Thesis for the Degree of Master of Arts

A Study of Semantic Integration on Syntactic Choice in the Relative Clause Production: A Cross-Linguistic Approach
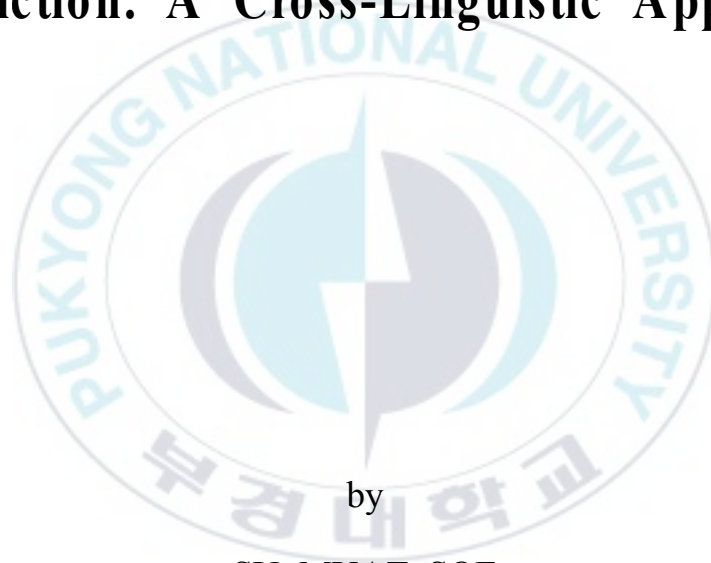
by

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Graduate School

Pukyong National University

February 2016

A Study of Semantic Integration on Syntactic Choice in the Relative Clause Production: A Cross-Linguistic Approach

(관계절 산출에서 통사적 문형선택에 대한 의미적 융합연구: 범언어적 접근)

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by

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A Study of Semantic Integration on Syntactic Choice in the Relative Clause Production: A Cross-Linguistic Approach

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Abstract

The purpose of this study is to explore how the semantic integration of animacy affects production frequencies of passive sentence in the relative clause structure among different languages. Specifically, it focused on examining the animacy effect and speaker's structure choice in relative clause production in Myanmar which is similar to Korean and Japanese with respect to the basic word order, but different from English.

Animacy plays a strong role in determining the choice of passive structure in English. English speakers, for instance, show a tendency to produce more passive sentence with the animate head nouns in the

relative clauses than inanimate head ones. In contrast, animacy plays a less prominent role in Myanmar, where more active structures were produced to varying degrees. Although the basic word order of English and Japanese are different, production preferences of object relative clauses in Japanese are almost the same as in English. But the structure choice for passive relative clause of Japanese and Korean, which have the same word orders are different. In general, word order appears not to influence relative clause structure choices. The speakers of languages mentioned in this paper produced passive relative clauses with different rates according to their different concepts of their mother languages.

Structure choice in language production is influenced by prior utterances (Gennari and MacDonald 2009). The results of Myanmar language will be connected with PDC model by testing the comprehension ability of Myanmar speakers on sentence structures and by analysing Myanmar text.

1. Introduction

1.1 Purpose of Study

This thesis mainly aims at examining the animacy effect on Myanmar relative clause production. Evidence indicates that many researchers focused their experiments on various languages and found out unique results of each language. Montag and MacDonald (2012) examined the animacy effect on English and Japanese relative clause productions. According to their research, animacy plays a strong role in passive relative clause production.

Park (2013) also examined animacy effect on Korean which is expressed with similar word order sequence as Japanese. According to the results of Montag and MacDonald's two experiments, both of English and Japanese speakers prefer passive structures although they are different in word orders. But the results of Korean are different from English and Japanese. Korean speakers produced more active structure than English and Japanese speakers. By viewing this points, it seems that animacy effect is not related to word order of that language. Gennari, Mirkovic and MacDonald (2012) investigated the animacy effects on Spanish and Serbian. Unlike English, animacy has less of an effect on Spanish and Serbian structure choices; more

active structures were common.

Currently, there are no study which focus on the animacy effect on Myanmar language. Myanmar language is also a head final language with the same basic order like Japanese and Korean: SOV. So I decided to examine that animacy still affects on Myanmar language structures or not?

1.2 Organization

This thesis is organized as follows: the first chapter is about the purpose and organization, the second chapter introduces about the animacy and thematic hierarchy. Human or animate entity is more prominent and accessible than inanimate in the hierarchy so it takes the first position of the sentence. Animacy plays a strong role in passive structure productions. Thus, in the final section of the second chapter, the relation of the active/ passive productions and accessible of the animate noun will be described. And then, the result of the previous studies which examined the animacy effect will be described.

In chapter 3, I will explore the animacy effect on Myanmar relative clause production. Methods and materials will be mentioned and finally the results of Myanmar language will be compared with three previous studies' results.

In chapter 4, I will discuss the results of Myanmar experiment with

PDC account (Gennari and MacDonlad 2009). They described that structure choices in language production is influenced by prior utterances. So text analysis and experiment will be done to determine if the speakers use particular distributional patterns if they experience it more and are familiar it.

I will relate the result of the text analysing to the first experiment in chapter 5 to draw the conclusion.

2. Theoretical Background

2.1 Theoretical Framework

It seems that talking is not a difficult activity with little conscious involvement. But this is not generally true; the process of changing a thought into speech is not trivial at all. Speakers always make a series of choices in language production with different lexical items and different sentence structures. Language production models characterize the complexity of the production process as a system consisting of several components. The process can be divided into three parts: meaning (semantic) encoding, grammatical (syntactic) encoding, and sound (phonological) encoding (Bock and Levelt 1994, and Schwarz 2006).

This paper focused on the grammatical encoding, which can be stated as a set of words and assigned grammatical functions. The role of grammatical encoding is that it creates a syntactic structure that should be identified from semantic encoding, but there is no inherent compatibility between these two types of encoding (Solomon and Pearlmutter 2013). Semantic encoding involves almost unlimited number of simultaneous and often unordered elements, while grammatical encoding ends up necessarily with linear and spread over

time (Park 2015). Making choices of lexical item and sentence structure is thus a critical part of syntactic planning in language production.

A series of studies have contributed to aspects of planning related to word orders and choice of sentence structures. During planning, choice of word order and syntactic structure is strongly constrained by the accessibility of words and phrases (MacDonald, Bock and Kelly 1993). Ferreia and Dell (2000) claims that speakers use a strategy to make the production process easier by placing more accessible or salient lexical items earlier. English speakers have a tendency to locate animate concepts at initial positions in the sentence (Gennari and MacDonald 2009).

MacDonal et al. (1993) and Ferreira (1994) collapse these ideas, by suggesting that noun animacy is one semantically prime factor that affects the structure choices a speaker makes in simple sentences. Gennari et al. (2012) extends their suggestion into English relative clauses, where speakers make choices between active (object) relative clause and passive relative clause, depending on the head noun that is necessarily fixed as the first noun in the clause. Gennari and MacDonald (2009) and Montag and MacDonald (2009) found the noun accessibility correctly predicts active versus passive structure in English relative clauses, such that speakers almost exclusively produce passive relatives when the head of the relative is animate, whereas they tend to produce both object relative and passive relative clause sentence when the head noun is inanimate.

A number of studies have been conducted to show how the semantic integration of lexical categories affects syntactic planning, but majority of work in sentence processing has focused on English, Japanese and Korean constructions. Since cross-linguistic investigation has known to play an important role in the theories of language processing (Thornton et al. 1998), this paper thus explores the cross-linguistic variation of syntactic planning in English, Japanese, Korean and Myanmar. By doing so, this paper examines the mechanism of how the semantic property of animacy constrains the syntactic properties of active/passive relative clause production in Myanmar, focusing particularly on the aspects of production frequency of passives among different language groups and text analysis for Myanmar native speakers.

2.2 Animacy Hierarchy

In this thesis, I concentrate on the linguistic categorization based on animacy, which is an extra-linguistic conceptual property of entities. "Animate" is an adjective mentioning various concepts in our daily lives. The notion of the animate comes from the Latin word *animus* 'soul'. According to the dictionary (Oxford English Dictionary 2014), it takes the meaning of "living; having a life." In English, for instance, generally animacy is divided into two ways of distinctions, living

versus non-living. An animate object is anything living; whereas an inanimate object is anything without life.

Comrie (1989) represented the hierarchial ordering of animacy as a general scale: human>animate>inanimate. The entities on the hierarchy were ordered according to their ability. Human being has the most prominent status and takes the leftmost position. Moreover, it is further arranged as "man>monkey>dog>spider>bacteria>grass>dust> rock>tortilla>vase". This suggests there is a relationship with being human and being animate down to being non-human and less animate (Tomline 1986).

Siewierska (1988) defined animate similarly suggesting that the human being is the highest form of animate. Here is the chain link Siewierska defined: human>other animate (animals)>inanimate. Rosenbash (2005) concluded that animacy was optimized at the human vs the inanimate research. The research findings defined the human as the most animate end of the spectrum and inanimate entities are the least animate.

2.3 Animacy Effects and Thematic Role Hierarchy

It seems that linguists have neither agreed upon how the animacy effect is reflected onto sentence structure. Some support the idea that animacy effect relates to thematic role assignment (Ferreira 1994).

Others have come to the conclusion that animacy effect focuses on the grammatical function assignment (Bock, Loebel and Morey 1992; MacDonald, Bock and Kelly 1993; Teufel, Branigan and Feleki 1996). Ferreira stated that subject's choice from among syntactic options are influenced by thematic structures.

Thematic roles can be described as the roles that the referents of the arguments of a verb play in the event or in the states that the verb denotes. These roles are agent, experiencer recipient/beneficiary, theme/patient, instruments, location and others etc which are mapped onto the subject in the thematic hierarchy.

(1) Agent>Experiencer> Recipients/Beneficiary> Theme/Patients
    >Instruments>Location>Others (Givon 2001)

According to the thematic hierarchy model, if an argument has an agent then it is mapped onto the subject. Without an agent, the next highest thematic role is mapped onto the subject. Here is an example of the thematic hierarchy using the word open:

open:

(2) open (agent, theme, instrument)
    "John opened the door with the key"

(3) open (instrument, theme)

　　"The key opened the door"

(4) open (theme)

　　"The door opened

Ferreira (1994) stated that the agent is highest in the hierarchy and the experiencer is immediately below. The hierarchy of the theme is lower than those of agent and experiencer. The thematic hierarchy appears to influence the competition for subject position, thus the more prominent role wins.

　Ferreira stated that verb type or thematic role includes an "animate-first" effect. Verb types further influences relative clause production, whether one uses the active and passive clauses. According to his finding the "theme-experiencer" verbs tend to dictate a passive relative clause, leading to a more prominent role in the production. Hence, "theme-experience" verbs assign the role of the theme to the subject of an active sentence and to the experiencer of the object of the sentence. In the example of "Bill amazed Tom", Bill is the theme and Tom is the experiencer of the emotion of amazement". A theme can be inanimate but an agent cannot (Jackendoff 1972); thus unlike experiencer-theme or agent-theme verbs, theme-experiencer verb accommodates inanimate subject in the subject position of active clauses. Ferreira concluded that the concept

of theme-experiencer verb is parallel with thematic hierarchy theory. Experiencers are higher on the hierarchy than themes. So, passives will be more common than actives with theme-experiencer verb to make the more prominent role the sentential subject.

Gennari and MacDonald (2009) suggested that inanimate nouns frequently fulfill the semantic role of patient or theme and occupy the syntactic object position. In contrast, animate nouns are preferentially associated with either agentive (subjecthood) or experiencer roles. This helps drive home the point that theme-experiencer verbs require the passive clause production.

There are lots of reason that a speakers tends to choose either active and passive types. Among them, animacy plays relatively strong role in passive structure production.
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2.4 Active/Passive Choice and Accessibility

When speaking, how is it that speakers can automatically decide whether to use active or the passive form? One possibility is that speakers' sentence production differs according to the activation levels of entities in conceptual memory. In Bock (1986), subjects were presented with a priming word such as *thunder* and then a picture of lighting striking a church. Subjects tended to describe the picture with an active sentence such as *lighting is striking the church*. When the

priming word preceding the same picture was one such as *worship*, subject tended to describe the picture with a passive such as *the church is being struck by lighting.*

Nouns that are concrete, imageable, prototypical and animate tend to occupy earliest sentence position (Bates and MacWhinney 1982; Bock, Loebell and Morey 1992; MacWhineey 1997; van Oosten 1984). An agent instigates the active action (Fillmore 1986; Jackendoff 1990) and so tends to be animate. Placement of agent in subject position released active sentence. For example in *Mary kicked the table*, the subject *Mary* is the agent of the action of kicking and the object *table* is the theme. This tendency to place agents in subject position may be one reason for higher frequency of actives over passives (Quirk et al. 1972).

Although passive sentences are certainly less common than actives in English, many writers encounter circumstances in which a passive sentence seems more appropriate than an active (Hopper and Thompson 1980; Svartvik 1966). Dewart (1979) described that the passive briefly as the reversed word order of the simple active. The order grammatical subject-verb-grammatical object corresponds to actor-action-acted upon in active sentence, but it corresponds to acted-upon-action-actor in the passive. There is no change in meaning between active and passive form of a sentence.

Dewart (1979) suggested some reasons why speakers tend to use the passive instead of the active although the two are the same in terms of meaning. The sentence of "The man was murdered", he

showed that the usage of the passive is essential. The actor is unknown, or it is not easily stated in such sentences and the passive comes out a solution. Allowing the acted upon to assume the initial nominal position in the sentence; the passive helps the speaker put the emphasis on the subject.

Tannebaum and Williams (1968) provide that the passive may be motivated by thematic considerations. Thematic hierarchy influence the speaker's structure choices. Dewart (1979) argued that in sentences with one animate and one inanimate entity, the animate noun would be uttered early in the ordering of the nouns, and in sentences with an inanimate actor, the passive voice enables the animate acted upon to take the first place as in the examples.

(5) a. The alarm clock awakened the boy.
    b. The boy was awakened by the alarm clock.

In Dewart (1979) did the experiment to children to inquire the role of animate and inanimate nouns. In this work, the task of the children was to recall a series of sentences with animate noun actors and inanimate patients as in (6a). and the reverse, inanimate noun actors and animate patients as in (6b).

(6) a. The gardener mows the grass.
    b. The blanket covers the baby.

As the results, the sentences belonging to the first group as (6a) would keep their original ordering, because animate (actor) precedes the sentence and inanimate (patient) follows the animate. Actually, they have the preferred ordering with the animate noun first. Importantly, animate elements are remembered better than inanimate elements and animate entities are being richer in terms of sensory features than inanimate entities (Bonin et al. 2013). If the test sentence is a passive sentence "*The grass was mowed by the gardener*", it is predicted that the sentence would be changed to active form. In the same way, "*The blanket covers the baby*" is changed to "*The baby was covered by the blanket*", because the passive only would enable the participants to use the animate noun first.

As the result, passive sentences with animate actor and the inanimate patients were recalled as actives, but active sentences with the inanimate actor and the animate patients were changed to passives to place the animate nouns first. Dewart (1979) concluded that rather than theme or saliency, animacy of the subject and object nouns influences the choice of voice. Looking at the strong influence of the ordering of the animate and inanimate nouns in the experiment, Dewart suggests that "In the production of the sentence, the semantics features associated with the nouns to be cued may have an important influence on the choice of sentence structure, in particular, on the voice of verb" (Dewart 1979).

Animate—first effects in language production can thus be accounted for in terms of accessibility (Ferreira & Firato 2002; Fukumura, van

Gompel, Harley and Pickering 2011; Meyer 1996; Smith and Wheeldon 1999).

When people try to express their thoughts into language, they choose different lexical choices (e.g, girl and computer) and different sentence structures such as active or passive sentences (*The girl carried the computer & The computer was carried by the girl).* According to the psychological preference, people try to output from more easy words that did not make difficulty in their production. In here, accessibility of the noun plays as a crucial role in speaker's structure choice.

In many cases, speakers absolutely try to choose sentence structure in order to make the planning and production process easier (Ferreira and Dell 2000). When speakers try to plan utterances, they put more 'accessible' or 'salient' nouns earlier in the utterances to make their production plan more easy. For example, speakers who produce passive such as (*The boy is being hit by the car), the boy* was more accessible, and was assigned the subject function in the relative clause. Why most accessible nouns are placed in first position is due to the relationship between the subjecthood and animate noun. According to the accessibility hypothesis, animate nouns are most accessible and take the subject function assignment (MacDonald et al. 1993). This arrangement allows words that are easily planned to be placed in first position, and nouns that need more planning time or more complicated nouns later in the sentence.

By uttering more accessible portions of an utterance early, additional

time is gained to plan less accessible components (DeSmedt and Kempen 1987; Kempen and Hoemkamp 1987; Levelt 1989). During planning, choice of word order and syntactic structure are strongly limited by the accessibility of words and phrase (Bock 1982; Bock 1987; Bock and Irwin 1980; Bock and Levelt 1994; Bock and Loebell, 1990; Bock and Warren 1985; MacDonald et al. 1993). Language production is parallel with conceptual accessibility hypothesis, easily retrieved items are processed first. Less easily retrieved items are processed later. Accessibility can be understood at the degree to which a word or phrase is ready for articulation in the utterance. Some elements, by virtue of being long, rare, less frequent or conceptually less salient etc, may require more planning and retrieval time than others.

Animate noun has more accessibility than inanimate noun because of their conceptual salience. Rosenbach (2005) stated that the prominent of animate entity can be even seen in English possessive form, the animate entity preceded the inanimate entity (boy's eyes) rather than vice versa (eyes of the boy). Animates' heightened accessibility influences choices of active and passive structures (MacDonald et al. 1993). English speakers, for example, a preference to locate animate entities in early sentence position, even these animate entities are not agents: passive *The girl was hit by the bike* is preferred over the active *The bike hit the girl* (Bock et al. 1992; Clark 1965).

2.5 Word Order

Most of the world's languages have specific word orders. In these languages, the order in which words are spoken conveys a great deal of the sentence's meaning. There are six important word orders that the speakers used: SOV, SVO, VSO, VOS, OVS and OSV.

Myanmar language derived from Tibeto-Burman languages. Myanmar utilizes the SOV word order language which is one of the six basic type of word order forms (Thet et al. 2011). Myanmar speakers will put the subject first, the object second, and the verb last (subject+object+verb). So while an English speaker would say "Mary likes corn," Myanmar speakers (SOV language users) would express same idea with equivalent, "Mary corns likes."

The construction of relative clause in Myanmar is markedly different from the relative clause construction in English. One of the salient features of relative clause in Myanmar is the head-final noun, which takes on a left branching characteristic compared with the head-initial and right-branching construction in English. Consequently, the relative clause in Myanmar functions as a way to present background information about the head noun before the head noun is identified. For example,

(7) ngar ka   Academy su ko   ya d'e   yoke shin karr
    ko   Kyee kh'e t'e

I-NOM   Academy award-ACC receive-REL movie-ACC
see-PAST-END

"I saw a movie that received Academy award"

(8) I saw a movie [which received an Academy award]

In contrast, for English, the head noun 'movie' comes before the relative clause "which received an Academy award" which provides background information about the movie as in (8). Hence, the position of the relative clause in relation to the head noun has major implications for language processing. This is due to the fact that language processing is incremental, as the structure of the sentence is generated "from left to right" as successive fragments of the message become avaliable (Levelt 1989).

It has been argued that the order of the Verb-Object position in a sentence is the cause of constraints in the placement of various grammatical features within a sentence (Greenberg 1963: Vennemann, 1975). Accordingly, the position of the relative clause construction also dictates the Verb-Object order. Here is an outline of how that works in VO and OV word ordered languages according to Slobin (1971):

(9) VO LANGUAGES:
   Auxiliary VERB   OBJECT   relative clause

(10) OV LANGUAGES:

Relative clause OBJECT VERB auxiliary

Myanmar language also is a head final language having the same word order as Korean and Japanese. Since the head noun is fixed at the final of the relative clauses in Myanmar that means the agent is placed at the start of the clause and object (patient) is always placed at the end of the clause. Myanmar relative clauses can be divided into an active object relative clause and two types of passive object relative clauses. Here are some examples,

(11) Active type

Kaunmalaye: phet d'et   luegee
girl   hug-active-PRE   man
"The man that the girl is hugging"

(12) Passive type

kaunmalaye: phet khanya d'et   luegee
girl   hug-passive-PRE   man
"The man that is being hugged by the girl"

(OR)

(13) phat khanya d'et   luegee (Agent omission style)
hug-passive-PRE   man
"The man being hugged"

In the second passive objective relative clause (13), agent is omitted. This omission style is used when the agent is unknown or there is not enough information to mention an agent.

2.6 Previous Studies

Speakers express language in several different ways, varying in sentence structure (active or passive), lexical choice and others opinions. For example, a transitive event in which *a dog is chasing a cat* can be expressed by an active sentence, *the dog is chasing the cat* as well as by a passive sentence, *the cat is being chased by the dog*. Speakers make structure choices in order to plan and process easier by placing the more accessible or salient nouns in first position (Montag and MacDonald 2012). Production preference on structure choice varies depending on animate or inanimate of the head nouns because noun animacy plays a crucial role in determining the choice of passive structure. Thus, linguists concentrated on noun animacy and examined animacy effects on various languages such as Spanish, Serbian, German, Ctalan, Greek, Turkish, Chinese, Japanese and Korean etc.

Montag and MacDonald (2012) stated that animacy effect can also be found in English, especially in English object relative clauses. Object relative clauses can be expressed into two types, active object

relative clause and passive object relative clause. For example, when one is asked *which movie are you watching?*, the possible answers may be *the movie that was recently banned by the Saudi Government* (passive object relative clause) or *the movie that the Saudi Government banned* (active object relative clause).

Gennari and MacDonald (2009) have proposed the processing difficulties of the object relative clause. Linguists suggested that object relative sentences are harder to process. Moreover, object relative clauses with animate heads are harder to process than object relative clauses with inanimate heads (Genneri and MacDonald 2008; Mak et al. 2002, 2006: Traxler et al. 2002, 2005).

English is a head-first language, it means that the head noun of the relative clause precedes the relative clause. In the examples (14) and (15) below, for instance, the head nouns (ball/baby) are placed at the beginning of the clause, and only the subsequent at the noun-verb order differs in active and passive structures in the relative clause in the sentences.

 (14) Inanimate head noun

   a. Active : The ball (that) the woman is holding

   b. Passive: The ball that is being held by the woman


 (15) Animate head noun

   a. Active: The baby(who/that) the woman is holding

   b. Passive: The baby who/that is being held by the woman

In the above mentioned relative clauses, the position of the head nouns does not vary in both active and passive relative clauses. The speakers placed the nouns that they prefer in the first position. By placing the more accessible or more prominent nouns in the first position of the sentence, animacy effect happens. Moreover frequencies of passive voice become higher. Some linguists did the research to investigate animacy effect on language production.

In the paper of "Animacy and competition in relative clause production: A cross linguistic investigation," Gennari et al. (2012) stated that animacy affects on English relative clause production. 82 students participated in their research at the university of Wisconsin-Madison. Scenes, created with two conditions: one acted upon animate objects and the remaining one acted upon inanimate objects, were used as the materials in their research. The target entities were separated from extra entities with colours. For target entities, the target questions were asked focus on this animate entities' colours. In both spoken and written production, there was a tendency to make animate head the subject of the relative clause, thus resulting in a passive structure. This research showed that animacy plays a strong role to determine the choice of passive structure in English.

In the paper of "Word Order Doesn't Matter: Relative Clause Production in English and Japanese," Montag and MacDonald (2012) investigated animacy effect on object relative clause production in English. They did the experiments to examine the animacy effect on

relative clause production with both English and Japanese languages.
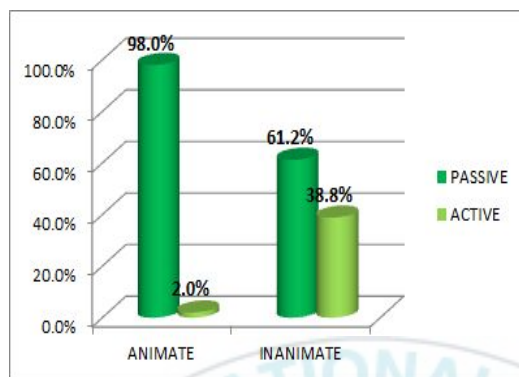
Graph 1: Active and Passive Proportions of English (Montag and MacDonald 2012)

In the first experiment of Montag and MacDonald (2012), they used eighteen undergraduates of American native speakers as participants. As the materials, they created coloured pictures that express two instances of a particular verb: one acting upon an animate patient and one acting upon an inanimate patient. Speakers were asked questions orally to describe what a particular person was doing or identify a particular object. According to their result, English speakers produced almost exclusively passive sentences when the target item was animate, and both active and passive sentences were produced when the target item was inanimate. 2.0% of responses were active and 98% were passive for animate targets. For inanimate one, passive structures were more common, 38.8% were active and 61.2% were passive. They proved that animate head noun plays a strong role in

determining the choice of passive structure in English. Passive production frequencies of relative clauses with animate head nouns are higher than relative clauses with inanimate head nouns.

Montag and MacDonald (2012) stated that more accessible nouns (animates) become grammatical subjects in the simple sentence and that they tend to be uttered firstly. This accessibility constraints similarly exist as in English relative clauses and affect sentence structure by placing the more accessible nouns in the position of grammatical subjects. This general specific character still affects on Japanese language which is different from English in basic word order (MacDonald and Christiansen 2002).

Unlike English, Japanese is a head final language and produced the most accessible noun later (Montag and MacDonald 2012). Japanese object relative can also take either active or passive relative clause. In English, head noun is fixed between the active and passive relative clause form, but unlike English, Japanese active and passive relative clauses have identical order across all words in the relative clause. For example,

(16) onnanohito-ga　　nage-te-itu　　　　otokonohito
　　　woman-nom　　　throw-pre-prog　　man
　　　"The man that the woman is throwing"

(17) onnanohito-ni　nage-rare-te-iru　　　　otokonohito
　　　woman-by　　　throw-pass-pres-prog　　man

"The man that is being thrown by the woman"

Montag and MacDonald thought that animacy effect can not respond to Japanese because it has different word order to English language. So they decided to do the second experiment to examine whether the animacy still affects on Japanese relative clauses or not. Their experiment target was focused on both head nouns, animate and inanimate. If Japanese results come out similarly to English, certain universal theory can be captured. If the frequencies of active and passive constructions are not similar across languages, it is likely that different cognitive process are underlying structure choices in both languages.

They continued their second experiment with eighteen native speakers of Japanese. All materials and methods that were used in their second experiment were identical to those used in English study. They used a task that has previously been used to elicit object and passive relative clause in English (Montag and MacDonald 2012). The result can be seen in graph 2. Similar to English participants, Japanese participants also produced almost exclusively passive relative clauses when the target item was animate. But when the target item is inanimate, a mix of active and passive relative were produced. For animate targets, 0.7% of production were active and 99.3% were passive. For inanimate targets, 69.9% were active while 30.1% were passive. According to the results of two experiments, effect of animacy can be seen in both languages. Japanese participants also
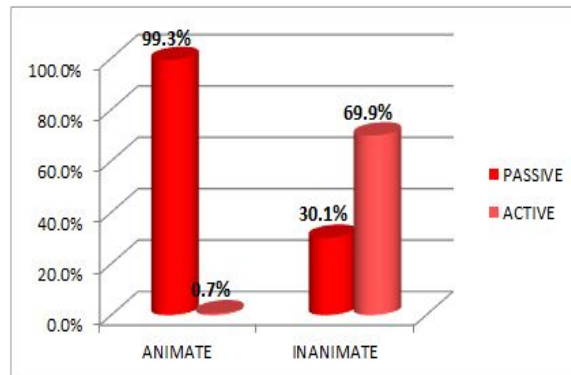
Graph 2: Active and Passive Proportions of Japanese (Montag and MacDonald 2012)

produced more passive relative clauses with animate head nouns.

Production frequency of active and passive sentences differed by target (head) noun animacy. Both English and Japanese participants produced almost exclusively passive relative clauses when the target item was animate. But when the target item is inanimate, English participants largely prefer passive relative clauses than Japanese participants though both of participants produce mix of active and passive types. Proportions of passives produced with animate heads are not different between two languages, but with inanimate heads, passive production rates of Japanese is much lower than those of English. By viewing this points, English speakers strongly prefer passive types whether the head noun was animate or inanimate.

Passive production rates of both languages with animate and inanimate head nouns can be compared by graph.
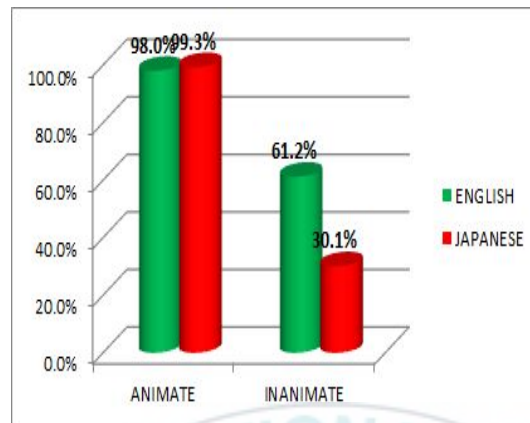
Graph 3 : Passive Production Frequencies of English and Japanese
(Montag and MacDonald 2012)

For animate head nouns, English passive object relative clause is 98%
and those in Japanese is 99.3%. For active object relative clause,
English is 61.2% and Japanese is 30.1%. Although both languages are
differ in word orders, both languages' common choices are passives
with animate heads.

As the results, animacy still affects on Japanese language. Japanese
speakers, however, produced similar sentence structure as the English
speakers in the absence of any word rearrangement. The sentence
production of both English speakers and Japanese speakers showed a
main effect of head noun animacy on passive structure production.

Park (2013) also examined the animacy effect on Korean language
which is similar in word order to Japanese. To compare the results of

the previous studies, he examined the animacy effect on Korean relative clause production by following the method of Montag and MacDonald.
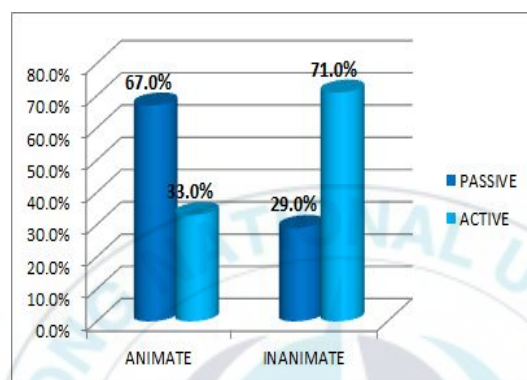
Graph 4 : Active and Passive Proportions of Korean (Park 2013)

According to Park, for animate head, speakers' passive production rate is 67% and active production rate is 33%. On the other hand, active frequency is 71% and passive frequency is 29% with inanimate head. Animacy still affetcs on Korean language. Korean speakers relatively uttered more passive voices than active voices with animate head noun, when the heads were inanimate, actives were common.

The results of the Park's experiment were compared with Montag and MacDonald's English and Japanese experiment results which can be seen in graph 5. Frequency of passive relative clauses with animate head nouns can be seen as English is 98%, Japanese is 99.3% and Korean is 67% respectively. Animacy affects on all three

languages' structure productions and tend to utter more passive voices. The interesting point is that passive production rates between English and Japanese have no differences, but differences between English and Japanese, and Korean is large. Korean speakers uttered more active sentences than English and Japanese speakers. Japanese speakers are the most highest passive voice users with animate head nouns.

One the other hand, with inanimate head nouns, English is 61.2%, Japanese is 30.1% and Korean is 29% in passive relative clause production. Unlike the result of animate head nouns, passive production frequency of English is larger than those of Japanese and Korean. Here, the passive production rates of Japanese and Korean are similar.

By seeing the previous three experiments, the production frequencies are different from each other. Japanese speakers prefer more passive voice with animate head nouns. For English speakers, they tried to choose more passive voices in both conditions, passive were more common with animate heads in English mostly. In Korean, although Korean speakers used both voices, they tended to choose more passive types with animate heads.

This previous experiments showed that animacy strongly affected on language structure production and tended to produce more passive voices with animate head nouns. But there were some experiments on Spanish and Serbian of Sillvia P Gennari, Jelena Mirkovic and MacDonlad (2012) on Spanish and Servian that expressed noun animacy plays a less prominent role in passive voice production. For
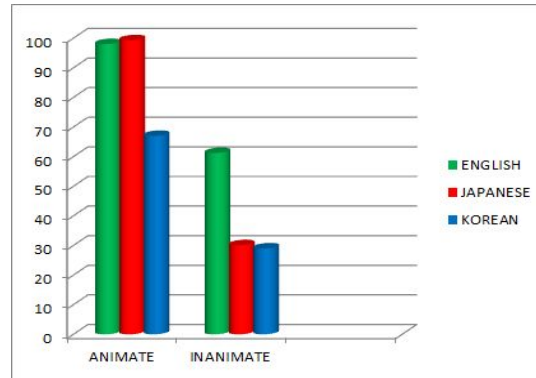
Graph 5: Comparisons of Passive Proportions in English, Japanese and Korean (Park 2013)

instance, Serbian and Spanish speakers produced less passive relative clauses with animate head nouns than English speakers. But Serbian and Spanish speakers also produced more passive relatives with animate heads than those with inanimate ones. Although languages are differ in word orders, all languages obey the semantic constraints in language structure productions, all speakers produce more passive structures regardless with animacy.

Myanmar language is similar in word order to Japanese and Korean. I wondered whether Myanmar speakers would produce the same result or not. Because word order is not the matter in language productions according to the previous experiments. So, I did experiment to examine animacy effect on Myanmar relative clause production.

3. Experiment

3.1 Method

3.1.1 Participants

A total of 40 native speakers of Myanmar who were graduate and undergraduate students at Pukyong National University, Busan, Korea, participated in this experiment. Their ages were 18 to 33 years old and they had never participated in similar experiment.

3.1.2 Materials

Totally, ten verbs were used in my experiment. I concentrated on the verbs which must have equal frequencies of use in active and passive. Firstly, four verbs which are to throw, to punch, to kick, and to hug were selected, which have similar frequencies of use in active and passive (Montag and MacDonald (2012) and Park (2013), These verbs were interpreted to Myanmar and the relevant picture of these verbs were reused in my experiment. As a native speaker of Myanmar, I have chosen the remaining six verbs which have similar frequencies of use in active and passive and which can be used in

both animate patients and inanimate patients. They are to hit, to pull, to water, to kiss, to push and to recline. The pictures of these six verbs were illustrated by imitating the pictures which were used in previous experiments. Here, I would like to introduce the nature of Myanmar passive verb. For example,

　(18) Yaik thi (to hit － active)

　(19) Yaik *khanya* thi (to be hit － passive)
　　　　 passive marker

khanya is the syntactic passive maker and it takes the meaning of "suffer or get". This passive marker can add in both simple sentence and relative clauses when we want to change active voice to passive voice. Every base form of Myanmar verbs end with "thi" like "다" in Korean. For example, lote thi/ 하다/ to do, thwar thi/ 가다/ to go. When speakers try to utter passive form, they put the syntactic passive marker *khanya* between the stem and the verb ending "thi". All ten verbs can be changed into passive form by adding *khanya.*

In each picture, there were two instances in different locations. The action was performed on an animate object (patient) and on an inanimate object in the picture. These objects were the target items in the experiment. For example, in fig. 1, the picture for the verb "hug" incorporated both *a toy being hugged and a man being hugged.* Each picture also contained an extra toy and an extra man that were different from the target objects. In addition to ten pictures, twenty

filler pictures were put to hide the purpose of the experiment. Questions for filler pictures are not relevant with relative clause production like what are the people doing? What is the girl going to do? etc. One of the target question was asked after every two filler questions to avoid noticing the purpose of the experiment.

To elicit the relative clause answers, questions were asked orally to describe a particular target person or object in the picture. For example, questions that are relevant to the experiment would be "who is wearing orange?" for the animate "man" target, and "what is pink?" for the inanimate "toy" target. There are one extra man and one extra toy in the picture so that the participants needed to produce target relative clauses differently from the extra objects in the picture. For

Fig 1: For the verb "hug"

the target item "man" in the picture, a good response would be "the man that is being hugged by the girl" or "the man that the girl is

hugging" because these responses distinguished the target man from the second man in the picture.

3.1.3 Procedure

To get the relevant answers, participants were pretrained to be familiar with the verbs. Speakers were told that experiment was about interpreting the pictures and they must be used verbs that are written in the picture when describing the pictures in the later test.

All the pictures are printed out and the verbs that the participants used in the real experiment were written at the bottom of the picture. These verbs can be equally used in both conditions, animate object and inanimate object. First, participants completed the pretraining test by using verbs that are written at the bottom of the picture. In the pretraining test, participants viewed only the segment of each picture that illustrated the verb. For filler pictures, participants viewed one part of picture containing a person or object and a corresponding noun.

After completing the pretraining test, participants performed the main test of the experiment. Questions were asked orally to the participants by showing one picture by picture. The questioner is a native speaker and verbs were used randomly as s/he likes by obeying two fillers after one target question rule. The participants were not controlled to answer the questions to get the real result of the experiment. The questioner wrote down the answers on the paper for the record.

3.1.4 Data coding and analysis

The questioner took the responses on the answer papers and s/he didn't know the purpose of the experiment. Then I divided the answers into two groups: with an active verb and with the passive verb. I decided the verbs with *khanya* as passive verbs. Sometime, speakers responded passive relative clauses with syntactic passive *khanya* without agents were also recorded as passive relative clauses because this experiment only focused on animacy effect on active and passive relative clause productions.

3.2 Results

The result of Myanmar language came out differently comparing to the results of previous studies. When the target item was animate, Myanmar speakers produced both types of relative clauses (actives are 72% and passives are 28%). However, participants produce almost exclusively active relative clauses for inanimate target items (actives are 92% and passives are 8%). The ratio of passive with animate head noun is higher than the ratio of passive with inanimate head noun. But, in both head nouns conditions, the total ratio of actives are much higher than the total ratio of passives. Prominently, Myanmar speakers produced more active relative clauses with both head nouns.
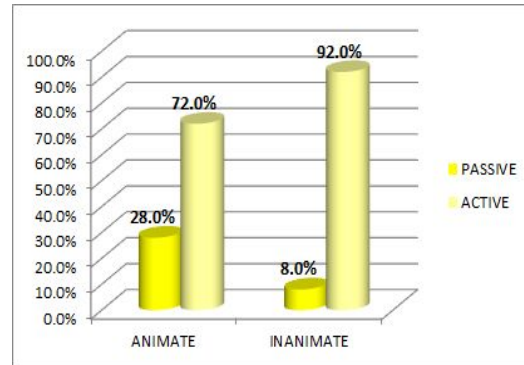
Graph 6: Active and Passive Proportions of Myanmar

The results came out from the experiments that examined animacy effect on Myanmar relative clauses were compared with the previous studies' results. When the head noun was animate, the passive production rates of Japanese, English, Korean and Myanmar were 99.3%, 98%, 67% and 28% respectively. On the other hand, the results with inanimate head nouns were 61.2% in English, 30.1% in Japanese, 29% in Korean and 8% in Myanmar. According to the result of my experiment, though the passive production rate of Myanmar is less than Japanese, English and Korean, the percentage of passive production with animate head noun is relatively higher than that of inanimate head noun. So, we can see that passive production is common with animate heads whether the word orders of the four languages are different or not. Therefore, effect of animacy can also be seen in Myanmar language although the passive production rate is very low compared to other three languages.
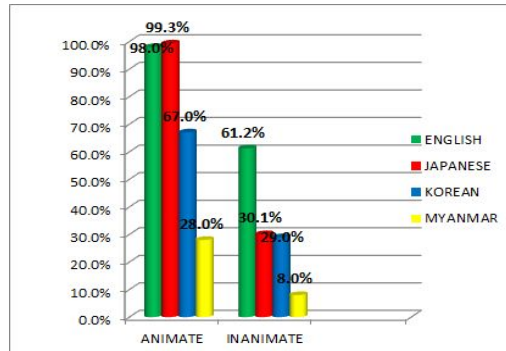
Graph 7: Passive Production Rates of Across Languages

The point I noticed in my experiment is that the passive production is relatively lower compared to other three languages. And Myanmar speakers do not show a preference of passive relative clause when the head noun is inanimate and the proportion of passives drops to 8 %. Even though all languages exhibit different rates of proportion of passives, they all show a conceptual effect of animacy on the semantic encoding. Now a question that arises here is why passives are rather rare overall in Myanmar. To address this question, this paper will investigate the comprehension ability of Myanmar speakers on voice choices and distributional regularities of Myanmar text. Any significant results will be accounted for within the framework of PDC (production, distribution and comprehension) in Gennari and MacDonald (2009) and MacDonald and Thornton (2009).

4. Analyses

4.1 Survey

4.1.1 Background

The Production-Distribution-Comprehension (PDC) model (Gennari and MacDonald 2009; MacDonald and Thornton 2009) suggests that constraints that perform on production choices lead to certain distributions in the language which influence comprehension difficulty. They argue that when planning a production, the producer is influenced by variables such as the accessibility of a word or concept. The accessibility of an item is known to be influenced by many factors including repetition (Gina 2012), context (Haskell Thornton and MacDonald 2010), imageability (Bock and Warren 1985), and animacy (MacDonald et al. 1993).

According to the PDC model, variables, such as accessibility, which reflect ease of retrieval due to previous experience, lead to distributional patterns in the language to which comprehenders are sensitive. As such, production preference are strongly related to comprehension difficulty in the structures that speakers do not

produce are the ones that cause more difficulty to comprehenders. This point has been supported by behavioral data showing that production preferences predict comprehension difficulty (Gennari and MacDonald 2009; Race and MacDonlad 2003). The PDC model thus suggests that the distributional regularities in the language impose shared constraints on both production and comprehension.

However, it is important to note that while the PDC model suggests a large degree of interactivity and interdependence between production and comprehension it does not necessarily suggest that they rely on the same processing system or mechanism. Saying this, others have suggested that production and comprehension engage shared mechanisms (Bock et al. 2007; Chand et al. 2006). Evidence for this comes from studies of syntactic priming, the tendency to reuse recently produced/heard syntactic structures. Bock et al. (2007) showed that syntactic priming effects occur across production and comprehension modalities such that comprehending a particular structure primes production of the same structure. Furthermore, the extent of priming effect across modalities was of the same magnitude as from production to production. This was taken as evidence for a shared production and comprehension sequencing system for syntactic processing.

Structure choices in production is influenced by prior utterances, both when these experiences stem from the speaker's prior productions and when the experiences stem from the comprehension (Bock et al. 2007). Speakers learned their native language by

exposure to their linguistic literary and conversational environment. To produce and comprehend words and sentences, speakers use their knowledge of language structure, their knowledge of the situation they are in, including the previous discourse and the local situation, and their cognitive abilities, including memory, attention, and motor control.

4.1.2 Goal

The goal of the this experiment is to investigate the comprehension ability of Myanmar speakers on relative clause structures (active and passive), which is proven to be as significant as a picture description task.

4.1.3 Participants, Materials and Method

Participants are laborers from Gimhae city, who are between 22 and 35 years old of Myanmar native speakers. The total number is 30, which consists 29 males and 1 female. All participants have never been participated in similar experiments. Ten verbs and ten colour pictures that were used in main experiment were reused, which had equal frequencies of active and passive use. In addition, there are 20 fillers for a total of 30 trails. Fillers are included to reduce strategic effects and structural priming from the repetition of structure from

one to the next. The focus of the this experiment is testing the comprehension ability on relative clause structures, not for production ability so the method that used in this experiment is different from the previous experiment. In the previous experiment, participants themselves generated the answers. But in this one, answers were already given. Two possible answers were written at the bottom of the pictures and participants chose one, active or passive, depending on their comprehension by checking a mark. Test and fillers trails are pseudo randomized such that there are always at least two filler trails between any two test trails.

4.1.4 Results and Discussion

The responses on thirty test trails from the experiment are coded for actives or passives to measure Myanmar speakers' preference on language structures. As the results, proportion that speakers chose actives is 97 % and those of passives is 3 %. All speakers show a rather strong preference on active structures. According to the PDC account (Gennari and MacDonald 2009), utterances that speakers produce were influenced by experience, including comprehension experience. The interesting point here is that the results of the experiment showed that Myanmar speakers have more comprehensible ability on active relative clauses than passive relative clauses. The proportion of passive that the speakers chose does not go beyond 3%.

By viewing this point, passive sentences are difficult to comprehend for Myanmar speakers.

4.2 Text Analysis

4.2.1 Goal

The goal of text analysis is to account for the different rates of production frequency of active and passive sentence structures in Myanmar, in order to gauge Myanmar speaker's experience with these constructions, and use the these environmental patterns to make predictions about production patterns. The framework on which this study is based is PDC account. Given the sensitivity to distributional information in language processing, experience plays a decisive role in the procedure of comprehension as well as production (Park 2015).

Speaker's processing of language structure reflects the distributional regularities of their experience (Gennari and MacDonald 2009). The initial choice of two alternatives between actives and passives is determined by distributional information in the linguistic input concerning the relative frequencies of two alternative structure pattern (Foder and Inoue 1994, Phillips 2004). This research applies Myanmar texts as an approximation of speakers' experience to determine the extend to which particular distributional patterns (

active or passive) might be linked to the particular pattern of proximity observed in the previous experiment of production frequency.

4.2.2 Method, Materials and Procedure

Two text were selected. One text is from the storybook and another text is from the documentary. Both were chosen by orienting to the readers aged above 20.

(20) I can see you, but I cannot touch you (2014, pp 424)

(21) The earth that I love (2000, pp 512)

The types of form, written and spoken, are equally balanced. The sentences relevant to this study are selected and recorded based on the following criteria: actives and passives. Specifically, this analysis is concentrated on the main verbs that are used in sentences. All of the sentences containing syntactic passive verbs *khanya* are recorded as passive sentences and sentences without *khanya* verbs are recorded as active sentences by hand.

4.2.3 Result

As the results, there are 8480 sentences in the first text. Among them, 8465 sentences are actives which is 99% and 15 sentences are passives which is 1% of the total sentences. In the second text, 11251 sentences are actives of total 11280 sentences, which is equal to 99% and 29 sentences are passives which is equal to 1%. Frequency of active sentences are relatively much than those of passive sentences in both texts. By viewing this points, Myanmar speakers have more exposure with active voices than passive voices.

4.3 General Discussion

In both experiment and corpus analysis, there appears a preference on active structures in Myanmar. While knowledge about passives is undeniably part of core grammar, individual speakers differ in the amount of experience they have had with this structure. In particular, since passives are found predominantly in formal writing text, speakers who are more familiar with this kind of discourse will have had more exposure to this structure than other speakers (Montag and Macdonald 2014). In contrast, it can predict that speakers who has less exposure with passive voices may produce less passive structures.

Text analysis provides a partial answer to this with evidence that occurrence of passive voices in Myanmar texts is relatively less and

the number of frequency does not go beyond 1%. At the same time, the percentage of active voices is 99% in both texts. This statistics implies that Myanmar speakers rather low chances of being exposed to passive sentences. This results suggested that language experience via reading has a significant effect on langage comprehension as well as production. Speakers who are not familiar with passive are difficult to comprehend and produce those structures and, instead, they try to utter structures that they are more comprehensible and more familiar (Gennari and MacDonald 2009). The PDC account showed that correlations between the environment (such that corpus accounts) and sentence comprehensions and showed that linguistics experience have direct effects on linguistic performance, supporting a significant role for learning in guiding sentence processing (Gennari and MacDonald 2009).

5. Conclusion

My aim in this thesis is to investigate the impact of animacy on Myanmar relative clause production. Some researchers investigated animacy effect on different languages, Montag and MacDonald (2012) on English and Japanese, and Park (2013) on Korean. But there were no research on Myanmar language.

Some researchers stated that animacy had a prominent effect on passive relative clause structure production (Jessica and MacDonald 2009; Montag and MacDonald 2012; Park 2013) and some said that animacy plays a less prominent role in passive structure productions (Silvia P. Gennari, Jelena Mirkovic and Maryellen C. MacDonald 2012). According to the Montag and MacDonald, both of English and Japanese speakers uttered almost exclusively passive relative clauses with animate head nouns. When the head noun was inanimate, they produced both of active and passive relative clauses. Even though English and Japanese differ in the proportions of active and passive relative clauses for inanimate head noun, they both clearly exhibit an overall animacy effect on structure choices in relative clauses.

Park (2013) also conducted a similar experiment on Korean speakers to see cross-linguistic variations of animacy effects among English, Japanese, and Korean. Korean has similar word order with Japanese, SOV. Park thought that languages that had similar word

orders would give similar results. Although Korean speakers uttered less passive voices with animate head nouns than English and Japanese, they also utter more passive voice with animate heads than inanimate heads. Noun animacy also had an effect on Korean language. The fact that I noticed is speakers who have similar word order languages may produce different sentence structures. I got an idea to examine the animacy effect on Myanmar relative clause because Myanmar canonical word order is SOV like Korean and Japanese.

To test the impact of animacy, experiments was conducted. In the first experiment, a picture description task was administered to 40 participants who were Myanmar native speakers. Colour pictures were imitated and reused, displaying ten verbs. In each pictures, two instances of particular verb, once acting upon an animate grammatical object and once acting upon an inanimate grammatical object, were displayed. The participants were asked the target questions, one was targeted to animate object and the other question was targeted toward inanimate object. To get the answers with relative clause, the colour of target items were asked. For the animate objects, the target questions were the colour of the clothes of patient; for the inanimate objects, the target questions were the colour of patients items. As result, Myanmar speakers produced more active types when the head noun were inanimate heads, and both active and passive types were produced when the head nouns were animates. But frequency of actives was higher than that of passives in animate head noun condition. Unlike Korean and Japanese speakers, Myanmar speakers

produced more active types whether the head noun was animate or inanimate. According to the results, the fact that I recognized is animacy still affects on Myanmar relative clause production although it has less effect on Myanmar than other three languages.

The interesting point is that the relative proportion of passive structures in Myanmar is relatively lower than the other languages. According to Gennari and MacDonald's PDC account, role of experience of previous utterances of language affects on structure productions and comprehension. When speakers produce the utterances, they usually repeat the syntactic structures which have been exposed several times in their daily lives by reading the books and listening the another speaker's utterances. In order to find the reason of why Myanmar speakers rarely used the passive structures, two kinds of experiment was conducted. The first one is retesting Myanmar speakers' preference on sentence structure to show statistics validity on active structure preference. According to the results, almost all speakers selected more active structures. And then, text analysis was carried out. Relative proportions of active and passive sentences were accounted by analysing the two kinds of novel book. As result, the relative proportion of actives is 99% and those of passive is 1%. According to the experiment and text analysis, speakers have more exposure with active sentences and this experience tend to choose more active voices.

This results can conduct with the results of main experiment. The impact of animacy can be seen in graph 6. Speakers learned both

comprehension and production ability from the same distributional properties of the language (Gennari and MacDonald 2009). Noun animcy affects on language structures and all of the speakers produced more passive structures with animate head nouns although they had different passive proportions. Among them, the passive proportion rates of Myanmar is relatively lower than the other languages. The language environment of Myanmar speakers is relatively full with active structures and they have less chances of being exposed to passive structures.

The effect of semantic integration has important implications for how the language production system coordinates syntactic planning processes. The avaliable data suggest that despite the cross-linguistic differences in the production of passive relative clause with respect to animacy, speakers of English, Japanese, Korean and Myanmar all make the similar structural choices with respect to semantic factor of animacy in the relative clause construction. This finding suggests that production choices reflect both cognitively motivated production demands such as noun accessibility as well as language specific constraints on frequency/ experience faced by the speakers.

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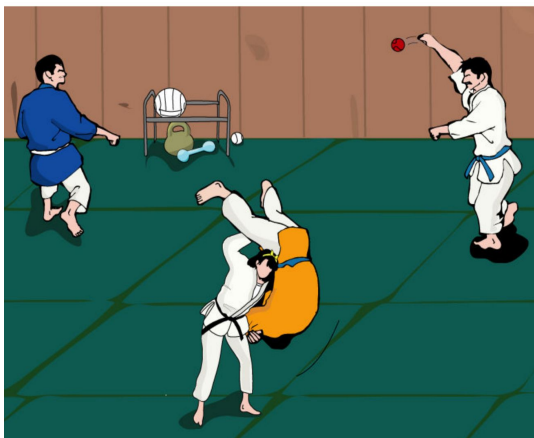Thant. W., Htwe, T. and N. Thein. (2011a). *Syntactic Analysis of Myanmar Language.*

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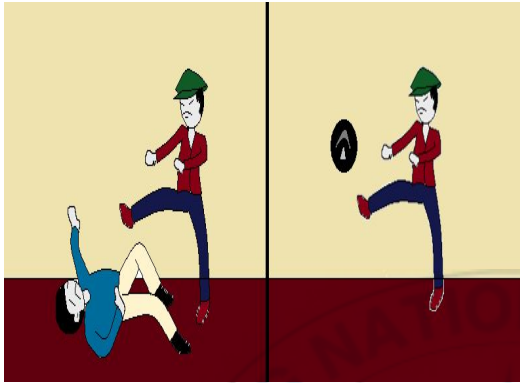
APPENDICES

1.(a) Who is wearing the orange?
  (b) What is Pink?

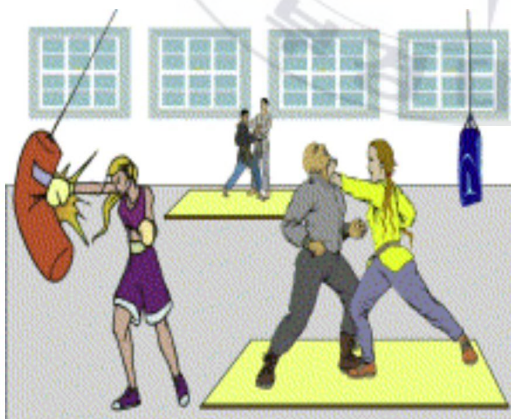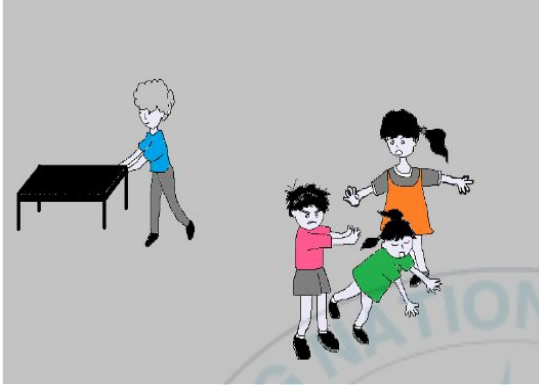2. (a) who is wearing the yellow?
   (b) What is red?

3 (a) Who is wearing the blue?
  (b) What is black?

4 (a) Who is wearing the grey?
  (b) What is orange?

5. (a) Who is wearing the green?
   (b) What is black?

6. (a) Who is wearing the orange?
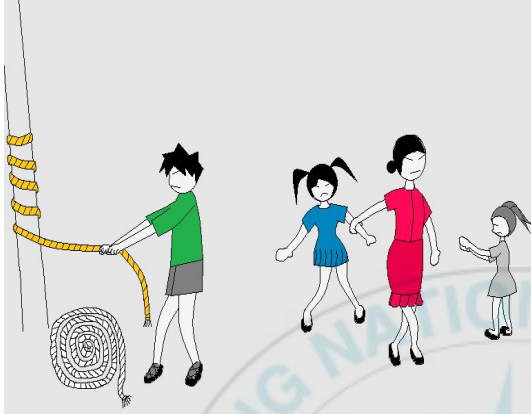   (b) What is green?

7. (a) Who is wearing the blue?
   (b) What is green?

8. (a) Who is wearing the red?
   (b) What is pink?

9. (a) Who is wearing the blue?
   (b) What is yellow?

!0. (a) Who is wearing the green?
    (b) what is pink?