A Pilot Study into Metaphor Interpretation and Cross-Linguistic Influence of Food Terminology in Japanese Adult Learners of English (As a Foreign Language)

James Broxholme[*]

Department of Applied Linguistics, Kagawa University, Takamatsu, Japan

ABSTRACT

This is a pilot study into metaphor interpretation and cross-linguistic influence of food terminology in Japanese adult learners of English. The research investigated if Japanese adult learners of English think differently to native English speakers and if different features of language affect cognition.

The study used the domain of food as a theme to conduct cross-sectional experiments on 16 Japanese speaking adult subjects and 16 native English speaking adult subjects with similar variables. The experiments conducted within the research paper established a number of findings that suggest that language can affect cognition and identified several differences in the way the two subjects groups think about food. The results also highlighted the need for figurative speech, metaphor interpretation and cross-linguistic influence teaching materials to be incorporated into upper intermediate and advanced level adult learners of English curriculums to improve language competence.

Keywords: Food terminology; Japanese adult learners; Food

INTRODUCTION

This pilot study will look at metaphor interpretation and cross linguistic influences of food terminology in Japanese adult learners of English. The study will look at the relationship these factors play in language acquisition and how they influence learners cognition. The study will also make appropriate links to the current research literature and different schools of thought. The paper will consist of a three experiments to investigate how these factors play across two independent groups then discuss the results and implications for the future. Finally, the paper will end with a set of conclusions relating to the experiments.

Rationale and aims for the study

The study was born out of my own personal research interest in linguistic relativity and cognitive linguistics. As an English teacher in Japan for ten years I have seen a number conceptual difficulties occur in the classroom. I believe that some of these instances were as a result of cognitive differences relating to language and culture. In particular, I have experienced several reoccurrences where Japanese learners of English cannot clearly and comprehensibly express their first language concepts concerning food in their second language (English). Whilst as a teacher I often understanding the semantic meaning the learners wish to convey, the satisfactory translatable terms in English have often been left open and unanswered. In addition to this pattern I have also noticed that some Japanese learners of English have used very different choices of vocabulary to describe food items such as astringent (Shibui) and refreshing (Sappari) for food items that I would not consider to be natural choices in my own language. As such, when these occurrences do happen the age-old question does language affect thought or thought affect language has reappeared in my mind.

This paper aims to investigate some of these conceptual differences using the thematic domain of food and taste as a context for research. I will refer to some of the background literature linked to this topic in the following chapter and then discuss further in the methodology section. As Gleason stipulated language is not only the product of culture but also a symbol of culture. The paper will also look at how the language of food has the power to influence and embody cognition. The research conducted in this thesis will draw from numerous

related studies and experiments to hopefully add evidence to support that language does indeed influence cognition.

Research questions

This paper will use a number of experiments on Japanese adult learners of English and native English speakers to test the cognitive understanding of food related terminology. These tests have been inspired from other research papers on similar themes within the context of cross-linguistic influence and metaphor to answer the following two main research questions:

- Do people think differently?
- Do different features of language affect cognition?

The following section will look into the research context to help build a setting for the study.

Research context

This chapter will begin with an explanation of some of the key concepts in broad terms and then present and review research on similar studies more specifically relating to this paper's theme. As the title of this thesis is a pilot study into metaphor interpretation and cross-linguistic influence of food terminology in Japanese adult learners of English I will begin with some definitions to establish a context for the study. To do this we must first look at what metaphor and cross-linguistic influence are and then begin to see how they can affect adult Japanese learners of English. In order to look at metaphor we must however first understand that it is generally associated with the cognitive linguistics field and begin there.

What is Cognitive Linguistics (CL)?

Cognitive linguistics can be interpreted in a number of ways, however according to Littlemore it can be best understood as a cluster of approaches, unified by the shared outlook on the nature of language [1]. It can be seen as originating in the 1980's as a reaction to Chomskyan generative linguistics which believed that language was independent from other forms of cognition and that language acquisition requires a separate module of the mind. Cognitive linguistics fundamental beliefs according to Littlemore are as follows:

- There is no language acquisition device
- Language is usage based
- A single set of cognitive processes operate across all areas of language
- Words provide only a limited and imperfect means of expression
- Language is inherently meaningful

According to Evans language has the influence to do the following [2]:

- Language reflects embodied conceptual organization such as conceptual metaphors
- Language is a lens for conceptual organization in the mind such as reflecting organized principles of embodied cognition
- Language provides a mechanism for construal such as linguistically encoding the same situation in different ways

- Language influences non-linguistic cognition such as categorization, reasoning and problem solving

Langacker's contribution to cognitive linguistics is most commonly seen as his creation of Cognitive Grammar (CG). CG emphasises that grammar is not just a set of arbitrary set of rules instead grammar is in itself meaningful. It is seen as a structured set of patterns from our exposure to language which affects our conceptual understanding of the world. Some key tenets of CG include representing language in symbolic structures, construal, semantically defining grammatical classes and valence relations (*i.e.,* relationships between components and elements of language structures). See Langacker for further details [3].

Following on from this theme Cook discusses the link between how we think relates to what we say and the relationship between cognition and language. Cook states that one possibility is the way people think influences the language they use and the other is that language influences how people think or a combination of the two. As such does a second language user of a new language maintain their native language ways of thinking and concepts or think in a new born way of the two languages over time? In fact, the two research questions discussed in the introduction of this thesis are taken from Cook's influential work on the matter. In relation to the first research question 'do people think differently' between languages Cook looks at this in terms of the following categories [4].

- Visual perception
- Smell and taste
- Spatial orientation
- Objects and substance
- Color

Other areas of investigation discussed by Cook include the conceptualization of motion events between satellite-framed languages (e.g. English) in which verbs tend to express motion and path by prepositions in comparison with verb framed languages (e.g. French) which express path within verbs. Other investigations in to the relationship between language and cognition include the influence of grammatical gender *i.e.,* languages such as German and Spanish where vocabulary indicates a masculine or feminine cognitive association and the influence of classifier languages on how we categorise objects. Other investigations in CL have looked into how languages affect perception of causation relationships such as in accidental and deliberate events.

Additional experiments have also shown that new concepts can be learned through new language acquisition with examples such as the Casasola, Bhagwat and Burke experiment in which they introduced a new concept based on the Korean word Kkita roughly meaning tight fit to 18 month old English speaking children and then used a made up word to represent this concept in English. It was shown that the children quickly acquired the new concept after watching only a few videos representing the Korean Kkita relationship between objects. A further study by Bloom highlighted that Chinese-English bilinguals outperformed monolinguals in counterfactual

reasoning skills. This was related to an experiment in which Chinese-English speakers were able to distinguish and interpret certain conditional circumstances within a story which the monolingual Chinese speakers could not do so as their native language didn't distinguish certain conditional concepts either lexically or grammatically. Cook therefore argues if learning a second language makes reasoning easier then this makes it a language problem not one of race and culture [5].

Linguistic relativity

Relating to the topic of cognitive linguistics is the often controversial theme of Linguistic Relativity (LR). Linguistic relativity is of importance to this research paper as food terminology is often seen to be relative to the language and embody thought processes held within that language. LR refers to the notion that thought patterns or cognition do vary in in accordance with language. The LR hypothesis (although never originally referred to as a hypothesis) was articulated by Benjamin Whorf and his teacher Edward Sapir who introduced the term relativity stating that hidden fixed habits of speech guide our objective understanding of experience. It is a term that has become unpopular over the years due to misunderstandings and misinterpretations in the past. One such quote that has often been used and misinterpreted according to Everett is the following: [6]

Whorf recognised that even if you speak two or more languages fluently it is often difficult to translate ideas accurately between them and often concepts will be lost or missed. Within the so called hypothesis it should be noted that there are differing scales of acceptance in it for example strong form believers generally believe that thought is completely constrained and determined by the language sometimes known as linguistic determinism. This is emphasized in the Wittgenstein quote: 'The limits of my language mean the limits of my world.' Weaker versions of the hypothesis sway towards a more nuanced view that language influences thought rather than completely determines it which is more consistent with the term linguistic relativity. Sapir stated that the real world is to a large extent unconsciously built up on the language habits of the group and that language acts as an operating guide to culture. Many of the topics referred to in the previous section are therefore pertinent and interrelated to LR. Lucy offers a comprehensive background of linguistic relativity and language diversity and places the development into stages [7]. The following table is adaption of these stages (Table 1).

Table 1: History of linguistic relativity.

	Investigation type	Contributors
Whorf hypothesis (1940~)	Tracing connections between meaning structures and habitual thought	Sapir, Whorf
Anthropological linguistics (1950~)	Linking grammatical structures to broad cultural patterns	Hoijer
Research on lexicons (1950~)	Exploring small sets of lexical items	Brown and Lenneberg
Research on Grammar (1950~)	Exploring specific features of grammar	Carroll and Casagrande, Bloom
Current research (1990~)	Investigating the relationship between diversity in language and thought to establish patterns of perception, classification and memory	Lucy, Cook, Boroditsky,

The inaugural work of Whorf and Sapir who endeavored to understand cultures and languages different from their own provided a basic design for the various stages above.

Whorf's initial research on how Hopi (Uto-Aztecan language spoken in Arizona, United States) and English encode time differently provided a foundation in the comparison of language reality relationships. According to Lucy further work explored Whorf's proposals such as Hoijer who looked at the grammatical form of exotic languages such as Navajo motion verbs but failed compare cross linguistically. Since then other research has investigated codability of lexical items primarily surrounding color concepts such as Brown and Lenneberg's research and the exploration of grammatical patterns in Bloom's research on markers in Chinese and English briefly discussed in section 2.1. Lucy however notes that despite the renewed impetus by Piagetian developmental psychology and Chomskyan

generative linguistics since the late 1950's there is a lack of empirical research available to strengthen the evidence of LR and prove differences in thought occur as a result of language. Lucy identifies some of these defects as [8]:

• Only working in one single language.
• Privileging the categories of one language.
• Only dealing with marginal aspects of the language.
• Failing to provide direct evidence of individual cognition.

More recent studies according to Boroditsky have provided a body of evidence that suggests people's thinking about objects can be influenced by aspects of grammar that differ across languages [9]. Such examples include a cross-linguistic study of accidental and incidental events by English and Spanish subjects which showed evidence that whilst both speakers described intentional events equally, English speakers used more agentive language for accidental events e.g. She broke the vase compared

to Spanish subjects. This study suggests that eye witness memory may be influenced by the languages we speak. Another study by Fausey and Boroditsky showed the subtly of linguistic descriptions of accidents can influence how much people blame, based on the agentive and non-agentive language descriptions revealing linguistic framing can shape construal. A further study by Boroditsky indicated that English and Mandarin speakers talk about time differently in terms of horizontal (English speakers) and vertical (Mandarin speakers) and that Mandarin speakers concept of time can change depending on when they first began learning English [10]. An experiment in which English speakers were taught to talk about time vertically resulted in some bias to think vertically about time after the training took place. Additional patterns have been identified in some indigenous languages such as the Pormpuraaw showing that there are no linguistic terms for left and right indicating that speakers conceptualize their surrounding and environment using cardinal directions. Everett further claims the Piraha language (spoken by a tribe in South America) also has very distinct features consisting of a lack of numerals, concept of counting, quantification lexical terms such as 'all' 'each' 'every' 'most' and 'some', color terms and perfect tense. These differences according to Everett indicates a number of conceptual deficits or constraints compared to other language speakers which consequently affects cognition.

In summary LR is a controversial concept and has many inclinations. Despite this feature of the theory Everett argues that language is perhaps the most unique component of culture, the shared set of behaviors of a particular group of humans [11]. As such languages speakers can be seen as partially influenced by the language they speak to varying degrees and there is a growing body of evidence included in this section that helps support this hypothesis. The following section will look into the area of metaphor.

Metaphor

A fundamental premise of CL according to Littlemore is that the structuring and organization of language reflect the structuring and organization of cognition [12]. Metaphor which is associated with Lakoff and Johnson and their seminal work 'Metaphors we live by' primarily draws on similarity and substitution and shows in essence how we use lexis from one semantic area to think and talk about other areas and was influential in formulating the theory of Conceptual Metaphor Theory (CMT) [13]. This is of relevance to this study as metaphor has the potential to influence internal perception of our linguistic thoughts. Whilst most people associate metaphor with language or creative writing Latkoff argues that metaphor is pervasive in everyday life, not just in language but in thought and action. Littlemore also argues that the relationship between linguistic metaphors and human cognition is what differentiates this theory from the standard concept of metaphor.

Metaphor therefore is seen as reflecting concepts organized in our minds and these concepts often create and possess some kind of bodily basis which is called 'embodied cognition'. This conception of the world is then structured by various mental associations which is sometimes transferable across languages

and sometimes less so. Lakoff and Johnson identified a number of conceptual metaphors that underline our abstract concepts and the way we think about the world and ourselves. Examples of these include good is up, bad is down, argument is war, time as space, anger as heat and ideas are food. These metaphor types are further broken down but into additional but have not been included in this review. Despite this extremely influential research there have been a number of criticisms raised at some of the claims. These skeptics question the circularity in regarding linguistic metaphors as evidence of conceptual metaphor and the exaggeration that conceptual metaphor has on cultural understanding. In spite of this criticism, metaphor still has implications in the way our organisation of language is reflected in linguistic metaphor patterns and associations.

Another term that low considers of importance relating to metaphor is the concept of metaphoric competence. This can be seen as the ability of L2 learners to use and understand metaphor. Low proposes the Bachman model in which a number of sub-categories contribute to the overall communicative language competence including the ability of learners to interpret cultural references and figures of speech being significant. Low further emphasises this importance by using the confusing metaphoric example of 'the Japanese government increased tax on car imports to create a level playing field' to argue that without metaphoric competence the learner would be likely to treat this statement literally. To be metaphorically competent therefore would enable the learner to infer that the level playing field refers to a market place rather than a place where sports are played.

Unfortunately, other studies have provided inconclusive evidence on the relationship between metaphoric competence and communicative language ability. Another study by Littlemore indicated that communicative language ability was more dependent on a holistic cognitive style (*i.e.*, considering parts as a whole) rather than metaphoric competence.

Additional studies by Littlemore have investigated the ability of Bangladeshi students in interpreting metaphor again with mixed results. According to this particular study misinterpretation of metaphor appeared in accordance with cultural traits highlighted from a values study identifying areas of disparity. Additional suggestions by Deignan indicate that metaphors are culturally loaded expressions, whose meaning has to be inferred through reference to a shared cultural knowledge [14].

In summary, metaphor remains a complex issue for language learners and its relationship in helping achieve communicative competency is still unclear. Further research needs to be investigated to establish if metaphor is important for language learners. Despite the difficulties in establishing a correlating relationship there is strong evidence included in this section to suggest the features of metaphoric language can affect thought and cognition. The following section will review the related topic of cross linguistic influence.

Cross-linguistic influence

Cross-Linguistic Influence (CLI) has connections with CL, LR and metaphor and linked to many of the above topics. Cross-

linguistic influence can be interpreted as the influence of a person's knowledge of one language on that person's knowledge or use of another language. It is of relevance to this research paper as the impact of an L1 can have considerable influence on the perceptions and thought process of the acquisition of an L2. It is generally associated with interference or transfer of the L1 on the L2 in bilingual or multilinguals. It can be seen in terms of the interference in phonology, syntactic, lexical, discourse and pragmatic interference when attempting to speak a second language. An example of this in the context of Japanese learners of English could be the ら,り,る,れ,ろ influencing the pronunciation of L or R sounds in English or vowel based endings of the Japanese alphabet causing Japanese English learners to add an A,E,I,O,U to the end of English words. Examples of this could be bato instead of bat or recoodo instead of record. CLI can also lead to a hybrid of languages associating form and meaning by using the learners L1 knowledge subconsciously. Cross-linguistic influence looks at the relationship between the languages including the cognitive processes involved. Understanding this principle and how L2 learning can be influenced by a learners L1 background can provide opportunities for teachers to target attention to error prone areas whilst not pigeon-holing learners into problematic categories prior to thorough assessment.

There have been a number of phases of CLI research according to Jarvis and Pavlenko including [15]:

• Recognising transfer as a factor.
• Investigating the phenomenon as a primary process.
• Development of theories to explain phenomenon in relation to social, situational, mental constraints, constructs and processes.
• Development of precise physiological account of how the phenomenon takes place in the brain.

These phases overlap to a certain extent and have been recycled over the evolution of CLI but help to show the progression. The most recent stage is concerned with how the phenomenon takes place in the human brain is of particular relevance to this research paper. One other particular model of CLI that is particularly relevant to this paper is the Bachman and Palmer model which looks at transfer types across ten dimensions. This is seen in the below Table 2.

Table 2: Characterization of CLI types across ten dimensions.

Area of language knowledge/use	Intentionality
Phonological Lexical Semantic Morphological Syntactic Discursive Pragmatic Sociolinguistic	Intentionality Unintentionality

Directionality	Mode
Forward Reverse Lateral Bi-or multilingual	Productive Receptive

Cognitive level	Channel
Linguistic Conceptual	Aural Visual

Type of knowledge	Manifestation
Implicit Explicit	Overt Covert

Outcome: Positive or negative

Semantic prosody

As eluded to cognitive processes include categorization and pattern finding and that language is inherently meaningful. Consequently the concept of 'semantic prosody' is relevant in looking at word association. The term semantic prosody was first introduced by Sinclair to describe words contained in collocations that have positive and negative connotations connected to them. Sinclair researched *via* concordance lines allegedly neutral words such as happen and set in and realised *via* analysis that they had negative associations. With this in mind it is important to consider if similar words or phrases across languages have similar or different semantic meanings and positive or negative connotations. As language and thought are closely intertwined the long term schematic association towards

language items can therefore have influence over judgements.

In summary, semantic prosody can potentially transfer over cross-linguistically *via* mental representations held in learners L1 linguistic system over to the L2 subconsciously. As such certain linguistic patterns which are considered positive may not necessarily be so in an L2 however the schematic associations held in the speakers native language may transfer over.

MATERIALS AND METHODS

Type of research

Due to the research topic I decided to conduct an experimental, cross-sectional classroom based group study to test my hypothesis. To clarify terms experimental refers to a controlled experiment and cross-sectional refers to the individuals and groups in these experiments were compared at one moment in time only as opposed to a longitudinal study. I chose experimental data as I felt this would provide more substantial empirical evidence and a cross sectional snapshot in time study due to the time required in conducting a longitudinal study and

the pressure on participants. I do however have future plans to conduct a longer term process type experiment on changes in cognition in second language acquisition beyond this thesis. I chose to record largely quantitative data due to the objectivity of the data however have included some qualitative observation records to support a mixed research approach. Finally, I chose a classroom based study for controllability purposes to reduce unnecessary data blurring however realise there may be more ecological validity of *in-situ* type testing in the future.

Research setting and participants

To create a valid representative sample for generalizability I chose sixteen subjects of similar variables *i.e.*, Japanese nationals, female, between 30 to 70 years in age range, upper-intermediate to advanced level English speakers and of similar educational level (University graduates). As a comparison group I chose similar native English speaking subjects without the second language level variable included. These samples are highlighted in the Table 3 below.

Table 3: Thesis subject sample.

Nationality	Native language	Number of participants (N)	Minimum education level	Age	Gender
Japanese	Japanese	16	Graduates of University	30-70 years old	Female
Mixed	English	16	Graduates of University	30-70 years old	Female

The subject sample choice was to minimize the variable influences that might have skewed the results.

Type of study

The choice of primary research as discussed earlier in section 1.1 was based on my observations as a teacher encountering suspected cognitive differences of Japanese speakers when describing food in particular taste and texture. I have always been under the impression that Japanese speakers think differently about food to native English speakers and often have trouble translating their thoughts from their native language into English. I believe that this is not always to do with English language ability rather to do with cross-linguistic difficulties and non-transferability of concepts about food, flavour and taste (Figure 1). Thumbnails of the sixty pictures are found below:
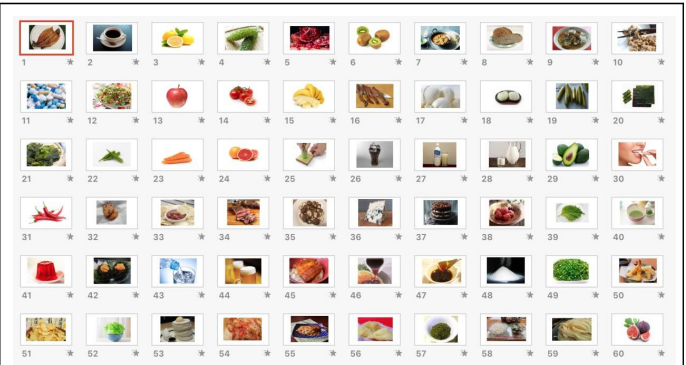

Figure 1: Food description pictures for test 1.

The metaphor test was a set of six sentences using the conceptual metaphor 'Ideas are food' from Lakoff's metaphors we live by to establish if the Japanese subject group could understand the metaphor meaning in the sentence [16].

The subjects would also be tested to see if they felt the metaphor terminology could be used in their own native language (Japanese) too. This test aimed to see if Japanese speakers have conceptual differences and think differently. The test results would then be analysed using the number of the correct answers to confirm the likelihood of conceptual metaphor's transferability between English and Japanese.

The final test was a figurative speech test consisting of eight gap fill sentences taken from the BNCorpus in which the subjects were required to fill in the blank with a multiple choice food related item. The list of sentences can be found in the Table 4 below.

Table 4: Figurative speech sentences used in test 3.

		Positive	Neutral	Negative
1	In a (pickle)			
2	Go (bananas)			
3	Cool as a (cucumber)			
4	Grain of (salt)			
5	(Pie) in the sky			
6	In a (nutshell)			
7	A lot on your (plate)			
8	(Spice) of life			

Procedure

Each test was carried out in a classroom environment setting and lasted approximately 45 minutes. Instructions were provided in English and Japanese in each questionnaire packet and each subject completed a demographic questionnaire about personal details to ensure the representative sample was consistent. The subjects were provided with reassurance that none of the personal data would be shared and it would be kept confidential.

Instruments for analysis

In order to analyse the data obtained from the test questionnaire results I used a number of descriptive statistics tools. I initially input the data into Office Excel and did some calculations such as mean, median, range and standard deviation scores using some of the available functions. For more complicated calculations such as t-tests and ANOVA tests I used online programmes for this. I used these tools in order to analyse the relationships between the two independent subject groups and answer the research questions mentioned above and to test my H^1. The following section will discuss the results and observations obtained from the set of tests [17].

RESULTS AND DISCUSSION

Food description test (Test 1)

Of the sixteen Japanese subjects a total of 498 different lexical words per test were produced by the group when they were shown the sixty food item photographs. This is in comparison to the English subject group with the same number of participants who produced a total of 416 lexical words to describe the food items. For the purpose of the experiment temporal descriptions such as slightly or very were disregarded. A comparison of the group's total tally is included in the Figure 2 below:
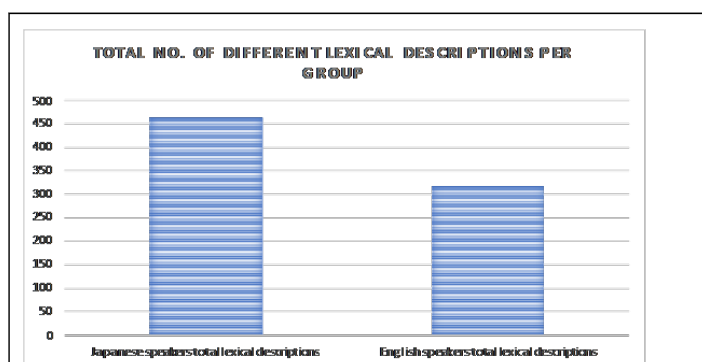

Figure 2: Total no. of different lexical descriptions per group.

This figure above shows a difference of 82 lexical items between the groups inferring a difference in the way the two groups think about food. There could potentially be cultural differences relating to the food culture consumption types within the two groups however this variable has been disregarded as it is beyond the scope of the language element to this study. This correlation indicates a lexical variability between the groups per 60 food items (or 960 in total) of 51.875% for the Japanese group compared to 43% for the English speaking group.

Possible contributing factors for this deficit in the English speaking group could be that English speakers think differently about food, flavour and taste or that there is a lack of vocabulary available to describe the differences in taste and texture. An alternative possibility could however be that the native English speakers in this experiment just do not generally describe food as much as Japanese speakers. Further individual data can be seen in Figures 3 and 4 below.
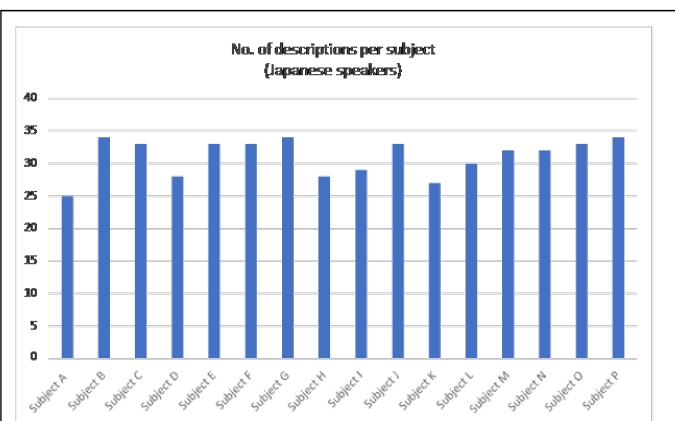
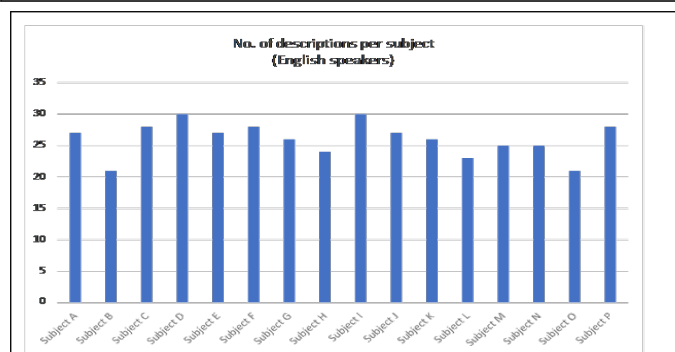**Figure 3:** No. of descriptions per subject (Japanese speakers).

Figure 4: No. of descriptions per subject (English speakers).

Despite this significant difference in the number of descriptions the range of both groups showed an equal figure of 9 and is represented below in a boxplot Figure 5.
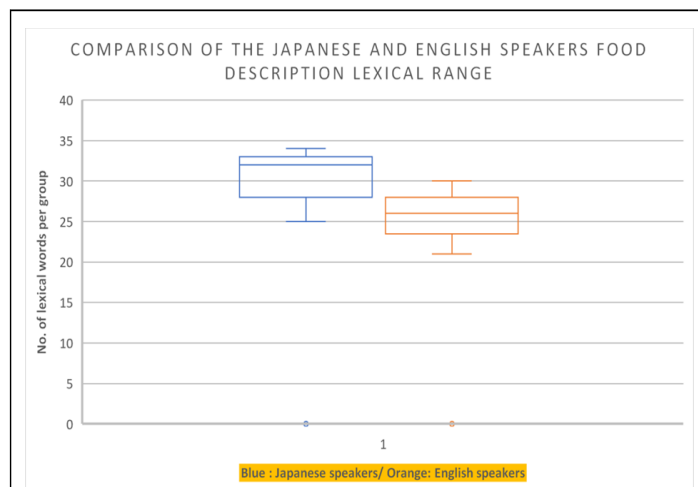

Figure 5: Comparison of Japanese and English speaker's lexical range.

Using this data it was then possible to create the following tables to establish the mean and Standard Deviation (SD) of the two groups (Tables 5 and 6).

Table 5: Calculating the standard deviation of Japanese speakers (Test 1).

Value	Distance from mean calculation (X-X̄)	Distance From Mean (DFM)	Distance sq. (X-X̄)^2
25	31.125-25	6.125	37.51563
27	31.125-27	4.125	17.01563
28	31.125-28	3.125	9.765625
28	31.125-28	3.125	9.765625
29	31.125-29	2.125	4.515625
30	31.125-30	1.125	1.265625
32	31.125-32	-0.875	0.765625
32	31.125-32	-0.875	0.765625
33	31.125-33	-1.875	3.515625
33	31.125-33	-1.875	3.515625
33	31.125-33	-1.875	3.515625
33	31.125-33	-1.875	3.515625
33	31.125-33	-1.875	3.515625
34	31.125-34	-2.875	8.265625

34	31.125-34	-2.875	8.265625
34	31.125-34	-2.875	8.265625
498			123.75

Table 6: Calculating the standard deviation of English speakers (Test 1).

Value	Distance from mean calculation (X-X̄)	Distance From Mean (DFM)	Distance sq. $(X-\bar{X})^2$
21	26	5	25
21	26	5	25
23	26	3	9
24	26	2	4
25	26	1	1
25	26	1	1
26	26	0	0
26	26	0	0
27	26	-1	1
27	26	-1	1
27	26	-1	1
28	26	-2	4
28	26	-2	4
28	26	-2	4
30	26	-4	16
30	26	-4	16
416			112

The figures represented above show the mean figure for the Japanese subject group as 31.125 and 26 for the English subject group. In addition the Standard Deviation (SD) of the Japanese group is 2.780744 compared to the English group which is 2.6457513. The p-value was also below $P<0.05$ showing the data as significant.

Other observational data gathered from the experiments include the substantial use of onomatopoeia descriptions to describe very specific food items by the Japanese dataset group. Examples of these include サクサク (saku-saku) which is used be describe crispy fried tempura, カリカリ (kari-kari) which is often used to describe as crispy for potato chips and パリパリ (pari-pari) which is often used to describe crispy for dried seaweed. These examples were regularly used as one off descriptions for specific food items by the Japanese group which were absent in the English speaking group who tended to opt for more subjective terms such as tasty, delicious or nasty potentially due to a lack of language available. The substantial use of onomatopoeia for food items within this experiment could represent a cognitive difference in the way Japanese speakers think about food. This onomatopoeia feature is not just unique to food descriptions in Japanese but also evident in other everyday language usage.

Based on other observational data from the tests a number of subjects within the Japanese group commented on the difficulties in describing many of the food items when speaking English. Comments included:

- How do you say doro-doro (sticky, thick texture) in English?
- How do you say neba-neba (sticky, gooey) in English?
- Do you have word for toro-toro (sticky, syrupy) in English?

These examples specifically relate to just a selection of many onomatopoeia examples that are often difficult to translate. The English translations used above may be interpreted differently hence the difficulties in translating these concepts to an L2. Onomatopoeia words in English were completely absent from this research data. This noticeable difference in the features between Japanese and English indicate a cross-linguistic difference between the two languages which could be explored further in later studies.

In summary, the results from Test 1 may be interpreted as supporting H[1] Upper intermediate to advanced Japanese adult learners of English think differently about food due to language differences in their native language as there is a large disparity between the groups specifically that the Japanese speakers provided a significantly wider range of lexical terms than the English speakers indicating a potential difference in cognition when discussing food. The following section will analyse the metaphor interpretation test (Test 2).

Metaphor interpretation test (Test 2)

The following table is a breakdown of the correct interpretation of the examples used within the metaphor interpretation test for the Japanese speaking group and English speaking group. The metaphor test consisted of six example sentences in which the subjects had to interpret the metaphor 'ideas are food' (Tables 7 and 8).

Table 7: Correct answers by Japanese speaking subjects (Test 2).

Metaphor	Ideas are food'	Correct	Incorrect
Example 1	He left a bad taste in my mouth	0	16
Example 2	That's food for thought	0	16
Example 3	We don't need to spoon-feed our students	1	15
Example 4	This is the meaty part of our paper	2	14
Example 5	He devoured the book	0	16
Example 6	I just can't swallow that claim	0	16

Table 8: Comparison of mean and SD (Test 2).

	N	Mean	SD
Japanese speaking group	16	0.1875	0.5439
English speaking group	16	6	0

Note: P value p<0.00000

As expected the English speaking subjects were able to interpret the metaphor accurately due to their native language ability. As such, comparison of Japanese *vs.* English speaking group on the whole can be disregarded as an unfair advantage in interpretation (Figures 6 and 7). The following pie chart is a breakdown of this data.
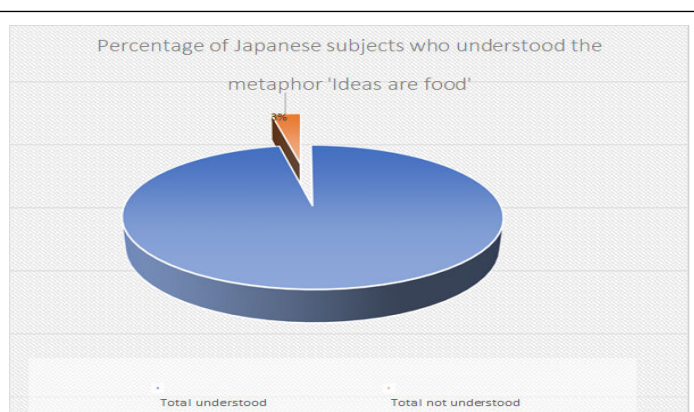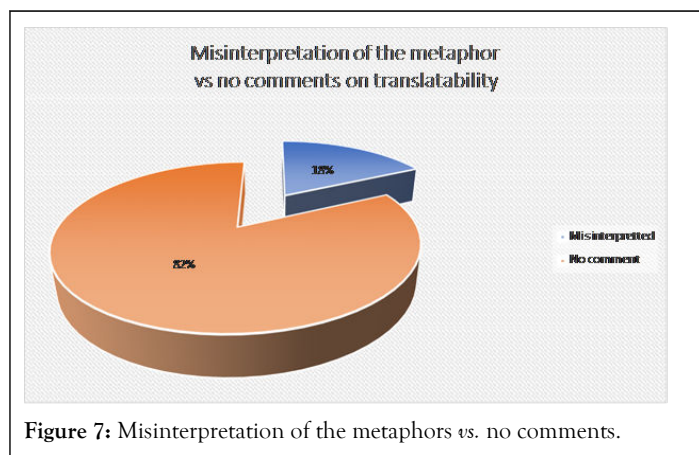

Figure 6: Percentage of Japanese subjects who understood the metaphor 'ideas are food.

Figure 7: Misinterpretation of the metaphors *vs.* no comments.

In addition to the above chart a percentage breakdown of the interpretations of the individual examples can be found below (Table 9).

Table 9: ANOVA summary of Japanese and English speaking subjects (Test 2).

	Degrees of Freedom (DF)	Sum of Squares (SS)	Mean Square (MS)	F-stat (F)	Significance (S)
Between groups	1	270.2813	270.2813	1827.291	0
Within groups	30	4.4374	0.1479		
Total	31	274.7187			

Note: P value P<0.0000

Literal meanings included in the comments by the subjects indicated a lack of understanding or correlation to second language learners in this task. Subject F was the closest of the subjects to show an understanding of the metaphor in their interpretation of no. 4 'This is the meaty part of the paper' but didn't offer any comments about whether it could be used in the same way in Japanese. There were a couple of other similar near interpretations but the explanations were not deemed to be sufficiently close to the semantic meaning.

In summary the results in Test 2 do tend to support H[1] Upper intermediate to advanced Japanese adult learners of English as a foreign language think differently about food due to language differences in their native language as there is a lack of correlation cross-linguistically of the conceptual metaphor. The data from the experiment suggests that differences in language patterns highlighted within the metaphors examples are not transferable and as such the schematic association of the language patterns may influence the way speakers think. The following section will present and discuss the final experiment.

Figurative speech test (Test 3)

The figurative speech test was to test the Japanese subjects understanding of common figurative speech patterns in English and to then compare semantic prosody interpretation with their English speaking counterparts to establish any cognitive differences in the form of positive and negative associations with certain food related terminology. Similar to test 2 the comparison of Japanese vs. English speaking group on the whole can be judged irrelevant as the L1 variable of English speakers undermines the purpose of the comparison. The semantic prosody interpretation element and data was much more useful to in helping test if the hypothesis was correct and to answer the research questions (Tables 10,11 and Figures 8-10).

Table 10: Correct answers by English speaking subjects (Test 3a).

Figurative speech		Correct	Incorrect
Example 1	I'm in a pickle	16	0
Example 2	Mark will go bananas	16	0
Example 3	She looked as cool as a cucumber	16	0
Example 4	I take that with a grain of salt	16	0

Example 5	But that's all pie in the sky	16	0
Example 6	That's his early days in a nutshell	16	0
Example 7	I know you have a lot on your plate	16	0
Example 8	I believe variety is the spice of life	16	0

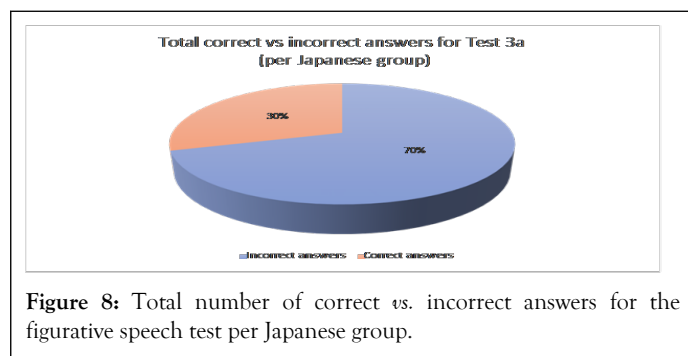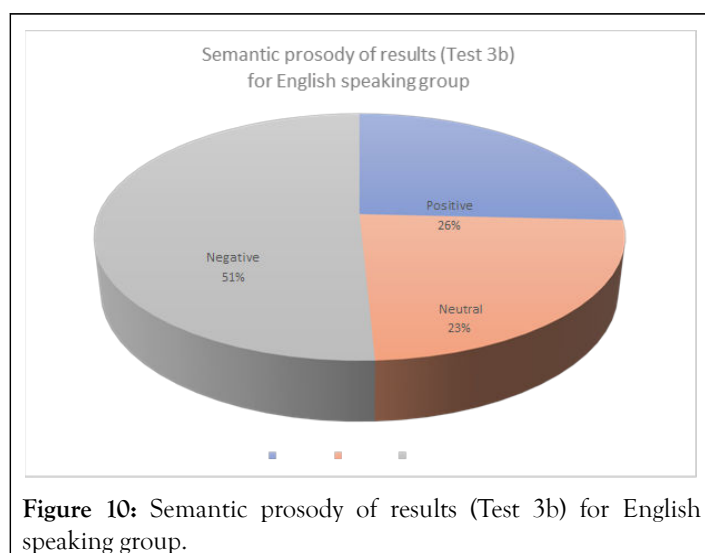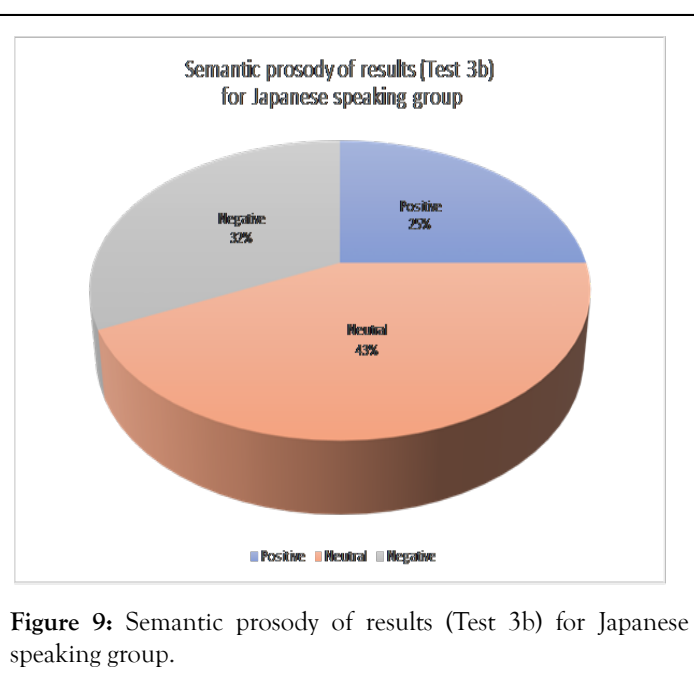**Figure 8:** Total number of correct *vs.* incorrect answers for the figurative speech test per Japanese group.

Table 11: Semantic interpretation of the figurative speech examples by Japanese speaking subjects (Test 3b).

Japanese speaking subjects	
Positive	32
Neutral	55
Negative	41
Total	128

Figure 9: Semantic prosody of results (Test 3b) for Japanese speaking group.

Figure 10: Semantic prosody of results (Test 3b) for English speaking group.

Further investigation into this potential pattern in Japanese would need to be researched beyond this paper. A further side by side comparison can be see below (Figure 11):
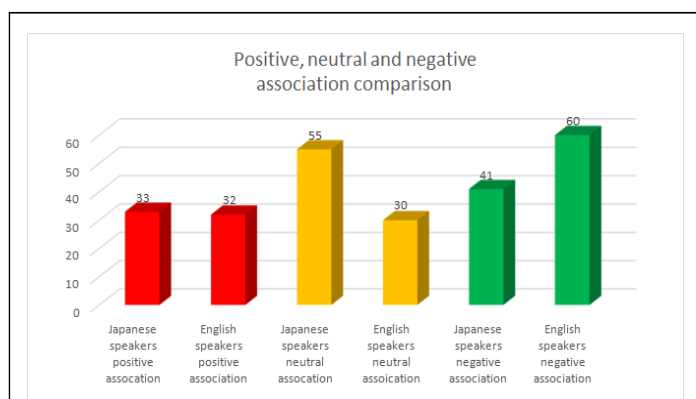
Figure 11: Side by side semantic prosody interpretation of (Test 3b).

Further concordance lines of the example sentences are found in further semantic prosody comparison.

In summary the results in test 3 tend to support H^1 upper intermediate to advanced Japanese adult learners of English think differently about food due to language differences in their native language as the semantic associations of the two groups in the experiments differ with the Japanese group tending to associate more neutral associations than the English speaking group. Notwithstanding, we would require further investigation as to whether this difference is due to language differences in their native language to confirm this hypothesis. This is a problematic relationship to prove however there is an indication that the thinking differences could be correlated to speech patterns in their respective native languages affecting cognition and schematic associations [18].

Implications and future opportunities

Despite some of the findings support the hypothesis it must be recognised that the sample used here is only a representative and also a relatively small sample. A larger scale research project could potentially yield differing results that might contradict some of the findings within this study. In addition, the study was conducted as a snapshot in time and as such some of the results may change in a longitudinal study [19]. With this in mind there could be beneficial findings in carrying out a similar study in which the subjects were recorded over a longer period of time to establish how lexical descriptions in L1 change over time as a result in increased language competence and proficiency in L2. It would be interesting to see if the lexical depth of the Japanese speakers in terms of food descriptions decreases as a result in increased English proficiency potentially changing schematic associations held in the subjects L1 and answer another research question by Cook: 'Does cognition change as a result of second language acquisition?' In addition, if thought can potentially change with the acquisition of an L2 then is this change permanent or can thought return to its original state. This kind of study could be carried out with beginners to see their language journey through to upper intermediate and advanced levels. This kind of investigation was not possible within this thesis due to the aspects of the tests requiring a higher level of proficiency in subjects along with the time practicality constraints of a thesis. This however this could potentially be carried out as part of a further PHD study.

Further use of advanced technology such as neuroimaging and eye monitoring equipment which is often used within interrelated cognitive science research fields would also help provide more empirical evidence [20].

CONCLUSION

Within this thesis paper I have investigated how metaphor interpretation and cross-linguistic influence of food terminology affects Japanese adult learners of English. I have conducted a number of research experiments within this thesis and linked them to current research. These experiments have been tested on two subject groups including sixteen Japanese learners of English and sixteen native English speakers of English with similar variables. These experiments have included a food description test, a metaphor test and a figurative speech test to establish if the groups think differently and if the features of language affect cognition. From the experiments within this research paper several findings and trends have been identified from the sample data. The first finding from the research paper identified that the Japanese leaners of English used within these experiments had a much wider lexical range of food terminology descriptions than their English speaking counterparts. The Japanese speaking group also produced many specific onomatopoeia examples to describe specific tastes and flavours which were absent in the English speaking group. This could be seen as an indication of the two groups thinking differently as a result of the language affecting thought process. The second finding was that there was a lack of awareness of the metaphor ideas are food within the Japanese learners of English subject group possibly due to a lack of equivalent transferable conceptual metaphor between the languages or simply that the concept was misunderstand due to a lack of comprehension. The final finding was that the Japanese learners of English tended to be much more neutral with their mental associations of food terminology than their English counterparts who were more inclined to be more subjective with schematic associations. This potentially shows a cultural trait held by the Japanese speaking group to be more passive with language and linguistic terminology than their English counterparts.

In conclusion, the data suggests that the two groups think differently and that specific features of language such as onomatopoeia and other linguistic descriptions affect conceptual cognition and how the speakers think about the food items. This furthermore has pedological implications as learners of English need to be aware of cross-linguistic differences and different conceptual metaphors between languages to potentially help improve metaphoric competence and prevent making cross-linguistic transfer errors. As such this paper recommends incorporating teaching materials that concentrate on figurative speech patterns and metaphor interpretation in English as Foreign Language (EFL) curriculums especially at upper intermediate and advanced level to improve the competence of learners dealing with these features of language. This recommendation does not just relate to the domain of food but also in other domains which figurative speech and metaphor are prevalent.

REFERENCES

1. Littlemore J. The effect of cultural background on metaphor interpretation. Metaphor Symb. 2003;18(4):273-288.

2. Evans V. Language and cognition: The view from cognitive linguistics. Language and Bilingual Cognition, Psychology Press, Hove, UK. 2011:83-122.

3. Langacker RW. An introduction to cognitive grammar. Cogn Sci. 1986;10(1):1-40.

4. Bassetti B, Cook V. Relating language and cognition: The second language user. Language and Bilingual Cognition, Psychology Press, Hove, UK. 2011:157-204.

5. Boroditsky L. Does language shape thought? Mandarin and English speakers' conceptions of time. Cogn Psychol. 2001;43(1):1-22.

6. Everett D. Cultural constraints on grammar and cognition in Piraha: Another look at the design features of human language. Curr Anthropol. 2005;46(4):621-646.

7. Lucy JA. Linguistic relativity. Annu Rev Anthropol. 1997;26(1): 291-312.

8. Taylor JR, Littlemore J. The bloomsbury companion to cognitive linguistics. The bloomsbury companion to cognitive linguistics. 2014:1-416.

9. Fausey CM, Boroditsky L. Subtle linguistic cues influence perceived blame and financial liability. Psychon Bull Rev. 2010;17(5):644-650.

10. Boroditsky L, Schmidt LA, Phillips W. Sex, syntax and semantics. The MIT Press, Massachusetts, United States. 2003.

11. Everett C. Linguistic relativity: Evidence across languages and cognitive domains. de Gruyter Mouton, Berlin, Germany. 2013.

12. Littlemore J, Low G. Metaphoric competence, second language learning, and communicative language ability. Appl Linguist. 2006;27(2):268-294.

13. Boroditsky L. Metaphoric structuring: Understanding time through spatial metaphors. Cognition. 2000;75(1):1-28.

14. Deignan A. Metaphorical expressions and culture: An indirect link. Metaphor Symb. 2003;18(4):255-271.

15. Jarvis S, Pavlenko A. Crosslinguistic influence in language and cognition. Routledge, London, United Kingdom. 2008.

16. Hauser DJ, Schwarz N. Semantic prosody and judgment. J Exp Psychol Gen. 2016;145(7):882-896.

17. Sato M, Schafer AJ, Bergen BK. One word at a time: Mental representations of object shape change incrementally during sentence processing. Lang Cogn. 2013;5(4):345-373.

18. Saalbach H, Imai M. The relation between linguistic categories and cognition: The case of numeral classifiers. Lang Cognitive Proc. 2012;27(3):381-428.

19. Ishii R, O'MAHONY M. Group taste concept measurement: Verbal and physical definition of the umami taste concept for Japanese and Americans. J Sens Stud. 1990;4(4):215-227.

20. Xiao R, McEnery T. Collocation, semantic prosody and near synonymy: A cross-linguistic perspective. Appl Linguist. 2006;27(1): 103-129.