were expected to recognise a certain individualised object with a name, to identify common properties of objects, to ascertain that those objects belong to the same category, and to determine to call them by the same name or not. Thus they were first shown a target abstract object with a name and further asked whether the same objects as the target or similar objects to the target could be called by the same name. The prediction was ENSs would be more likely to call them by the same name because English has the zero article plural nouns which indicates the category and the plurality simultaneously in one word, but Japanese does not. The results supported language effects on behaviours of ENSs and JNSs, showing that ENSs tended to give significantly higher scores in grouping objects than JNSs. There were no statistically significant differences between the high proficiency JLE group and the low proficiency JLE group, but at least the high proficiency group were always in-between the two other group and showed a possibility that they are moving toward the ES group.

Thus the three experiments in this research produced parallel responses as shown below. The graphs in Figure 21 show that JNSs and ENSs behaved differently,

from the left, in the taxonomic relationship judgments, the interpretation of generic plural nouns, and the categorisation of abstract objects. The graphs also show that JLEs with high proficiency in English always behave in-between the other two groups. Thus it supports multi-competence among JLEs, which claims they behave differently from monolingual speakers of their L1 and L2 as a consequence of learning English as an L2.

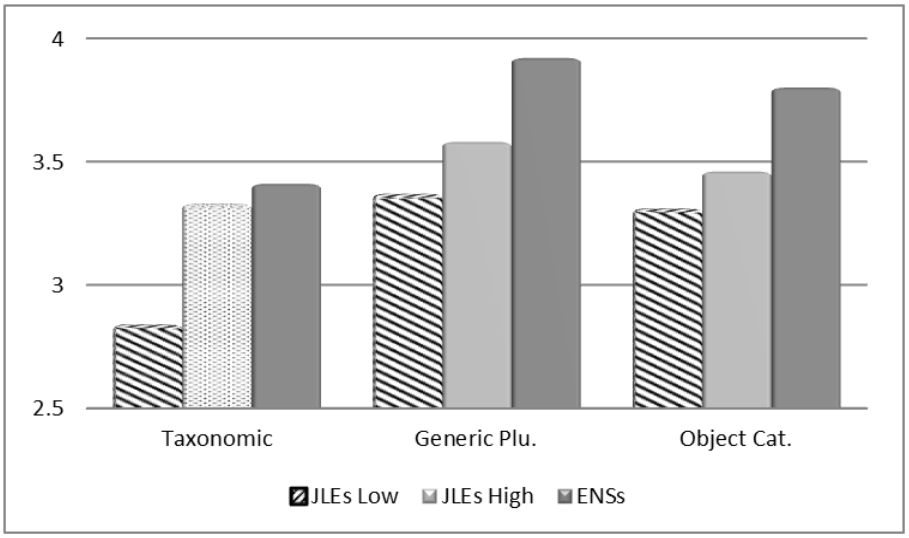


Figure 21. Parallel response patterns of the three groups in the three experiments

Chapter 7. Discussion

7.1 Main Findings of This Research

7.1.1 *The West-East Paradigm*

This research examined multi-competence of Japanese learners of English (JLEs) by exploring whether they will shift their object categorisation behaviours to those of English native speakers (ENSs) as a consequence of learning English. The study was based on the findings in social psychology of different behaviours between the West and the East. According to the West-East Paradigm, which has been extensively investigated in the field of social psychology (Kitayama et al. 2003; Masuda & Nisbett 2001, 2006; Miller 1984; Morris & Peng 1994; Nisbett, 2003; Nisbett & Miyamoto 2005; Norenzayan et al. 2002), Westerners, namely English speakers in North America, and East Asians, namely Chinese, Koreans and Japanese in the studies mentioned, have different views of the world and tend to categorise objects in different ways. That is, Westerners tend to relate objects based on the taxonomic relationship and East Asians tend to relate objects based on the thematic relationship. This is illustrated by the example of the taxonomic and thematic relationships between *monkey-banana-panda* in Figure 22, repeated here from Sections 2.1.3 and 4.1.1. This study particularly shed light on different categorisation behaviours between Japanese native speakers (JNSs) and ENSs by conducting the taxonomic-thematic triads categorisation experiment, and further examined language effects on cognition in JLEs.

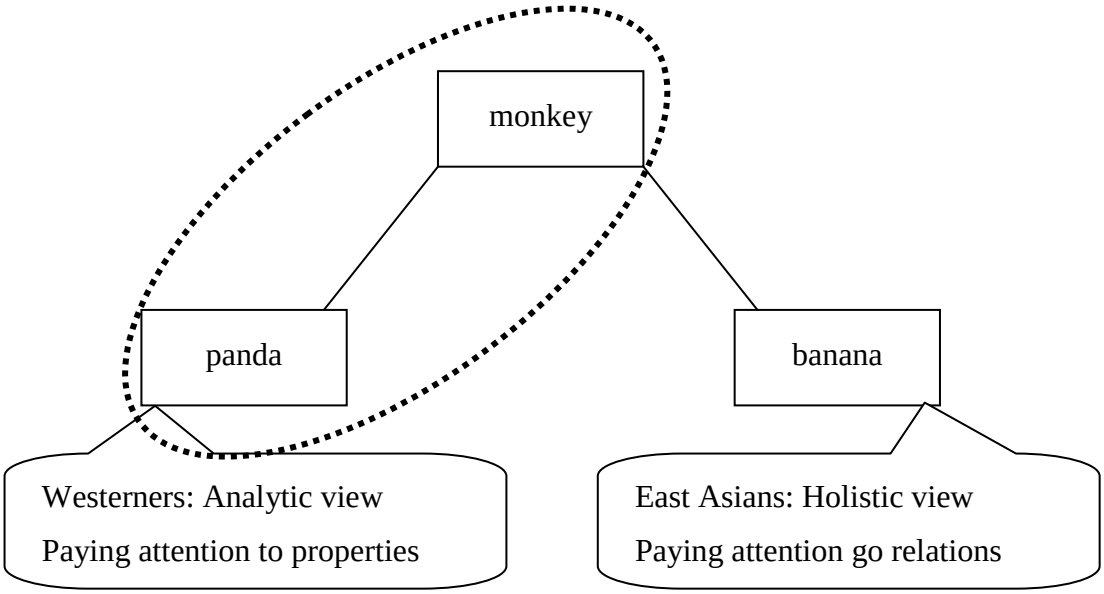


Figure 22. Taxonomic and thematic relationships and different views between Westerners and East Asians with an example of *monkey-panda-banana* and the area of this study

Three experiments were carried out in this study. Experiment 1 used taxonomic-thematic triads similar to those triads used by Ji et al. (2004). The experiment had three aims. First, it investigated whether Japanese speakers would respond to the triads categorisation task in the East Asian way predicted by the West-East paradigm. Second, the experiment explored Japanese L2 learners' multi-competence; that is, whether JLEs would shift their behaviours as a consequence of learning English besides their L1 Japanese. So JLE groups at different English proficiency levels were formed and their performances were compared. Finally, to further support the multi-competence view, it examined how Chinese learners of Japanese (CLJs) would respond to the triads. Because Chinese and Japanese speakers both belong to the East Asian group, it was predicted that CLJs would not change their responses as a consequence of learning Japanese as JLEs would from learning English. Thus, overall, Experiment 1 examined how ENSs, JNSs and CNSs would behave in

object categorisation judgments, testing out the West-East paradigm proposed in the field of social psychology. Thus Experiment 1 is actually a set of three experiments 1A, 1B and 1C with slightly varying hypotheses and participants.

Experiment 2 used generic noun phrases and examined whether ENSs and JNSs would interpret them in different ways. It was based on one of the experiments on generic noun phrases conducted by Gelman and Tardif (1998). Nisbett (2003) postulates that the different behaviours in the taxonomic-thematic triads experiment are attributable to differences in generic expressions between languages. Categorisation processes resemble the understanding of generic expressions in the sense that they both require extracting essential properties of objects by inducing common properties among members of a category. Chapter 3 argued that marking of generics is less explicit in Chinese than in English though generic expressions are ambiguous by nature in both English and Chinese. It also explained that Japanese is similar to Chinese as far as generic expressions are concerned. Thus Experiment 2 investigated whether ENSs and JNSs would interpret generic noun phrases in different ways and, furthermore, whether JLEs at different proficiency levels would respond differently as a consequence of learning English, in order to see any effects of English in the framework of multi-competence.

Experiment 3 used drawings of abstract objects and investigated how differently ENSs and JNSs would categorise them. In this experiment, the participants were shown a group of artificially drawn objects in the same shapes or in slightly different shapes, and asked whether they were called by the same name. English has zero article plurals such as *birds* and *lions* to express generics more explicitly than Japanese, as discussed in Chapter 3. Having such a specific way to refer to a group of

objects should help categorisation and make it easier to use the same name to refer to a category in general. If there is any language effect on their ways of object categorisation, it is predicted, therefore, that ENSs would be more likely to categorise objects in the same/similar shapes as belonging to the same group, and thus more likely to call them by the same name than JNSs would. It further examined whether JLEs at different English proficiency levels would respond in different ways in order to see effects of English learning on their categorisation, in other words, to examine the multi-competence of JLEs.

The following list shows the predictions from the West-East paradigm, and the extent to which they were confirmed by the experiments in the present research.

1. ENSs tend to relate taxonomically-related objects (*monkey-panda*) more strongly than JNSs, confirmed by Experiment 1A (see Section 4.1.6, pp. 162-163).
2. JNSs tend to relate thematically-related objects (*monkey-banana*) more strongly than ENSs, not confirmed by Experiment 1A (see Section 4.1.6, pp. 162-163)
3. JLEs tend to show more ENS-like responses in taxonomic categorisation as they acquire higher proficiency in English, confirmed by Experiment 1A (see Section 4.1.6, pp. 162-166).
4. Chinese learners of Japanese do not tend to shift their dispositions in the taxonomic-thematic categorisation judgments, confirmed by Experiment 1B (see Section 4.2.6, pp. 174-175).
5. Chinese learners of English tend to show more ENS-like responses in taxonomic categorisation as they acquire higher proficiency in English, not confirmed by

Experiment 1B (see Section 4.2.6, pp. 175-176).

6. Young JLEs also tend to show more ENS-like responses in taxonomic categorisation after four years of learning English at school, not confirmed by Experiment 1C (see Section 4.3.6, pp. 182-183).
7. ENSs and JNSs interpret the zero article generic plural nouns (*dinosaurs*) in significantly different ways, and ENSs interpret them in more predictable ways than JNSs, confirmed by Experiment 2 (see Section 5.6, pp. 197-201, and Section 5.7.2, pp. 203-206).
8. JLEs with higher proficiency in English interpret the generic noun phrases (*kyouryuu* 'dinosaurs') in more predictable ways than the low proficiency group, also confirmed by Experiment 2 (see Section 5.6, pp. 197-201, and Section 5.7.2, pp. 203-206).
9. ENSs are more likely to categorise the same/similar objects into a group than JNSs, confirmed by Experiment 3 (see Section 6.6, pp. 228-231).
10. JLEs at an advanced level responded in the object categorisation task always in-between the ENS group and the low proficient group, and hence they tend to act more like ENSs as they acquire higher proficiency in English, confirmed by Experiment 3 (see Section 6.6, pp. 228-231).

The list above indicates that the present research has found cognitive activities peculiar to ENSs and JNSs on the taxonomic relationships as indicated in the West-East Paradigm. It did not confirm their predicted behaviours on the thematic relationships, and thus it covers only the area circled by the dotted line in Figure 22, p. 243. The findings in this research are displayed contrastively in Table 24, which shows the

	Noun forms	Cognitive behaviours
English ↕ Japanese	*birds* (plurality obligatory)	ENSs ● Relate taxonomically-related objects more strongly. ● More likely to interpret generic expressions as generic. ● More likely to group the same/similar objects.
	J-E bilinguals	In-between ENSs and JNSs
	tori 'bird' (plurality not obligatory)	JNSs ● Relate taxonomically-related objects less strongly. ● More variable interpretations of generic expressions. ● Less likely to group the same/similar objects.

Table 24. Plural noun forms in English and Japanese and their parallel behaviours among English speakers and Japanese speakers with J-E bilinguals in-between the two groups

expected behaviours of ENSs and JNSs in the three tasks; it also shows that JLEs at an advanced level (Japanese-English bilinguals) were always in-between the two groups.

As shown in the table, the three experiments confirmed that ENSs and JNSs react in different ways in the categorisation judgments of taxonomically-related objects, interpretation of generic plural nouns and the shape categorisation test. Furthermore, JLEs will shift their cognitive behaviours toward those of ENSs as a consequence of learning English. Therefore, the experiments in this study verified a weaker version of the linguistic relativity hypothesis stating that language gives some effects on the behaviours and perceptions of speakers of different languages, and the results of the experiments support multi-competence of JLEs as well.

Judging from the overall results shown in Table 24 above, we can now assume that plurality in English and lack of plurality in Japanese are relevant to different cognitive behaviours between ENSs and JNSs. There are constant parallels between noun forms and behaviours: that is, if a language obligatorily takes the plural

noun form to refer to a category, speakers of the language pay more attention to categories; and if the language does not take the plural noun form, speakers of the language pay less attention to categories. The way in which number is expressed makes a salient difference between the two languages, and a possible conclusion of the present research is that speakers of the two languages would behave differently in the three experiments in this research because of the difference in grammatical number marking.

To view this conclusion from a wider perspective, the next section will reflect the language effects on the taxonomic-thematic categorisation in this study once again by taking previous research findings into consideration. Then the following sections will examine language effects in interpreting noun phrases, and then further discuss how noun forms would be related to taxonomic categorisation by referring to Nisbett (2003) again.

7.1.2 *Language effects on the taxonomic-thematic categorisation*

Chapter 2 has seen that language, or labelling, does affect categorisation behaviours in the taxonomic-thematic categorisation experiments by looking at cognitive development among small children in previous studies. Some studies verified language effects showing that English speaking children tend to categorise objects based on taxonomic categories more easily when they hear names of objects than when they do not hear them (Markman & Hutchinson 1984; Waxman & Hall 1993; Waxman & Markow 1995). A similar effect of language enhancing taxonomic categorisation was also found among Japanese children and adults in the taxonomic-thematic triad matching experiment (Sugimura 1993). Thus, a similar categorisation mechanism, that is, categorisation enhancement by language, seems to work more or less in the same

way among both English and Japanese speakers. The mechanism seems quite reasonable from our everyday life experiences. For example, when we are told, 'This is a trout, and that is a salmon', we try to find out what are the differences between the two apparently similar fishes which cause them to have different names. Or in some other case, if shown an animal which looks like a kangaroo, and told, 'This is a wallaby', we try to find out properties that make it called *wallaby* not *kangaroo*. By hearing different names, we pay attention to the properties of objects, and try to find commonalities and differences between them. Thus we understand that language, or labelling, directs our attention to the properties of objects.

Age effects were also found in addition to labelling effects. Though each experiment described in Chapter 2 reveals pieces of different aspects of cognitive developments among children, by putting those pieces together, we can see that English-speaking children, in the taxonomic-thematic triads categorisation, show no specific preference for taxonomic nor thematic relations around 2-3 years old (Markman & Hutchinson 1984; Waxman & Hall 1993; Waxman & Markow 1995, Waxman & Namy 1997), thematic relationship appreciation around 4-5 years old (Blaye & Bonthoux 2001; Markman & Hutchinson 1984; Waxman & Namy 1997), then taxonomic preference around 5 years old and onwards (Blaye & Bonthoux 2001; Smily & Brown 1979). Furthermore, when more pieces of findings from cross-cultural studies (Chiu 1972; Gutchess et al. 2006; Ji et al. 2004; Unsworth et al. 2005; Sugimura 1993) including the present study are added, we can tentatively gain a picture as shown in Figure 23. The horizontal line indicates the degree of taxonomic preference, and the vertical line indicates age. The figure shows how English speakers shift their taxonomic preferences along the age dimension from neutral to thematic preference, then to

taxonomic preference, and that the taxonomic preferences of English speakers and Japanese speakers start to diverge at around the age of 5. After age 5, it was found by a previous study that Japanese 3rd graders and adults showed more taxonomic preference than preschoolers (Sugimura 1997), and English speaking adults are more taxonomic oriented than Japanese speakers by Experiment 1A in the present study. As Figure 23 shows, Japanese are comparatively less taxonomic oriented than English speakers. Thus we can see that both ENSs and JNSs undergo similar mechanisms of language enhancement in the taxonomic categorisation as described above, but at the same time we also have seen that there are some differences between the two language groups.

To conclude, language does have some effect on categorisation and enhance

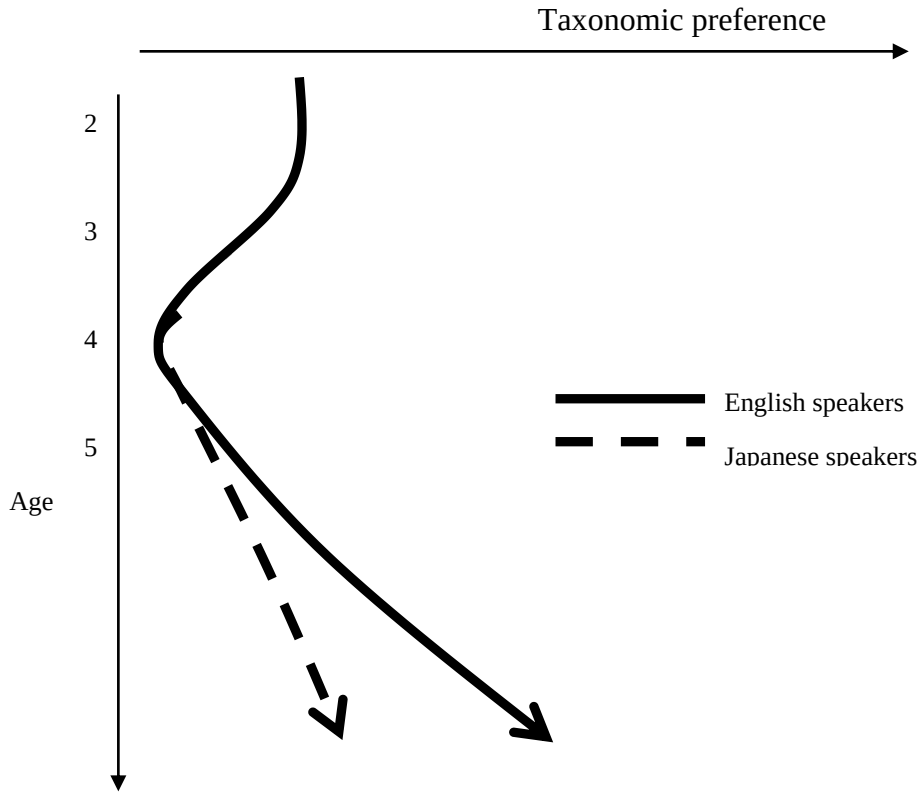


Figure 23. Schematic taxonomic preference shift in English and Japanese speakers

taxonomic relationship of objects, but exposure to different languages for a long period of time seem to give different degrees of enhancement to speakers of different languages. So the next question discusses what kind of language forms gives what kind of effects.

7.1.3 *More evidence of language effects*

Some studies further show evidence of effects of different linguistic forms on cognitive activities. ENSs show different behaviours under different instructions in the taxonomic-thematic triads experiment: for example, ENSs are more likely to group taxonomically-related objects under the *another-one* condition than the *goes-with* condition and the *goes-best-with* condition (Waxman & Namy 1997). That is, when the instruction saliently indicates an individualised discrete object by the phrase *another one*, they are more likely to match taxonomically related objects than when the instruction implies neutral 'matching' or 'relationship' using the more thematic-oriented phrase *go with*.

Experiment 2 in the present study also revealed evidence of effects of different linguistic forms on interpretation of noun phrases among ENSs and between ENSs and JNSs. ENSs interpreted the plural generics (*rabbits*/*hammers*/*dinosaurs* /*roses*) as generic at the rate of 98.1%, and the singular generics (*a horse*/*a kite*/*a lion*/*a teapot*) at the rate of 67.3%. Japanese participants, on the other hand, did not show such clear differences in interpreting the generic nouns which take different forms in English but the same form in Japanese. Among the interpretations by JNSs, generic interpretation occurred 86.7% for the English plural nouns and 82.6% for the English singular nouns. Because the plural and singular nouns take the same form in Japanese,

the results are understandable. Constant exposure to different noun forms such as *a bird* and *birds* in English, and the same noun form *tori* 'bird' in Japanese seem to cause these cognitive differences.

The following list shows what has been confirmed for the effects of language in the field of child development studies and bilingual cognitive studies:

1) Language enhances taxonomic categorisation among ENSs and JNSs (Markman & Hutchinson 1984; Waxman & Hall 1993; Waxman & Markow 1995).
2) Different instructions (the *one-another* condition vs. the *go-with* condition) affect categorisation behaviours among ENSs (Waxman & Namy 1997).

The present study also revealed language effects on noun phrase interpretations as follows:

3) Among different noun forms in English, ENSs interpreted the zero article plural nouns (*dinosaurs*) as generic more frequently than the indefinite article singular nouns (*a horse*).
4) Among different language groups, ENSs show a higher rate of correct interpretation than JNSs in interpreting the zero article plural nouns (*dinosaurs*).

Thus we have confirmed that there are always parallel relations between noun forms and behaviours within the same language group, and across different language groups. That is, they behave in the way the language indicates. When people use a noun form which indicates an individuated object, they tend to look at a single object which

belongs to the same category rather than paying attention to the relationships of the objects. When they use a noun form which indicates a group, they tend to pay attention to common features of the objects and group them. When they use noun forms in which number blurs, they pay less attention to features of objects and thus they are less likely to group objects. From these findings, it may be possible to predict that different language forms may lead to different behaviours on taxonomic categorisation.

7.1.4 *Plural noun forms in English and their equivalents in Japanese*

Thus we have seen that ENSs and JNSs behave differently in the relationship judgments of taxonomically-related objects, and JNSs will shift their behaviour as a consequence of learning English. Also we have seen that ENSs and JNSs interpret generic nouns, plural in English and singular in Japanese, differently, and JNSs shift their ways of interpretation as they acquire high proficiency of English. Then how are the way to categorise objects and plural noun forms related to each other? Now we need to look at noun forms in English and Japanese once again and discuss how they are related to taxonomic categorisation.

As we have seen in Chapter 3, generic noun forms in English and Japanese are not straightforward but are rather ambiguous and their interpretations depend on general knowledge and context knowledge as well as the linguistic forms. However, there is a considerable difference between English noun forms and Japanese noun forms, as shown in Figure 24. The figure shows a contrastive difference of how birds are referred to in English and in Japanese: English uses two different forms *a bird/birds*, and Japanese uses only one form *tori*.

English	*a bird*	*birds*
Japanese	*tori*	*tori*

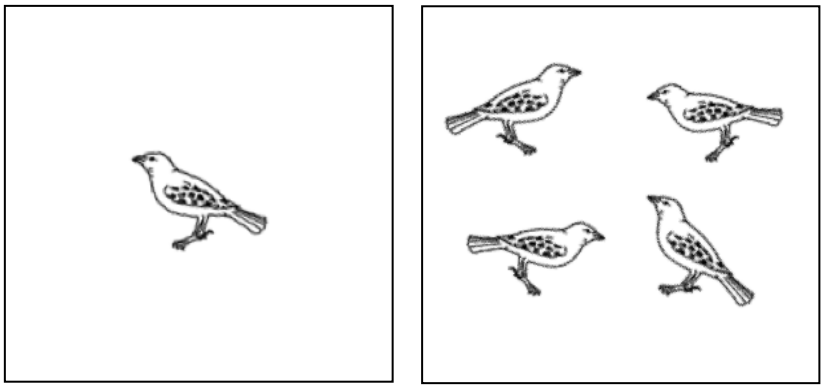


Figure 24. Different noun forms in English and Japanese and their cognitive images

Looking at Figure 24, we can now understand why Nisbett (2003) speculates that generic plural nouns such as *birds* must be relevant to taxonomic-based categorisation. In order to call the entities in the right square *birds*, we need to decide if they share a set of properties that warrant being called by the same category name. Paying attention to shared properties is naturally necessary even when Japanese is used, if it is used to refer to the whole category. The plural *birds*, however, would direct the speakers' attention to the whole category more instantaneously than the singular *a bird*. The behavioural differences caused by the two noun forms were found in interpreting generic nouns in the singular and plural form in Experiment 2, as described above. The plural generic nouns were interpreted as generic considerably more than the single generic nouns by ENSs: 98.1% and 67.3% respectively.

Indeed, the examples below show how interpretation of the same noun form in Japanese can be different and expressed in different ways in English. Japanese noun phrases are ambiguous in number and definiteness, while English obligatorily expresses

singularity and plurality, and definiteness and indefiniteness. Therefore, *tori* 'bird' in Japanese can be translated as *a bird*, *the bird*, *birds*, and *the birds* in English depending on the contexts as shown below.

tori –ga nigeta.

Bird –NOM fly away –past

{ A bird flew away.
  The bird flew away.
  (Some) birds flew away.
  The birds flew away.

Thus, as Nisbett (2003) observes,

> … generic nouns (that is, category names) in English and other European languages are often marked by syntax. When the conversation turns to waterfowl, you can say "a duck," "the duck," "the ducks," or "ducks." The last term is a generic one and the syntax tells you this. It's normally obligatory to indicate whether you're speaking about an object or a class of object, though sometimes the context can do the job. But in Chinese and other Sinitic languages, contextual and pragmatic cues can be the only kinds of cues the hearer has to go on. (p. 151)

The passage above appears in the discussion of differences between the West and the East saying that Westerners tend to categorise objects than Easterners, that Westerners find it easier to categorise by applying rules about properties of objects than Easterners, and that Westerners are more likely to generalise from particular instances to the

category as a whole than Easterners (Nisbett 2003). The discussion goes on to say as follows.

> The Western concern with categories is reflected in language. "Generic" noun phrases are more common for English speakers than for Chinese speakers, perhaps because Western languages mark in a more explicit way whether a generic interpretation of an utterance is the correct one. (p. 156)

Nisbett's description of generic expressions in English is over-simplified, and there is much more to say concerning generic expressions in English, as we have seen in Chapter 3. But at least we can possibly say ENSs and JNSs behave differently because of the difference in the noun form *birds* and *tori* 'bird'. Because of the plural nouns, we can furthermore assume that ENSs would be more likely to categorise objects at the superordinate level too, which is also concerned in the taxonomic-thematic relationship experiment in this study. Objects at the basic level were used here, hence categorisation is necessary at the superordinate level: for example, as in the triad pictures in Figure 25, which were used in Experiment 1.

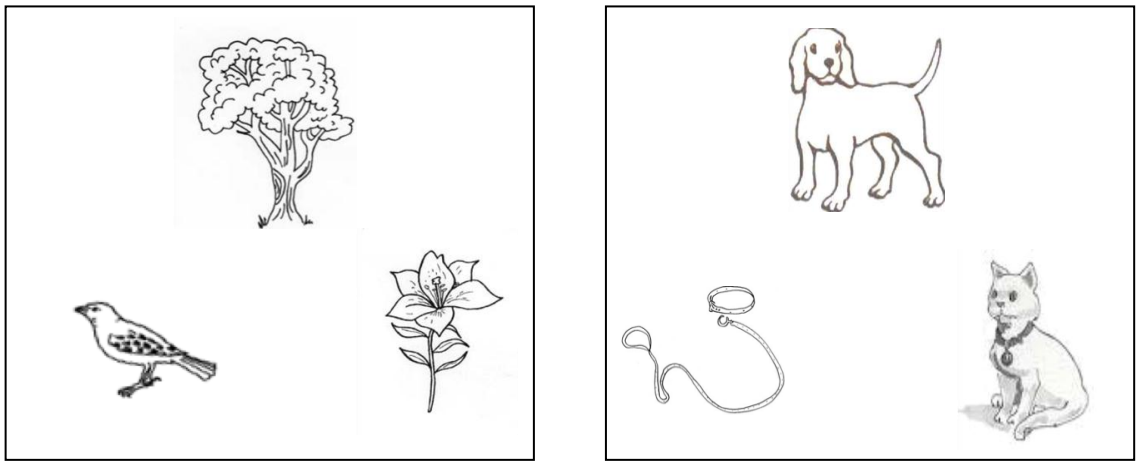


Figure 25. Taxonomic-thematic triads used in Experiment 1

Shown the triad on the left *tree-flower-bird*, because ENSs have plural nouns such as *trees, flowers,* and *plants*, they not only pay attention to categories but also may be more likely to group tree and flower into a superordinate category of *plants.* The same can be said for the triad on the right. ENSs are more likely to group *dog* and *cat* out of the triad *dog-cat-lead,* and form a category of *animals* or *small-sized-animals-often-kept-as-pets*. It is assumed they are more likely to do so because of those plural noun forms, compared with the JNSs, who do not have plural forms in their language.

This kind of difference in grouping was confirmed by Experiment 3, which showed ENSs and JNSs are different in whether to call a group of objects by the same name or not. ENSs are more likely to group the same/similar figures into a category by calling them the same name than JNSs, and JNSs tend to shift their behaviour toward those of ENSs as they acquire high proficiency of English. Theoretically, we can now predict that categorisation behaviours and plural noun forms may be related in some ways, but further empirical research is necessary to confirm the clear correlation between taxonomic categorisation and acquisition of plural marking in JLEs.

A recent study by Goro Murahata (2010) found that there is a difference in the taxonomic-thematic matching task between the groups with and without English-learning experience among 5^{th}-6^{th} graders in Japanese primary schools. It is rather doubtful that plural noun forms are already efficient in their cognitive behaviours among such small children at such a beginning stage of learning English as an L2. That is, 5^{th}-6^{th} graders with more experience of learning English are inclined to show more taxonomic choices than those with no or less experience of learning English. What is concerned here is whether they have enough exposure to English plural noun forms enough to be affected by them.

The children had had two English lessons a week for four years at school at the longest. With that amount of exposure to English, do they change their matching preferences? One possibility is that small children at the age of 10-12 develop different mechanisms in object categorisation by learning a foreign language. Because they learn that an object has an English name besides the one they have learned in their L1 Japanese, they are more attentive to objects than relationships between the objects. Therefore, the effect may not be generated from the noun forms but from the experience of learning a foreign language. Another possible explanation is that the children may have had language effects through learning plural noun phrases. In this case, it is necessary to pursue further investigation into when effects of learning English start to appear in cognitive behaviours of object categorisation among JLEs.

7.1.5 *What does it mean to be different?*

It is important to discuss now what 'being different' means in the task of taxonomic-thematic categorisation. Categorisation is an important cognitive activity which helps one to identify an object. Being able to use a word, for example the word 'bird', means that a person can identify something as a *bird* not a *squirrel* when he/she sees it, by categorising it as a *bird* among other objects that are not birds. Categorisation takes place at the superordinate level *small animal* as well as the basic level *bird-squirrel*. To determine that *bird* and *squirrel* belong to the same taxonomic group *small animal*, but *bird* and *flower* do not is also categorisation at the superordinate level.

Experiment 1 in this research did reveal some differences between ENSs and JNSs in the object categorisation task of judging how strongly taxonomically-related objects are related. The differences, however, are not so large that they create complete

dissimilarities in their everyday social behaviours of English and Japanese speakers. Just because ENSs tend to relate taxonomically-related things more strongly than JNSs, it does not mean that the speakers of the two languages would fail in mutual understanding or that they would look at objects in completely different ways. It is not also such a clearly perceivable individual difference that any particular English speaker shows significantly different behaviours from any particular Japanese speaker, thus we could distinguish an English speaker from a Japanese speaker by observing the way they behave. The differences found were not at the individual, but at the group level. It should be kept in mind, therefore, that research into the relationship between language and cognition should be conducted on groups with different language, social, or nationality backgrounds, not with individuals with different interests, abilities, occupations and other possible differences (Cook 2011). Clearly, each individual in both groups has acquired universal ontological perceptions, so they can see that the target items and the taxonomically related objects are individualised objects with certain names.

In Experiment 1 the stimulus objects were all Rosch's basic level items such as *dog* and *tree*, though a few of the items in the thematically-related objects to the target were not concrete objects, such as *wedding* and *desert*. The basic level is considered to be the most abstract level in the sense that they are the most easily recognised as a member of a category. Basic level objects are those which have the most common attributes and thus the most differentiated from one another. Also the names are the most used among category names in everyday life by adults and the first used by children (Murphy 2004; Rosch et al. 1976). When participants looked at the two items, therefore, they presumably thought instantly that the two things belonged to

the same group such as ‘animals’, ‘four legged animals’, or even ‘four legged small-sized animals which are often kept as pets’. It is hard to imagine anyone who did not come up with such a superordinate taxonomic group, or anyone who did not understand why the two items were paired. The judgment scores ranged from 1 to 5 in the present experiment, with 1 meaning the most weakly related and 5 meaning the most strongly related, and the lowest mean score for the taxonomically-related objects among the groups was 2.84 and the highest mean score was 3.41. The low score means that the participants of the group at least recognised the relations though they thought the objects were not very strongly related. The participants differed only in scoring the strength of the relationship, while sharing the same, universal categorisation behaviours to some extent.

Then how are the differences treated? We should note that, in conducting research on linguistic relativity between speakers of different languages and multi-competence in bilingual speakers, it is not appropriate to ask whether speakers of a particular language are able to perceive objects or not, or able to understand the relationships or not. Rather it should be asked in what way they perceive or in what way they understand because the differences are characteristic and qualitative (Imai 2000). Barner et al. (2009) observed that ENSs and JNSs equivalently recognise object names as objects and substance names as substance. Biederman et al. (2009) also reported that the Himba, who are living in northern Namibia and surrounded by fewer artifacts than people in Los Angles, are equally sensitive to shape of objects and to substances. From those studies it is predicted speakers of different languages would be able to recognise objects. Even if they are able to perceive an object or an event, however, it does not mean that they perceived it in exactly the same way. Some of them may feel it easier

than the others. Then it is the relativists' argument that the ease may come from certain linguistic forms particular to the language they speak (Hunt & Agnoli 1991; Imai 2000). In this sense, human cognition is not universal but relative.

In other words, the scores of the judgments in the present study show that JNSs do not perceive the taxonomically-related objects in the same way as ENSs. Nor do JLEs at an advanced level perceive them in the same way as those at a beginners' level. Thus the differences are subtle but definitely present. In examining cognitive differences between speakers of different languages, or language effects on bilingual cognition, it is important to seek for differences while acknowledging the universal elements of cognition. As Imai (2000) and Gelman (2004) say, language plays an important role in people's categorisation but at the same time it is also argued that relativity and universals interact in language use and cognition. That is, we do have a universal aspect in the greater part of the cognitive activities in categorisation but there are also some areas specific to speakers of certain languages, which are presumably guided by specific linguistic forms. Certain aspects of a language may lead its speakers to pay more attention to some specific part of events related to the linguistic forms. In the present case, the generic plural noun forms in English are likely to lead its speakers to pay more attention to the properties of a category and make it easier for them to categorise taxonomically-related objects than the equivalent noun form in Japanese does.

It should be also noted that it is not appropriate to judge the differences as negative or positive, and right or wrong. Showing the tendency to relate taxonomically-related objects more strongly is not negative, nor positive in everyday life. Even if some Japanese develop a tendency to relate taxonomically-related objects

more strongly as a consequence of learning English, the cognitive shift in taxonomic categorisation does not seem to be large enough to eliminate acquired taxonomic categorisation knowledge. Nor does it seem to affect functioning in the society because such a cognitive shift would not change a person into someone completely different. Even among individuals in a language group there are individual variations. At least it can be clearly seen from the results of Experiment1A that JLEs at an advanced level did not show significant differences in thematic relationship judgments, so that they have not become completely blind to the relationships as a consequence of learning English.

7.1.6 *Language effects in bilingual studies*

It is necessary to note lastly that language effects on the cognitive shift can be more specifically and clearly investigated by examining bilinguals than by examining monolinguals across different languages. It is sometimes difficult to attribute cognitive differences directly to language when there are so many factors involved in the participants, such as differences in life styles, social practices, educational backgrounds and natural environments. For example, difficulty of concluding cognitive differences by claiming language effects appeared already in one of the earliest studies on linguistic relativity, Carroll and Casagrande (1958). In comparing the preferences of objects matching between Navaho and English speakers, the results of the experiment went against the prediction that the Navaho language would direct the speakers' attention to shape more than English. The unexpected results were considered to be attributable to the different living environments. The English children were living in an industrialised environment in the wealthy Boston area and the Navaho children were having a simple life in a rural area. In the case of the study on spatial reasoning, Li and Gleitman (2002)

argue that cognitive differences between Tenejapan and English speakers could be attributed to differences in education and geographical environments rather than absolute and ego-centred language differences. Mazuka and Friedman (2000) also questioned the results for the object-classification task conducted by Lucy (1992). They claimed the cognitive differences between the two language groups could have come from the differences in their educational backgrounds and their life styles. However, these non-linguistic factors can be reduced to the minimum in bilingual research (Bassetti & Cook 2011), where in most cases bilinguals at different proficiency levels were compared and the cognitive differences are considered to be rather intra-personal. Those studies on language effects in bilinguals are found in some early studies on linguistic relativity (Carroll & Casagrande 1958; Caskey-Sirmons & Hickerson 1977; Ervin 1961) and recent studies (Athanasopoulos 2006, 2007, 2009; Athanasopoulos et al. 2004; Brown & Gullberg 2011; Cook et al. 2006; Forbes et al. 2008).

Experiment 1 in the present study, in this sense, did reveal language effects. Because most of the Japanese participants in this study exclusively had studied English in Japan, where they were not exposed to English speaking environment in daily life, it can be concluded that they have gained some effects of English learning on part of cognitive activity concerning taxonomically-related objects categorisation.

7.2 Implications for SLA Research and L2 Pedagogy

7.2.1 *Implications for SLA research*

This research has confirmed the multi-competence of Japanese learners of English. As described in 1.2, the ideas of multi-competence emerged out of

multi-lingual situations in the world and have been supported both incidentally and directly with empirical evidence. It naturally follows that these ideas entail some important consequences for SLA research and pedagogy. This section considers how the ideas of multi-competence might change perspectives in SLA research especially in an EFL context such as in Japan where learning English as an L2 is almost exclusively for potential use in the future.

Multi-lingual situations of the present world (Crystal 2000/2004; Gordon 2005; Kachru 2009) show that it is difficult to find complete monolingual speakers of a language, as described in Section 1.2.2. This study has also seen a difficulty of finding Japanese monolingual speakers, and it replaced the monolingual Japanese speaker group with the lower proficiency group to see how English learning affected cognition. Thus, if it is natural for us potentially to be able to acquire more than one language, the ways in which our minds are organised must permit this type of language acquisition from the beginning. In other words, if the normal potential of the human mind is to know more than one language, linguistics should not be based on minds with only one language, but minds of more than one language (Cook 2007). Thus Cook (1993) suggests the goals of SLA research as follows with emphasis on 'languages':

- What constitutes knowledge of languages?
- How is knowledge of languages acquired?
- How is knowledge of languages put to use?

If SLA research is based on the framework of multi-competence, that is, the whole system of language knowledge possessed by those who know more than one language,

the goals are not to describe and explain impoverished knowledge, imperfect acquisition and inappropriate use of the target language in comparison with those of natives'. But rather the goals are to describe and explain knowledge, acquisition and use of a language/languages on their own. What is crucial in SLA research is to discover L2 users' own grammars, however different these may be from those of natives' (Cook 1995). Therefore, "SLA research is no longer about finding excuses why L2 users are failed native speakers but can explore what makes L2 users what they are" (Cook 2002a, p. 19).

Thus a new SLA research perspective based on the multi-competence framework opens up an interesting area of SLA research. If L1 and the L2 user's interlanguage are in the same mind, it is highly possible for both languages to influence each other. Not only the transfer from the L1 onto the L2 but also the 'reverse' or 'backward' transfer of the opposite direction, that is, transfer from the L2 onto the L1, is predicted (Jarvis & Pavlenko 2008). Bidirectional transfer is found between L1 Russian and L2 English among Russian L2 users of English in their narratives in word usage and expressions (Pavlenko & Jarvis 2002). Another study reports strong influence of L1 Japanese on L2 English and more subtle influence of L2 English on L1 Japanese among JLEs in expressions of Path (Brown & Gullberg 2011). Thus potentiality of bidirectional influence is one of the developing areas in SLA research and SLA research will further find bidirectional transfer between L1 Japanese and L2 English. As the present research has shown that learning English has affected certain areas of cognition in JLEs, further evidence for multi-competence of JLEs need to be and ought to be found as well.

7.2.2 *Comparative fallacy of L2 users against native speakers*

The multi-competence framework provides a new perspective on L2 learners, as described in 1.2.4. Though the terms 'L2 learners' and 'Japanese learners of English' have been used for the convenience of describing experiment participants in the present study, the term the 'L2 user' is preferred in the multi-competence framework. Considering L2 English learners in Japan, which is the focus of the present research, L2 users are those who use English besides Japanese for real-life purposes, and L2 learners are those who learn English in the classroom setting for later use. Once L2 learners use the language out of the classroom or even in the classroom for any purpose of actual communication to convey any information, however limited it may be, they are L2 users. Behind the term 'the L2 learner' lies a comparative fallacy in comparison with the L2 learner and the native speaker of the L2.

As many empirical studies have shown, the L2 user is a unique individual and is different from the monolingual, that is, the native speaker of the L2. Just as it is not useful to compare an apple with a pear, it is illegitimate to compare the L2 user with the native speaker of the L2 by using either of the standards as a measure of the other (Cook 2008b). We should widely recognise "the difference of the L2 user as a unique human being rather than as a defective monolingual, just as blacks are not defective whites, women are not defective men, and academics are not defective navvies" (Cook 1995, p. 54). Thus we should see a Japanese learner of English as an L2 English user on his or her own right in going beyond Japanese to whatever degree.

Then how can we measure the L2 user's progress or achievement in the L2? Is it ever possible to do so without native speaker comparison? On this point, Cook does accept that native speaker comparison is a useful research technique; however, it is

never acceptable from the L2 user perspective to measure their L2 performances by treating L2 users as deficient native speakers (Cook 2002b). We should always keep in mind from a multi-competence perspective that the difference discovered between the L2 user and the native speaker has emerged as a consequence of learning another language besides his or her L1.

7.2.3 *Consequences for L2 pedagogy*

Multi-competence raises at least three pedagogical issues: role models of L2 users, L1 use in classroom, and goals of teaching/learning L2. First, multi-competence perspectives provide alternative role models besides native speakers. As long as L2 users are judged against the native speakers, the goal of getting native-like proficiency seems to be the ultimate goal of learning another language, but it is unattainable to most of the learners and it may give them a feeling of failure (see Section 1.2.3 for detailed description). Rather effective L2 users can be role models presenting a realistic and attainable goal. Monolingual native speakers of an L2 can be good speaker models of the language but cannot be learner models of the language.

Also from multi-competence perspectives, being a good role model of an L2 user means that he/she shows not only a good command of the language but also flexible and unique behaviours which are different from those of monolingual L1 and L2 speakers. Effective L2 users may not speak just like monolingual L1 or L2 speakers, nor think and behave in the same way as monolinguals do. But it is not a deviation from the monolingual standards, nor wrong.

Secondly, the multi-competence framework challenges the argument for avoiding L1 use in the L2 classroom. Along with the tradition of communicative

language learning and teaching, it has been a leading idea to maximise the use of L2 while minimalising or principally avoiding the use of the L1 in the classroom. This idea forms the backbone of the foreign language teaching policy designated by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). They released *Action Plan to Cultivate Japanese with English Abilities* in March, 2003, which aims to improve English classes and to cultivate communication skills in English. It suggests that teachers of English should conduct classes principally in English and should create many situations where students can communicate with each other in English (MEXT 2003).

From a multi-competence perspective, however, two languages in mind form a total language system in many linguistic domains, rather than stored as two independent systems being interwoven. Therefore, the L2 classroom should be the place where the L2 users can fully function with their total language system. Also judging from the context in Japan, where L2 users share the same L1, L1 Japanese can be effectively and systematically used to convey and check meaning of words or sentences, explain grammar, organise tasks, maintain disciplines, gain contact with individual students and so on (Cook 2001). Teachers do not have to feel guilty about using the L1 in the classroom. This does not mean, needless to say, that an English class can or should be conducted totally in the L2 user's L1. The principle aim of the positive introduction of the L1 in teaching L2 is, as Cook (2001) says, to produce L2 users who are able to operate with a holistic language system of languages as genuine L2 users, not as imitation natives.

Lastly, the multi-competence perspective also awakes thoughts about the goals of teaching/learning an L2. The goals can be both external and internal. Aoki

(2010) warns that communicative language teaching has placed too much emphasis on external functions of language, that is, practical use of the target language, and has paid little attention to internal linguistic functions related to cognition, thought and judgment. Internal goals can be better cultural attitudes and greater cognitive flexibility which relate to the academic and educational goals of the classroom itself. In Japan, where few students expect to use English for real communication in their daily life, acquiring communication skills in English for future use seems to be practically only one goal as representatively shown in the action plan published by the MEXT. In fact, the overall goals of English education in Japan are indicated in *The Course of Study for Foreign Languages* as developing practical communication abilities, and promoting positive attitudes towards foreign languages or cultures is incorporated as one of the goals of English education in Japan (MEXT 2003). One of the major insights from the multi-competence perspective is the idea that teaching needs to take more account of "the internal goals involving changes in the students' minds" (Cook 2002b, p. 339).

This research has shown effects of English learning on cognition in Japanese learners of English. Then acquiring a 'multi-cognitive' (Murahata 2010) perspective can be one of the internal goals of learning L2, through which it will be possible to further study cross-cultural communication and solve problems caused there. For example, it may contribute to answer the questions why Westerners or English speakers and East Asians or Japanese sometimes misunderstand each other or why Japanese speakers do not look at things as the way English speakers do (Nisbett 2003).

7.3 Limitations of the Research and Suggestions for Further Study

7.3.1 *Limitations of the present research*

There are two issues to be raised here. Firstly, this research has contributed to the field of multi-competence research by providing supporting evidence that JLEs tend to show different behaviours from JNSs in taxonomic categorisation as a consequence of learning English, which also supports the Sapir-Whorf Hypothesis, and thus it claims that JLEs are unique beings who are different from Japanese and English monolinguals. With these results, the main purpose of this study is accomplished. Having reviewed all of the results from the previous studies referred to in this study and the results of the present study, we can say that speakers of different languages behave differently in the taxonomic-thematic categorisation task, and that the languages they speak will bring about the differences. The results of the present study, however, do not decisively assert that there is a cause-effect relationship between the plural noun forms and the cognitive behaviours in the preferences of the taxonomic-thematic categorisation.

The reason of the scepticism comes from the comparatively weak relations between the linguistic form of generic expressions and the cognitive behaviours. JLEs indeed shift their categorisation behaviours as a consequence of learning English as they categorise objects in different ways after having reached a rather high proficiency level in English from novice learners. We have also discussed the theoretical background of how the zero article plural generic noun form seem to be related to taxonomic categorisation as Nisbett (2003) argues: that is, the plural noun form will enhance grouping objects with common properties into a category more effectively than the singular noun form. The relations between language and cognition in this case, however, are not as clear and strong as the studies by Lucy (1992) and Athanasopoulos (2006). To reiterate from Section 1.1.4, Lucy (1992) observed that English takes plural forms of

inanimate countable nouns while the Yucatec language does not. Then he used sets of six pictures containing animate and inanimate countable objects and substance objects. Five pictures of a set were different from the target picture in number and amount of the objects depicted in them. The English speaking and Yucatec speaking participants were asked which of the five pictures was most like the target one. The results revealed that Yucatec speakers did not discern changes in the number of inanimate countable objects as often as English speakers. As well, to reiterate from Section 1.2.6, Athanasopoulos (2006) replicated the experiment between English speakers and Japanese-English bilinguals. Japanese is similar to Yucatec in that it does not pluralize inanimate nouns, either. Then he found that advanced Japanese learners of English had developed their sensitivity toward inanimate countable nouns, which supports the results of Lucy's (1992) and the multi-competence of JLEs.

In the two experiments above, different behaviours appeared between the two language groups are directly related to the inanimate countable noun from. In the present research, however, the taxonomic-relationship judgment task does not seem to be related to the plural noun form as directly as the picture matching task is related to the inanimate countable noun form. It is necessary, therefore, to continue to seek for some specific linguistic form which is assumed to be directly related to the enhancement of a taxonomic relationship. In order to clarify the relation between noun forms and taxonomic categorisation, it is necessary to examine the relation between the acquisition of the noun forms and taxonomic categorisation behaviours. Alternatively, it is necessary to find more evidence to support the correlation between the generic plural noun form and taxonomic categorisation among speakers of other languages besides English, Japanese and Chinese.

The second issue concerns the research approach, which is partly related to the first issue. This research took the behaviour-centred approach suggested by Lucy (1997) and started with confirmation of different behaviours between ENSs and JNSs, which led to explore whether different language forms between English and Japanese would give any effects to the behaviours. Experiment 3 in this study practically took the structure-centred approach, which started with the analysis of the languages and then went on to the experiment on behavioural differences (Lucy 1997), as the experiment was designed in order to examine how differently JNSs and ENSs would group objects as a consequence of acquiring contrastive noun forms in terms of number marking. The results of Experiment 3 were satisfactory and showed different cognitive behaviours of object grouping between ENSs and JNSs. The relevance, however, between the plural noun form and taxonomic categorisation still remains vague.

The difficulty to specify some linguistic forms related to different cognitive behaviours is a problem in taking the behaviour-centred approach. In the case of the counterfactual research started by Bloom (1981, 1984), who first noticed different behaviours between Chinese and English speakers in dealing with counterfactual events, there does not seem to be any big problem with the expected linguistic area, the counterfactual expressions using 'if'. How about the following case? Cross-cultural differences were reported in the perceptions of optical illusions, concluding that Europeans and non-Europeans show significant differences in susceptibility to geometric optical illusions (Segall et al. 1963). However, it is extremely difficult to specify any relevant area of grammatical features which may cause such illusions, if anyone would start research in the field of bilingual cognition. It may be possible to find that speakers of some language may shift their perception as a consequence of learning

another language, but it is never easy to speculate which part of the language may cause the shift.

For this reason of the difficulty of finding a specific relevant language area to the behavioural shift already found, we have to be extremely cautious in starting research with behavioural differences to investigate linguistic relativity or multi-competence. Lucy (personal communication, January 28, 2011) also expresses concern over this approach, saying studies using this approach "arise from an ad hoc observation of an interesting difference in behaviour and then engage LR (linguistic relativity) as one possible explanation," so tend to have "an opportunistic quality". Lucy (2011) excludes the behavioural-centred approach as a possible way to study linguistic relativity and multi-competence for the reason, though it was one of the three approaches he suggested in his earlier publication (Lucy 1997). There needs to be caution in pursuing the behavioural-centred approach. Also after all, the research needs to restart with theoretical comparison of the languages involved, thus eventually taking the structure-centred approach.

To conclude this section, the limitation of this research lies in the vague relevance between the linguistic form and the cognition, and further evidence is necessary to support the relationship between language and cognition in the area of the taxonomic-thematic categorisation.

7.3.2 *Further study*

The ideas of multi-competence have not yet spread widely in Japan. Getting to know about multi-competence surely provides new approaches to L2 learning and teaching. It also changes Japanese L2 learners' attitudes toward learning and teaching

including their self-images. By calling themselves ‘L2 users’ rather than ‘L2 learners’, they can be more confident in themselves using the L2. By bearing in mind that their knowledge of language is more than 100% because they have extra knowledge besides their L1 Japanese, they can have more positive images of themselves. Therefore, more evidence to support multi-competence of Japanese L2 users should be provided by exploring their bilingual mind. As follow-up research of the present study, it is interesting to investigate when JLEs will start to shift their behaviours on taxonomic-thematic categorisation along the acquisition of proficiency in English. Also a longitudinal study on how one person will shift his/her cognitive behaviours as he/she studies English must be another interest of researchers.

From another point of view looking at the cognitive shift in taxonomic categorisation, Gelman (2004) speculates that the amount and the frequency of generic expressions may foster essentialist reasoning by picking up essential points successfully in an argument and train successful summary making. If taxonomic categorisation and generic expressions are really related to each other, JLEs may improve their skills in summary making by learning English.

There are contrastive differences in language forms between English and Japanese, and further research can make it possible to reveal more cognitive shifts among JLEs as a consequence of learning English. For example, to cite a few, by learning the present perfect tense *John has been to Paris*, which is not in Japanese, do they shift their ways of looking at events by giving different judgments on how important and how relevant something is to what is going on now? By learning many descriptive words for ‘to walk’ in different ways such as *stride*, *stagger*, *march*, *totter*, and *wander* in English, for which Japanese needs to add some phrases, do they pay

more attention to the way they move from one place to another? By getting used to using only one word for a younger brother/sister and an older brother/sister, do they get to pay less attention to people's age? Such studies surely bring about new aspects of English learners, by which they recognise that learning another language does not only mean acquiring proficiency of the language, but it also means acquiring other ways of looking at the world, that is, multi-competence.

Chapter 8. Conclusions

This thesis first described the beginning, decline, revival and development of research over linguistic relativity in the 1950s to the 1990s (e.g. Bloom 1981; Brown & Lenneberg 1954; Carroll & Casagrande 1958; Ervin 1961; Lucy 1992) and introduced the ideas of multi-competence (e.g. Cook 1991). Multi-competence emerged at the right time when linguistic relativity started to attract attention again and much of SLA research has accumulated incidental evidence collected from bilingual speakers which supported the idea (e.g. Flege 1987; Laufer 2003; Obler 1982; Seliger 1989).

The aim of this thesis has been to investigate effects of English learning on cognition in Japanese learners of English (JLEs) from a multi-competence perspective. In order to do that, this study next reviewed the so-called West-East Paradigm originally found in social psychology, which claims that Westerners tend to pay comparatively more attention to salient objects and their properties independently from the context, and that East Asians tend to pay comparatively more attention to relationships among objects by taking the context into consideration (e.g. Kitayamaet al. 2003; Masuda & Nisbett 2001, 2006; Nisbett 2003). Based on those ideas, this study adopted the behaviour-centred approach (Lucy 1997) and first verified the multi-competence of JLEs through an experiment using the taxonomic-thematic triads. Previous research had shown that Chinese speakers and English speakers behaved differently in the taxonomic-thematic matching task (Chiu 1972; Nisbett 2003; Ji et al. 2004).

The present study showed, as predicted by the West-East Paradigm, that English native speakers (ENSs) tend to relate categorically-related objects more strongly than Japanese native speakers (JNSs) and further that JLEs tend to relate them

more strongly as they acquire higher proficiency in English, though it did not reveal different behaviours toward thematically-related objects. An additional experiment on Chinese learners of Japanese (CLJs) further supports the West-East Paradigm by showing that CLJs did not shift their categorisation behaviours. The important contribution of the present research to the West-East research is that it showed possible effects of language, rather than of culture as previously claimed (Ji et al. 2004), on the taxonomic categorisation in JLEs. This conclusion comes from the facts that this study used Japanese-English bilinguals, or JLEs, to show intra-personal effects of language, and that they shift their categorisation behaviour as they acquire higher proficiency in English by studying English almost solely in Japan with little exposure to English speaking environments.

The study further investigated which part of grammatical features of the languages was relevant to the different cognitive behaviours in taxonomic categorisation. Following Nisbett (2003), it explored generic noun forms which refer to categories in English and Japanese. Generic expressions are ambiguous by nature, but when they are compared in detail generic expressions are less ambiguous in English than in Japanese: English has the zero article plural generic noun such as *ducks,* while Japanese does not have such plural nouns to refer to categories. Thus the second experiment of the present study investigated how ENSs and JNSs would interpret generic expressions by replicating an experiment by Gelman and Tardif (1998).

The second experiment showed that ENSs interpreted plural generic nouns such as *horses* as generic more frequently than singular generic nouns such as *a kite*. Furthermore ENSs interpreted plural generic nouns as generic more frequently than JNSs. These results show a parallel relationship between the categorisation behaviours

and interpretation of generic noun phrases. That is, English speakers tend to relate taxonomically-related objects strongly because their language has a specific way to express a category in the plural form of the noun and hence they understand plural generic nouns more correctly. On the other hand, the Japanese language does not have such plural nouns to refer to categories, and hence the speakers are less likely to interpret generic nouns as generic and do not relate taxonomically-related objects as strongly as English speakers. Detailed analyses, however, revealed some possible flaws in the experiment stimulus sentences, which might have produced different results, and needed further confirmation.

The third experiment explored whether ENSs and JNSs would behave differently in the categorisation of objects as a consequence of acquiring a different way of referring to categories. Asked whether the same/similar objects could be called by the same name, ENSs tended to respond in a more affirmative way than JNSs, and JLEs at an advanced level behaved in between the two groups. Thus, this experiment also adduced evidence in support of the multi-competence of JLEs and showed they shift their ways of categorising objects to those of ENSs as a consequence of learning English, or possibly by acquiring a different way of referring to categories in English. As for different noun forms between English and Japanese, some studies have already confirmed the multi-competence of JLEs using a shape-material triads matching task (Cook et al. 2001; Athanasopoulos 2007), showing that they tend to show a stronger preference for shape over material in matching objects as they acquire high proficiency in English. The present research has revealed another area of cognitive activities among JLEs which they shift by learning English. The present study, therefore, adds to the accumulated evidence supporting the multi-competence of JLEs.

The three experiments showed parallel behaviours in taxonomic categorisation, interpretation of generic plurals, and shape categorisation among ENs, JNs and JLEs as Table 24 shows (p. 247). Thus the experiments brought forward evidence to possibly show that some grammatical properties of English and Japanese give effects on the way the speakers categorise objects, and that JLEs were different from both ENSs and JNSs because they have the two languages in their minds. They have left a concern, strictly speaking, on the legitimate correlation between the object categorisation and the noun forms. Thus further cross-linguistic studies are necessary to re-confirm that the plural noun forms give certain effects on taxonomic categorisation.

Lastly the findings of this study have valuable implications for English education in Japan by proposing a new perspective in the field to view JLEs as unique individuals with more than one language in their minds. Much emphasis on practical use of English has been placed in teaching/learning English, with the national aim of cultivating Japanese with English abilities (MEXT 2003). The multi-competence view, however, sheds light on internal goals of learning a foreign language involving cognitive shifts and leads JLEs to look at themselves not as failed native English speakers but as successful English users in their own right. Further investigation into the multi-competence of JLEs following the present research will surely help them realise that they are developing conceptual system that is unique in nature by acquiring another language in addition to their L1 Japanese, because, though moderately, "language is a guide to 'social reality'" (Sapir 1929, p. 162), and "we cut nature up, organize it into concepts, and ascribe significance as we do" (Whorf 1956, p. 213) by using the language we speak.

Appendices

Appendix A: Triads Used in Experiments on Cognitive Development of Children.

	Target	Taxonomic	Thematic
Smiley & Brown (1979)	Bird	Robin	Nest
	Needle	Pin	Tread
	River	Lake	Boat
	Net	Rope	Fish
	Sheep	Goat	Wool
	Bee	Butterfly	Honey
	Cow	Pig	Milk
	Crown	Hat	King
	Spider	Grasshopper	Web
	Dog	Cat	Bone
Markman & Hutchinson (1984)	Cow	Pig	Milk
	Ring	Necklace	Hand
	Door	Window	Key
	Crib	Adult bed	Baby
	Bee	Ant	Flower
	Hanger	Hook	Dress
	Cup	Glass	Kettle
	Car	Bicycle	Car tire
	Sprinkler	Watering can	Grass
	Paintbrush	Crayons	Easel
	Train	Bus	Tracks
	Dog	Cat	Bone
Waxman & Hall (1993)	Cup	Cup	Baby doll
	Shampoo bottle	Shampoo bottle	Baby doll
	Airplane	Airplane	Clown
	Bed	Bed	Smurf doll
	Shirt	Shirt	Teddy bear
	Cookie	Cookie	Cookie monster
	Carrot	Tomato	Rabbit
	Raincoat	Pants	Snoopy doll
	Chair	Table	Mimmie mouse doll

	Car	Boat	Adult figurine
	Brush	Comb	Raggedy Ann doll
	Bottle	“Sippy” cup	Baby doll
Waxman & Namy (1997)	Chocolate chip cookie	Oreo cookie	Cookie Monster
	White fish	Orange fish	Fish bowl
	Tulip	Daffodil	Vase
	Yellow shampoo	Pink shampoo	Doll
	White airplane	Red airplane	Person
	Blue bed	White bed	Smurf
	Blue car	White car	Key
	Carrot	Tomato	Rabbit
	Chair	Table	Minnie Mouse
	Tiger	Panda bear	Cage
	Grapes	Corn	Plate
	Sweater	Pants	Snoopy
	Boat	Car	Person
	Car	Jeep	Stop sign
Lin & Murphy (2001)	Cat	Lion	Litter box
	Spider	Wasp	Spider web
	French fries	Baked potato	Ketchup
	Panda bear	Grizzly bear	Bamboo
	Chalk	Marker	Blackboard
	King	President	Crown jewels
	Organ	Accordion	Church
	Tortilla chips	Potato chips	Salsa
	Pepperoni	Pork chops	Pizza
	Bees	Flies	Honey
	Camel	Antelope	Desert
	Crib	Water bed	Baby
	Police car	Sedan	Police officer
	Pencil	Pen	Eraser
	Hollywood	Chicago	Movie stars
	Monastery	Synagogue	Monk
	Can opener	Bottle opener	Can

	Diamond ring	Bracelet	Engagement
	Michael Jordan	Babe Ruth	Basketball
	Robbery	Treason	Bank
	Beer	Juice	Party
	Airplane	Car	Pilot
	Swimming	Golf	Swimming suit
	Hawaii	Missouri	Beach
	Milk	Soda	Calcium
	Saxophone	Harp	Jazz
	Turkey	Swan	Thanksgiving
	Waitress	Stewardess	Restaurant
	Igloo	Cabin	Eskimo
	Hot dog	Steak	Mustard
	Cow	Buffalo	Farm
	Pig	Dog	Barn
	Toothbrush	Hairbrush	Teeth
	Coconut	Pineapple	Palm tree
	Movie theatre	Opera house	Popcorn
	Penguin	Goose	The Antarctic
	Cactus	Willow	Dry climate
	Ambulance	Fire truck	Stretcher
Blaye & Bonthoux (2001)	Ball	Teddy bear & rocking horse	Foot ball & sport shoes
		Building blocks & puppet	Girl & dog
	Boots	Trousers & blouson-style jacket	Hat & horse saddle
		Scarf & shirt	Riding cap & spur
	Axe	Shovel & hammer	Log & stump
		Screwdriver & pliers	Leafless tree & bundle of wood
	Lion	Bird & giraffe	Tamer & whip
		Dog & ape	Tamer (woman) & cage
	Orange	Carrots & grapes	Bowl & spoon
		Water & meat	Teapot & bread

	Apple	Carrots & pineapple	Ladder & basket
		Banana & cheese	Knife & basket
	Rake	Wrench & saw	Sun hat & beach umbrella
		Hammer & scissors	Sand castle & swim suit
	Gloves	Pants & hat	Snowman & skis
		Shirt & sweater	Scarf & ski sticks
	Towel	Jumper & socks	Tooth brush & comb
		Dress & shirt	Bath robe & hairbrush

Waxman & Markow (1995)	Experiment 1			
	Green car	Orange car	Blue car	Red car
	Green airplane	Orange airplane	Blue airplane	Red airplane
	Brown & white cow	Light brown cow	White & brown cow	White cow
	Green dinosaur	Light brown dinosaur	Dark brown dinosaur	Gray dinosaur
	Brown horse	Orange tiger	Brown bear	Panda
	White roadster	Black sports car	Green truck	Red airplane
	Red hammer	Blue wrench	Green pliers	Orange saw
	Blue dog	Yellow lion	Red duck	Blue bear
	Experiment 3			
	Red car	Green car	White car	Orange car
	Red airplane	Green airplane	White airplane	Orange airplane
	Green & yellow horse	Yellow & purple horse	Yellow & purple horse	Blue & pink horse
	White & purple cat	Pink cat	White cat	Purple cat
	Blue bear	Red duck	Yellow lion	Blue dog
	Green pear	Red apple	Yellow banana	Orange
	Yellow screwdriver	Blue wrench	Red hammer	Orange saw
	Yellow helicopter	Blue airplane	Red van	Pink car

Appendix B: Materials Used in Experiment 1A, B, and C: Taxonomic-Thematic Categorisation Judgments

[Questionnaire]

<English>

Questionnaire on your background

1. Age _____
2. Gender （ Male / Female ）
3. Occupation _____
4. First language _____
5. Nationality _____
6. How long have you been in Japan? _____ years _____ months
7. Have you studied Japanese before? If yes, how long?

   Yes. No.

   _____ years _____months
8. Proficiency level of Japanese

   Beginner / intermediate / advanced

(Please write the grade you have passed in the Japanese language proficiency test, if you have taken . Grade _____)

9. Have you learned any other language? _____

If yes, how do you describe your proficiency level of the language?

Beginner / intermediate / advanced

Thank you very much for completing this form.

If you are curious about this experiment, and want to know the results, I will let you know them around the end of September. So please write your contact (postal or email) address.

I (want / don't want) to know the results.

Send them to _____.

<Japanese>

英語の学習などに関するアンケート

１．　あなたの年齢　_____才

２．　あなたの性別　（　男　・　女　）

３．　あなたの母国語　_____

４．　あなたが英語の勉強を始めた年齢　_____才

５．　今までに英語の勉強をしてきた長さ（空白の期間があれば、それは除いて合計の期間を書いてください。また、公共機関での正規の学習に限りません。）

_____年_____か月

６．　今までに英語を話す国や地域で長期（一ヶ月以上）に滞在したことはありますか。

（　有　・　無　）

６－１．上の６番で「有」と回答した人は、その期間の長さ（間に帰国していた期間があれば、合計の期間を書いてください。）

＿＿＿＿＿＿年＿＿＿＿＿＿か月

６－２．上の６番で「有」と回答した人は、いつ頃のことですか？

＿＿＿＿＿＿＿年前

７．　職業（現在の職業を書いてください。また今までの職業もよろしければ、書いてください。）　＿＿＿＿＿＿＿＿＿＿＿

８．　現在どの程度英語を使ったり、あるいは聞いたり、読んだりしていますか。英語に触れている時間を書いてください。

一週間に　＿＿＿＿＿　（時間）

９．英語以外に外国語の学習をしたことがありますか？あれは、その言語と期間をお答え下さい。

言語＿＿＿＿＿＿＿＿＿＿　　学習期間＿＿＿＿＿＿＿＿年

ご記入ありがとうございました。

この実験の結果をお知りになりたいという方には、簡単な結果をお知らせしますので、結果報告の希望と連絡先をご記入の上、村端にお渡し下さい。結果のお知らせは、申し訳ありませんが諸々の事情で9月ごろになると思われます。

・ 結果を　（　知りたい　／　知りたくない）

・ 結果は次のところに連絡してもらいたい　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

実験のご協力、どうもありがとうございます。

この実験のデータは大変貴重なものです。大切に扱わせていただきます。

<Chinese>

学外语问卷调查表

请回答下列问题:

1．年龄:_____ 岁。

2．性别(画圈): 男 女

3．现在的身份是(画圈): 大学生 1 2 3 4 (年级)

学习日语情况:

4. 开始学日语时,年纪多大?_____ 岁。

5．通过了第几级“日本语能力检定试验”?_____ 级。

学习英语情况:

6．开始学英语时,年纪多大?_____ 岁。

7．一共学了多少年英语?_____ 年。

8. 当年高考时的英语成績为 _____ 分。

9．考入本大学后、学习英语的频度。(画圈)

每天 有时 几乎没有 完全没有

谢谢合作!

[Instructions and triads]

<English>

Research on perception

(Asking for your participation)

This research is on people's perception and it aims to see how people look at objects around them.

You will find sets of three items on the following pages. There are a target item in the center square and two items on both sides in each set.

How close is the target item to each of the other two items in your mind? Choose the number from 1 to 5 as shown below.

1 : Very far

2 :

3 :

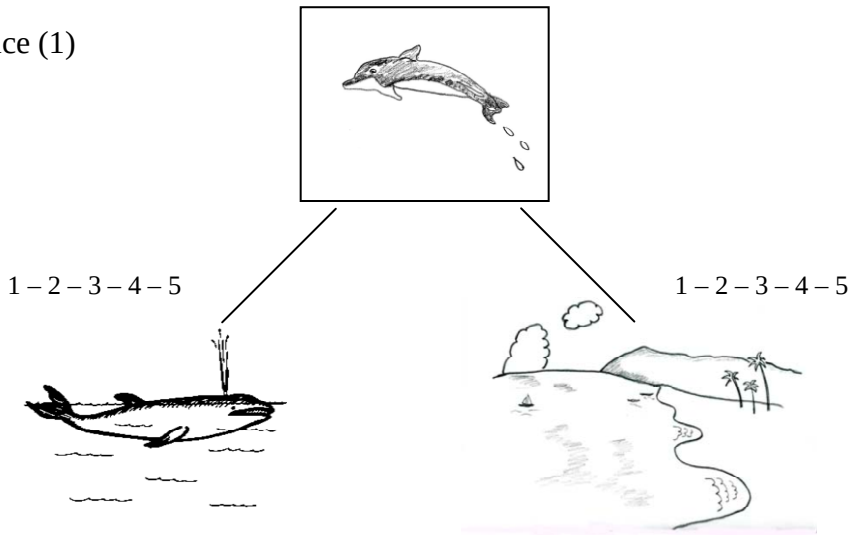
4 :

5 : Very close

(Circle the number you have chosen.)

The first three sets are for practice.

Practice (1)

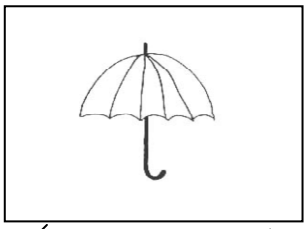


Practice (2)

1 – 2 – 3 – 4 – 5

1 – 2 – 3 – 4 – 5

Practice (3)



1 – 2 – 3 – 4 – 5

1 – 2 – 3 – 4 – 5

This is the end of the practice part.

If you have any question, please feel free to ask before you go on to the next part.

<Japanese>

「もの」の見方に関する調査

（協力のお願い）

これは、ヒトが身の回りにある「もの」をどのように結びつけて見ているのか、関する実験です。

この実験では、三つの「もの」が一組となっています。中央の四角の中に中心となるものがあり、その左右に二つのものがそれぞれ描かれています。

四角の中のものは、あなたの頭の中で左右のものとどの位近くにありますか。その程度を次のように１～５の数字で表して下さい。

１：非常に離れている

２：

３：

４：

５：非常に近くにある

（あてはまる数字を○で囲んで下さい。）

最初の３問は練習です。

(Practice triads are omitted.)

次のページから、実際の実験テストが始まります。

この時点で、質問などがあれば、遠慮なく聞いて下さい。

<Chinese>

关于如何看“物”的实验调查

这是人与身边的物品有一种什么样的关系的实验调查。

在这里，由三样东西组成一组。以中间方框里的东西为中心，它的两边各有一样东西。

你觉得，四角里的东西，和其他两个，结合多强？请你用 1 至 5 的数字来表示。

1：结合很弱

2：

3：

4：

5：结合很强

（在数字上画圈）

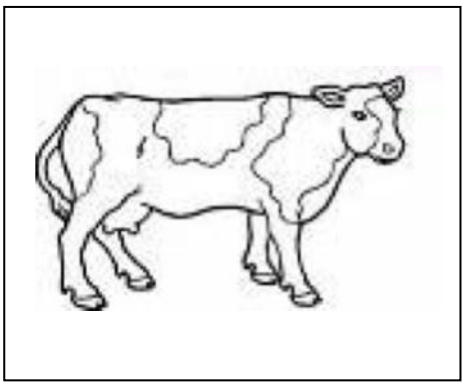
(Practice triads are omitted.)

从下一页开始为正式测试。如果有疑问的话，请现在提出来，不要客气。

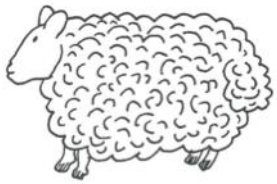
[Triads]

The target is at the center with its taxonomically-related object on the left and its thematically-related object on the right. Distracters are marked with # next to the number.

(1)



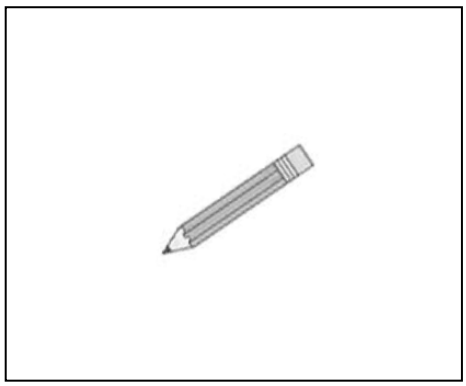
1 – 2 – 3 – 4 – 5

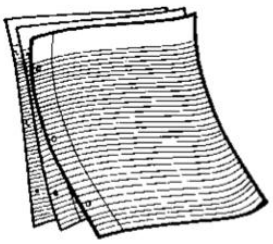


1 – 2 – 3 – 4 – 5

(The layout used for the experiment is omitted below.)

(2)





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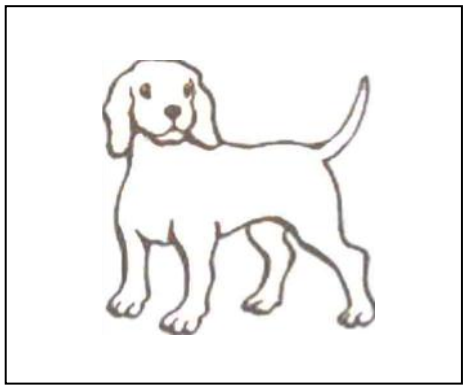

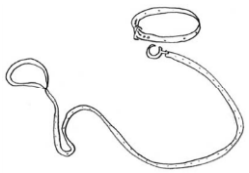

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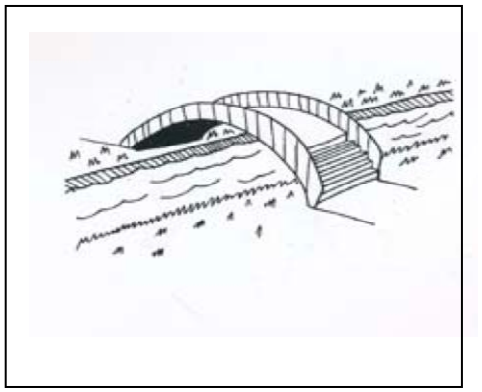

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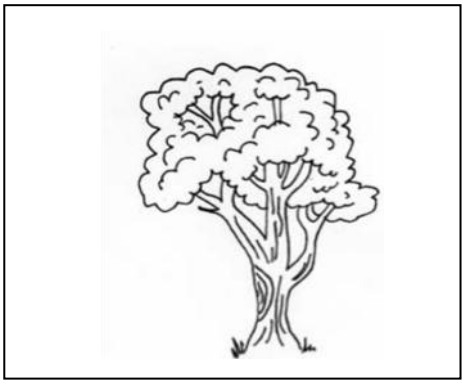

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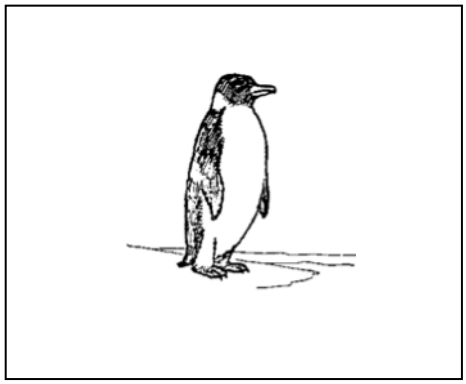

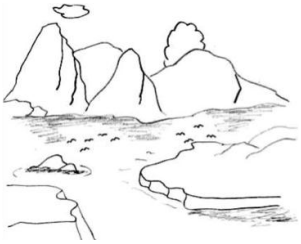

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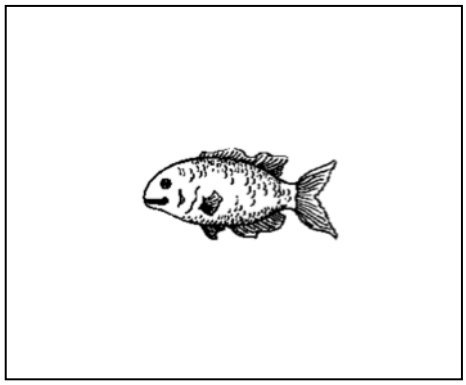

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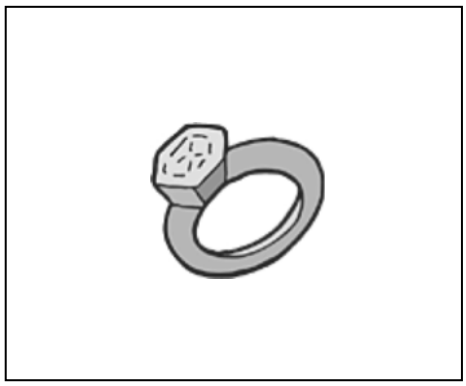

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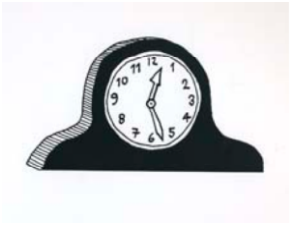

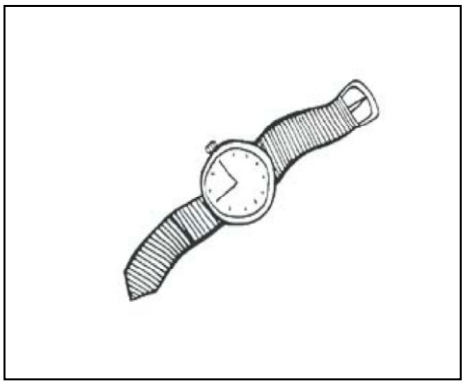

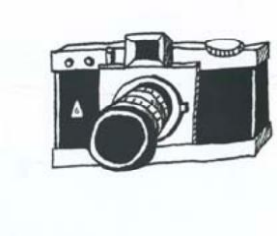

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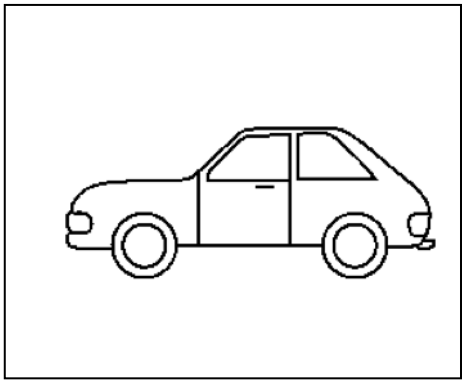

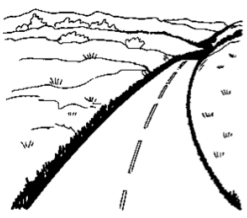

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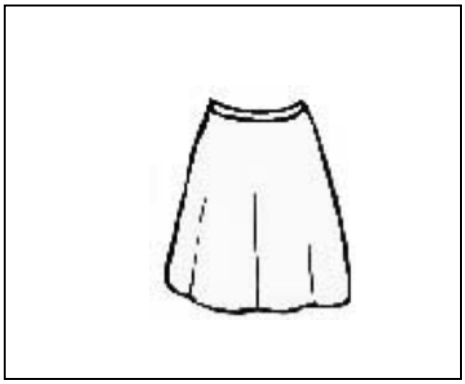

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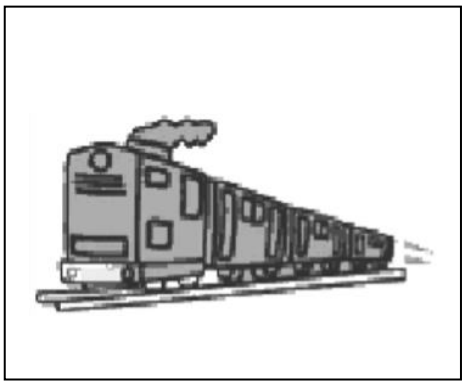

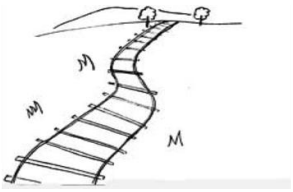

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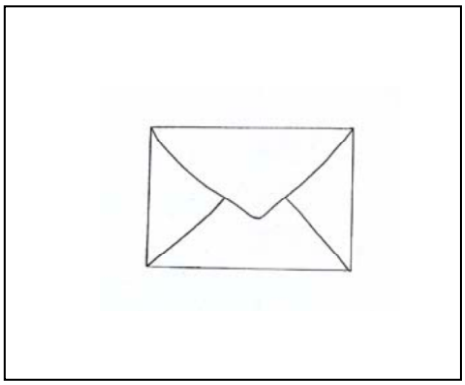

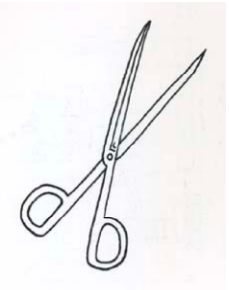

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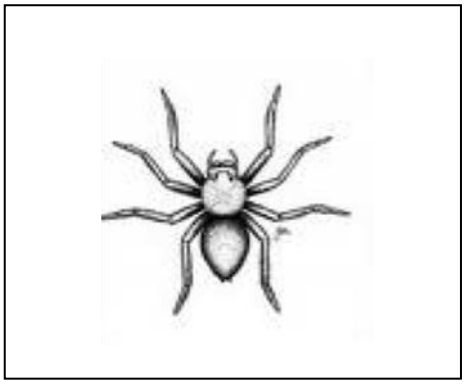

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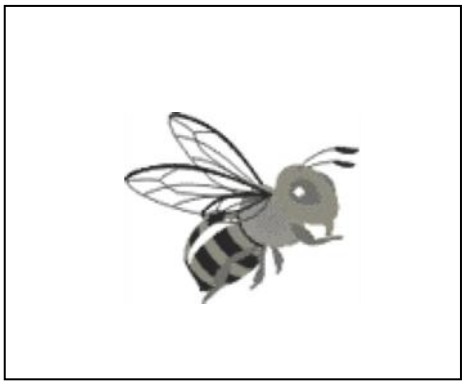

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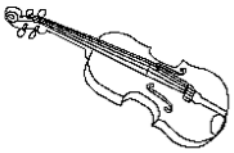

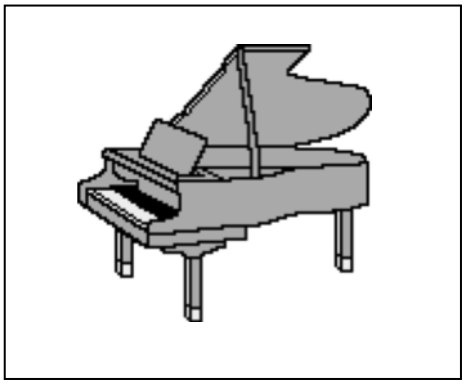

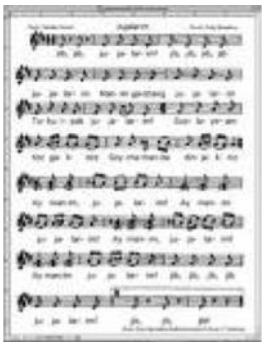

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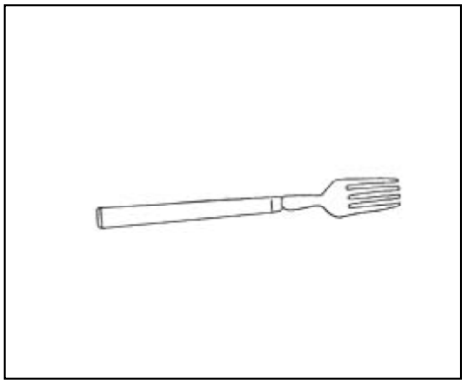

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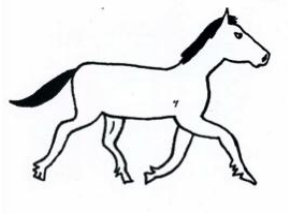

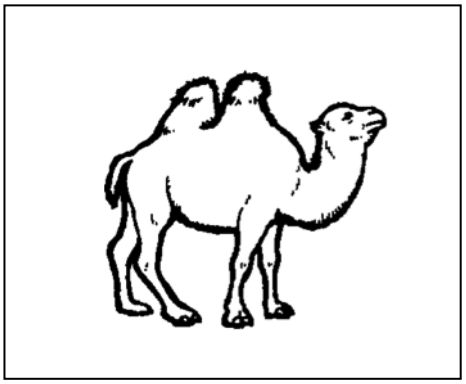

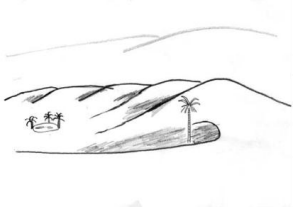

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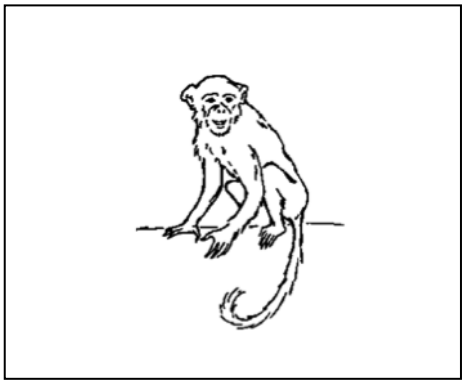


(20)

The stimuli pictures were taken from Druks and Masterson (2000), and also taken online from "Stimuli used in IPNP Studies" (available from http://crl.ucsd.edu/~aszekely/ipnp/1stimuli.html), "Clip Art Factory" (available from http://www.printout.jp/clipart/index.html), and some were drawn by the author.

Appendix C: Materials Used in Experiment 2: Interpretation of Generic Expressions

<English>

Questionnaire (Survey)

This is a survey how you understand language in everyday life. There is no right or wrong answer because the sentences here are ambiguous. So please just show how you feel.

Read the following sentences from 1 to 16, and think about what the underlined part refers to. Please choose one description that you think best describes the part and circle it.

(Ex.) We used to have some goldfish when I was small.

A. It refers to one goldfish. (B) It refers to a few goldfish.

C. It refers to many goldfish. D. It refers to goldfish in general.

1. A horse says neigh.

A. It refers to one horse. B. It refers to a few horses.

C. It refers to many horses. D. It refers to horses in general.

2. The butterfly is not dancing anymore.

A. It refers to one butterfly. B. It refers to a few butterflies.

C. It refers to many butterflies. D. It refers to butterflies in general.

3. A kite goes flying in the sky.

A. It refers to one kite.
B. It refers to a few kites.
C. It refers to many kites.
D. It refers to kites in general.

4. You roar like a lion.

A. It refers to one lion.
B. It refers to a few lions.
C. It refers to many lions.
D. It refers to lions in general.

5. My brother likes dinosaurs.

A. It refers to one dinosaur.
B. It refers to a few dinosaurs.
C. It refers to many dinosaurs.
D. It refers to dinosaurs in general.

6. The little billy goats lived on the side of the valley.

A. It refers to one goat.
B. It refers to a few goats.
C. It refers to many goats.
D. It refers to goats in general.

7. These little wheels go round and round.

A. It refers to one wheel.
B. It refers to a few wheels.
C. It refers to many wheels.
D. It refers to wheels in general.

8. Did you see the bugs?

A. It refers to one bug.
B. It refers to a few bugs.
C. It refers to many bugs.
D. It refers to bugs in general.

9. The tractor doesn't have a nose.

A. It refers to one tractor.
B. It refers to a few tractors.
C. It refers to many tractors.
D. It refers to tractors in general.

10. Hey silly frog!

A. It refers to one frog.
B. It refers to a few frogs.
C. It refers to many frogs.
D. It refers to frogs in general.

11. What do you do with a teapot?

A. It refers to one teapot.
B. It refers to a few teapots.
C. It refers to many teapots.
D. It refers to teapots in general.

12. Bunny rabbits don't make noises, do they?

A. It refers to one bunny rabbit.
B. It refers to a few bunny rabbits.
C. It refers to many bunny rabbits.
D. It refers to bunny rabbits in general.

13. Can you hand me the purple blocks?

A. It refers to one block.
B. It refers to a few blocks.
C. It refers to many blocks.
D. It refers to blocks in general.

14. Come and sit in your chair.

A. It refers to one chair.
B. It refers to a few chairs.
C. It refers to many chairs.
D. It refers to chairs in general.

15. Hammers are for pounding (nails).

A. It refers to one hammer.　　B. It refers to a few hammers.

C. It refers to many hammers.　　D. It refers to hammers in general.

16. Do you like roses?

A. It refers to one rose.　　B. It refers to a few roses.

C. It refers to many roses.　　D. It refers to roses in general.

Thank you very much for your cooperation.

Lastly I'd like to ask your;

Age:_____

Gender: (M　F　)

Native language: (English　　Other _____)

<Japanese>

日本語の意味の受け止め方に関するアンケート調査

高知大学非常勤講師　村端佳子

これは、皆さんが日頃どのような感覚で日本語を理解しているのか、に関する調査です。ここにある文章はもともと意味が曖昧ですから、正しい答えというのはなく、あくまでも皆さんの受け止め方を知るためのものです。感じたままを直感的に答えて下さい。

問（1） 次の１．から１６．までの日本文を読んで、下線部の箇所は、（ア）（イ）（ウ）（エ）のどれにあたると思われますか。一つだけ選んで、その記号に丸をつけてください。

（例）子どもの頃金魚を飼っていた。

（ア）一匹の金魚のことを言っている

（イ）数匹の金魚のことを言っている

（ウ）たくさんの金魚のことを言っている

（エ）金魚について一般的なことを言っている

1. 小さなヤギは谷の斜面に住んでいました。

(ア) 一頭のヤギについて言っている

(イ) 数頭のヤギについて言っている

(ウ) たくさんのヤギについて言っている

(エ) たいていのヤギについて一般的なことを言っている

2. チョウチョはもう踊っていません。

(ア) 一匹のチョウチョについて言っている

(イ) 数匹のチョウチョについて言っている

(ウ) たくさんのチョウチョについて言っている

(エ) たいていのチョウチョについて一般的なことを言っている

3. 紫色のブロックを取って下さい。

(ア) 一個のブロックのことを言っている

(イ) 数個のブロックのことを言っている

(ウ) たくさんのブロックのことを言っている

(エ) たいていのブロック一般のことを言っている

4. あなたの怒鳴り声はライオンのようだ。

(ア) 一頭のライオンのことを言っている

(イ) 数頭のライオンのことを言っている

(ウ) たくさんのライオンのことを言っている

(エ) たいていのライオン一般のことを言っている

5. おーい、おバカなカエルさんよ。

(ア) 一匹のカエルに呼びかけている

(イ) 数匹のカエルに呼びかけている

(ウ) たくさんのカエルに呼びかけている

(エ) 一般的なたいていのカエルに呼びかけている

6. ウマはヒヒーンといななく。

(ア) 一頭のウマについて言っている

(イ) 数頭のウマについて言っている

(ウ) たくさんのウマについて言っている

(エ) たいていのウマについて一般的なことを言っている

7. 友達は恐竜が好きだ。

(ア) 一頭の恐竜のことを言っている

(イ) 数頭の恐竜のことを言っている

(ウ) たくさんの恐竜のことを言っている

(エ) たいていの恐竜一般のことを言っている

8. きゅうすは何に使いますか。

(ア) 一個のきゅうすについて言っている

(イ) 数個のきゅうすについて言っている

(ウ) たくさんのきゅうすについて言っている

(エ) たいていのきゅうすについて一般的なことを言っている

9. こちらに来て椅子にかけなさい。

(ア) 一脚の椅子を指している

(イ) 数脚の椅子を指している

(ウ) たくさんの椅子を指している

(エ) 一般的なたいていの椅子を指している

10. 凧（たこ）は空を舞う。

(ア) 一枚の凧について言っている

(イ) 数枚の凧について言っている

(ウ) たくさんの凧について言っている

(エ) たいていの凧について一般的なことを言っている

11. トラクターには先端部分がついていません。

(ア) 一台のトラクターについて言っている

(イ) 数台のトラクターについて言っている

(ウ) たくさんのトラクターについて言っている

(エ) たいていのトラクターについて一般的なことを言っている

12. 小さな車輪がグルグル回るのです。

(ア) 一個の車輪について言っている

(イ) 数個の車輪について言っている

(ウ) たくさんの車輪について言っている

(エ) たいていの車輪について一般的なことを言っている

13. あなたはバラがすきですか。

(ア) 一本のバラのことを言っている

(イ) 数本のバラのことを言っている

(ウ) たくさんのバラのことを言っている

(エ) たいていのバラ一般のことを言っている

14. ウサギさんは鳴き声を出さないよね。

(ア) 一匹のウサギについて言っている

(イ) 数匹のウサギについて言っている

(ウ) たくさんのウサギについて言っている

(エ) たいていのウサギについて一般的なことを言っている

15. 金づちは釘（くぎ）を打つものです。

(ア) 一本の金づちについて言っている

(イ) 数本の金づちについて言っている

(ウ) たくさんの金づちについて言っている

(エ) たいていの金づちについて一般的なことを言っている

16. 虫が見えましたか。

(ア) 一匹の虫のことを言っている

(イ) 数匹の虫のことを言っている

(ウ) たくさんの虫のことを言っている

(エ) たいていの虫一般のことを言っている

ご協力どうもありがとうございました。

Appendix D: Materials used in Experiment 3: Shape Generalisation Test

The experiment was conducted on the personal computer (Macintosh: iMac G4, 14-inch display) as follows.

<English>

Thank you very much for your cooperation.

This slide show proceeds automatically.
Please don't touch the PC
unless you are asked to do so.

Write your responses on the sheet provided.

Twenty pictures of objects will be shown.

They are all in unfamiliar shapes.

The objects will be given names.

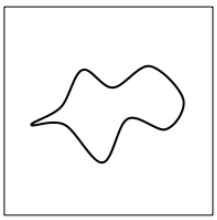
You will see another picture right after that.

Please decide
if the objects in the second picture
can be called the same name or not,
and judge it on a 5-point scale as follows:

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

Now look at an example.

(Example) This is a "tabol".



Now you will see another picture. Look at the
picture and decide if you can call it a "tabol".

(Example) Is this a "tabol"?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

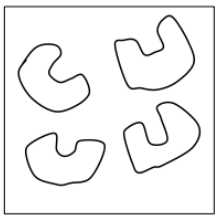
Now try some examples
and write your responses on the sheet for practice.

You will see Practice 1, 2, and 3.

The slides will change every three seconds.

（Practice 1） This is a “tarf”.

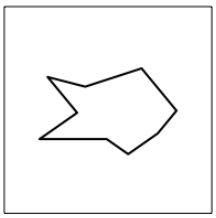
(Practice 1) Are these “tarfs”?



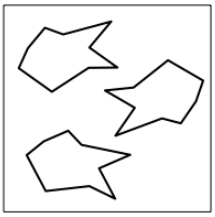
Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

(Write your response to Practice 1.)

（Practice 2） This is a “dak”.



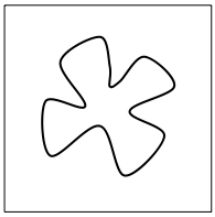
(Practice 2) Are these “daks”?



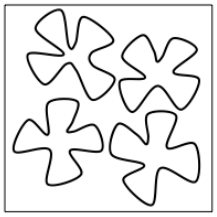
Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

(Write your response to Practice 2.)

（Practice 3） This is a “maffe”.



(Practice 3) Are these “maffes”?



Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

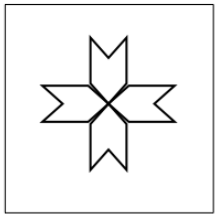
(Write your response to Practice 3.)

That's all for the sample practice.

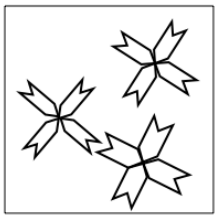
Now we will start the main part.

Press the 'return' key, when you are ready.

1. This is a "nibe".



1. Are these "nibes"?



Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

(Write your response to 1.)

Below are the objects sheets only.

2. This is a "kabet".

2. Are these "kabets"?

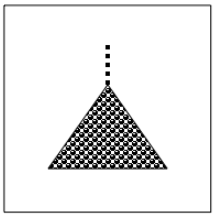
Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definite 5

3. This is a “moiyer”.

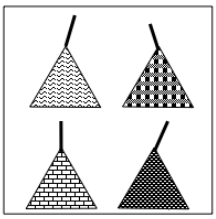
3. Are these “moiyers”?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

4. This is a “camf”.



4. Are these “camfs”?



Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

5. This is a “kidal”.

5. Are these “kidals”?

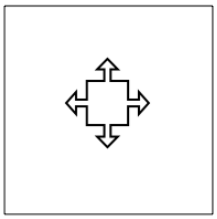
Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

6. This is a “yone”.

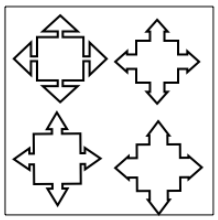
6. Are these “yones”?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

7. This is a “reme”.



7. Are these “remes”?



Definitely not — Probably not — Maybe — Probably — Definitely

1 — 2 — 3 — 4 — 5

8. This is an “effice”.

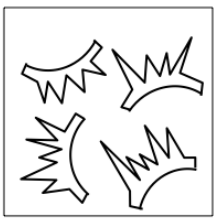
8. Are these “effices”?

Definitely not — Probably not — Maybe — Probably — Definitely

1 — 2 — 3 — 4 — 5

9. This is a “terrer”.

9. Are these “terrers”?



Definitely not — Probably not — Maybe — Probably — Definitely

1 — 2 — 3 — 4 — 5

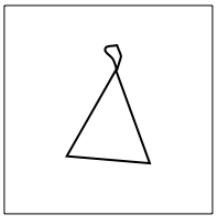
10. This is an “apog”.

10. Are these “apogs”?

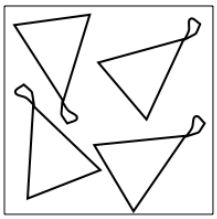
Definitely not — Probably not — Maybe — Probably — Definitely

1 — 2 — 3 — 4 — 5

11. This is a “mamit”.

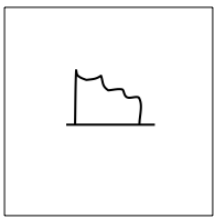


11. Are these “mamits”?

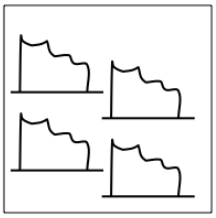


Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

12. This is a “tisee”.

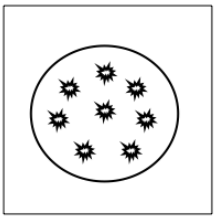


12. Are these “tisees”?

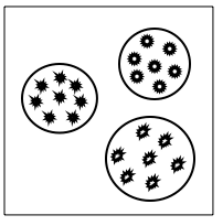


Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

13. This is a “fisle”.



13. Are these “fisles”?



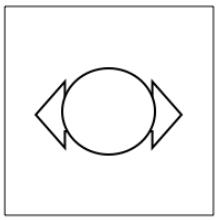
Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

14. This is a “kishy”.

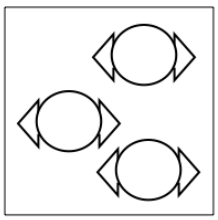
14. Are these “kishies”?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

16. This is a “falm”.

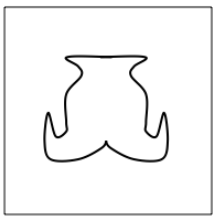


16. Are these “falms”?

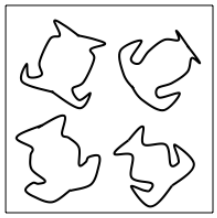


Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

15. This is a “nimute”.



15. Are these “nimutes”?



Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

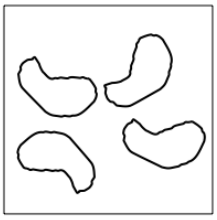
17. This is a “shtate”.

17. Are these “shtates”?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

18. This is a “kalif”.

18. Are these “kalifs”?



Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

19. This is a “rubek”.

19. Are these “rubeks”?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

20. This is a “vite”.

20. Are these “vites”?

Definitely not 1 — Probably not 2 — Maybe 3 — Probably 4 — Definitely 5

<Japanese>

ご協力ありがとうございます。

自動的に進みますので、特定の指示がない場合に
はコンピューターには触れないでください。

回答はお手元の用紙にお願いします。

これから２０個の絵をお見せしますが、
それらはあまりなじみのない形をした物です。

その形にそれぞれ名前を付けていきます。

次に別の絵をお見せします。

２枚目の絵に描かれたものは、１枚目のものと同じ名前で呼ぶことができるかどうか、つぎのように５点法で判断し、選んだ数字に○をつけてください。

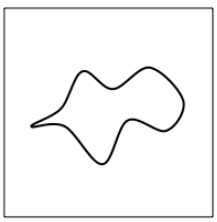
そうではない — どちらともいえない — そうである

たぶんそうではない — たぶんそうである

1 — 2 — 3 — 4 — 5

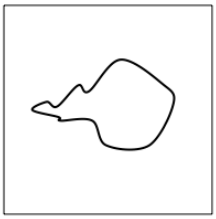
では、始める前に次の例を見てください。

（例）これは「たぼる」です。



次に、別の絵が出てきます。それを見て同じ名前
で呼べるかどうかを、判断してください。

（例）これは「たぼる」ですか？



そうではない　　どちらともいえない　　そうである

たぶんそうではない　　たぶんそうである

1 ——— 2 ——— 3 ——— 4 ——— 5

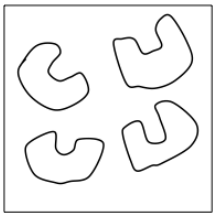
では、練習のために実際に判断をしてみて下さい。

練習１、練習２、練習３の絵が出ます。

画面は3秒ごとに切り替わります。

（練習１）これは「たるは」です。

（練習１）これらは「たるは」ですか。



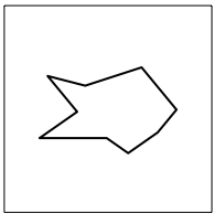
そうではない　　どちらともいえない　　そうである

たぶんそうではない　　たぶんそうである

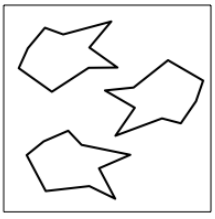
1 ——— 2 ——— 3 ——— 4 ——— 5

（練習１　の回答を記入して下さい。）

（練習２）これは「だか」です。



（練習２）これらは「だか」ですか。



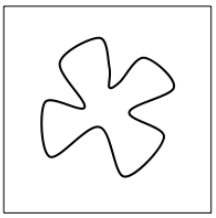
そうではない　　どちらともいえない　　そうである

たぶんそうではない　　たぶんそうである

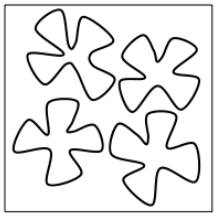
1 ——— 2 ——— 3 ——— 4 ——— 5

（練習２　の回答を記入して下さい。）

（練習３）これは「まふ」です。



（練習３）これらは「まふ」ですか。



そうではない　　どちらともいえない　　そうである

たぶんそうではない　　たぶんそうである

1 ——— 2 ——— 3 ——— 4 ——— 5

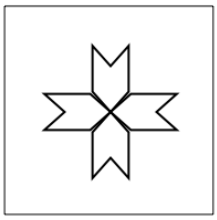
（練習３　の回答を記入して下さい。）

以上で練習は終わりです。

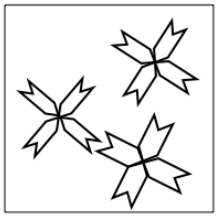
では、始めます。

よろしければ、<u>リターンキーを押して</u>ください。

1. これは「ないば」です。



1. これらは「ないば」ですか？



そうではない　　どちらともいえない　　そうである

たぶんそうではない　　たぶんそうである

1 ——— 2 ——— 3 ——— 4 ——— 5

（1　の回答を記入して下さい。）

(Further sheets are omitted.)

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