# Chapter 1

Introduction

A variety of models have been used to clarify the correlation between the lexical semantics and the syntax of a word. Especially, the study of lexical semantics occupies a vital status to explain the assumption that the meaning of a verb affects its syntactic behavior. Furthermore, it is drawn attention to classify verbs in a systematical way via the verbal semantics. (Chiang 2006, Hu 2007, Levin 1993, Liu 1999, Liu 2002, Tsai et al. 1998). Levin (1993) contributed towards a classification of three thousand and one hundred English verbs with the alternation-based approach and Liu (2002) made effort on Mandarin verbal semantics. Motivated by the literatures, this study attempts to focus on Mandarin perception verbs to observe the symbolic mappings from lexical semantics to syntax. To provide an organized explanation, this study adopts the frame-based approach (Fillmore & Atkins 1992) to explore the set of verbs.
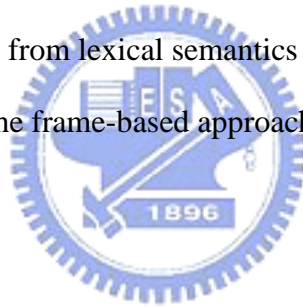
1.1 The Issue: Verbs of Perception

It has been noticed that there are diverse types of perception verbs. By investigating fifty-three languages representing fourteen language stocks, Viberg (1984) argued that perception verbs essentially have three types: active, passive, and copulative. The three types are shown in the following table.

Table 1. The Basic Paradigm of Perception Verbs in English (Viberg 1984)

Sense Modality	ACTIVE PVs	PASSIVE PVs	COPULATIVE PVs
Vision	look (at)	see	look
Hearing	listen (to)	hear	sound

Touch	feel	feel	feel
Smell	smell	smell	smell
Taste	taste	taste	taste

From the table above, it reveals that the English perception verbs are classified according to not only five senses but also three dimensions in Viberg's typological analysis. The dimensions are based on the volitionality of an abtained perceptual experience. Since it provides a cross-linguistic observation of perception verbs, we examine whether Mandarin perception verbs show such properties. Through the examination, it is found that Mandarin perception verbs represent correspondent diversities, which is displayed in Table 2.

Table 2. The Basic Paradigm of Perception Verbs in Mandarin

Sense Modality	Activity PVs	Achievement PVs	Stative PVs
Vision	看 *kandao* 'see'	看到 *kandao* 'see' 、 看見 *kanjian* 'see'	看起來 *kanqilai* 'look'
Hearing	聽 *ting* 'listen'	聽到 *tingdao* 'hear' 、 聽見 *tingjian* 'hear'	聽起來 *tingqilai* 'sound'
Touch	摸 *mo* 'touch'	摸到 *modao* 'touch'	摸起來 *moqilai* 'feel'
Smell	聞 *wen* 'smell'	聞到 *wendao* 'smell'	聞起來 *wenqilai* 'smell'
Taste	嚐 *chang* 'taste'	嚐到 *changdao* 'taste'	嚐起來 *changqilai* 'taste'

Similarly, Mandarin perception verbs perform the distinction of types. However, we label the three types as **Activity**, **Achievement**, and **Stative** on the basis of the event types of the verbs. In terms of the event types, van Voorst (1988) looked at aspectual variations and claimed that achievement verbs generally do not allow the progressive form. *See* and *hear* are

taken for illustration in his statement.

　　Ex: *He was hearing the fire-alarm.

　　　*He was seeing the downtown area.

Equivalently, the distribution of aspectual differences can be seen in Mandarin perception verbs. Examples are given below.

(1) Aspectual Variations among Mandarin Perception Verbs

　　a. Progressive

　　➢ 我<u>正在</u>**聽**台北愛樂的演奏。

　　　wo zhengzai ting taibei ai-yue de yanzou

　　　I PROG listen Taipei love-misuc DE play

　　　'I am listening to the playing of Taipei Philharmonic Orchestra.'

　　➢ *我<u>正在</u>**聽到**那聲巨響。

　　　wo zhengzai tingdao na sheng ju-xiang。

　　　I PROG hear that voice huge-sound

　　　'I am hearing that loud sound.'

　　➢ *他的嗓門<u>正在</u>**聽起來**很大聲。

　　　ta de sangmen zhengzai tingqilai hen dasheng

　　　he DE voice PROG sound very loud

　　　'His voice is sounding very loud.'

　　b. Perfective

　　➢ 我**聽**<u>了</u>那張 CD。

　　　wo ting le na zhang CD

　　　I listen PERF that CL CD

　　　'I have listened to that CD.'

　　➢ 我**聽到**<u>了</u>那聲巨響。

　　　wo tingdao le na sheng ju-xiang

I   hear   PERF   that   voice   huge-sound

'I have heard of that loud sound.'

➤ *他的嗓門**聽起來**了很大聲。

ta   de   sangmen   tingqilai   le   hen   dasheng

he   DE   voice   sound   PERF   very   loud

'His voice has sounded very loud.'

From (1), it shows that the hearing verbs in Mandarin are varied in aspectual representations. 聽 *ting* 'listen' can take progressive as well as perfective aspectual markers; 聽到 *tingdao* 'hear' can only take perfective aspectual markers; but 聽起來 *tingqilai* 'sound' can take neither progressive nor perfective aspectual markers. The aspectual variations among the perception verbs provide a basis to classify them into three main types: Activity, Achievement, and Stative by adopting some criteria to distinguish lexical aspects (Smith 1991, Tang 1992, Tang 2000, Huang *et al* 2000).

However, a noticeable difference between Mandarin and English is revealed from the comparison of Table 1 and Table 2. That is, the morphological characteristics are quite different between the two languages. From Table 1, we see that the distinction of types is exhibited through lexical items. Take English hearing verbs for example. In Table 1, hearing verbs mainly include 'listen', 'hear', and 'sound'. The three lexical items respectively carry one type and they show seldom relationship on the morphological performance. Nevertheless, in Table 2, the Mandarin perception verbs of different types are morphologically-related closely. Take Mandarin hearing verbs for illustration. The verbs of the three types are 聽 *ting* 'listen', 聽到 *tingdao* 'hear', and 聽起來 *tingqilai* 'sound'. It exhibits that the suffixes such as 到 *dao* 'reach' and 起來 *qilai* 'rise' cause diverse grammatical behaviors of the perception verb 聽 *ting* 'listen' when the suffixes are attached to the root morpheme, that is, the perception verb 聽 *ting* 'listen'. Such difference between English and Mandarin results

from their language types. English is a synthetic language while Mandarin is an analytic language. That is why we see the comparison from Table 1 and Table 2.

In this way, this study pays attention to Mandarin perception verbs from grammatical perspective as well as morphological perspective to observe the semantic-syntactic behaviors. With the observation as evidence and basis, the study attempts to analyze the verbs in a systematic way.

1.2 The Questions

Due to the differences aroused by verbal behaviors and morphological make-ups, some questions are to be explored. First, what are the semantic characteristics behind the diverse verbal behaviors and morphological make-ups of perception verbs? Secondly, how to organize and categorize the Mandarin perception verbs according to the mapping between semantics and syntax? Thirdly, after identifying the subclasses of the Mandarin perception verbs, what should be noticed in their interrelationship? These are the questions the study aims to answer.

1.3 Theoretical Framework: Frame Semantics

To provide an answer to the questions above, this analysis is based on Frame Semantics (Fillmore & Atkins 1992). The approach emphasizes that '*a word's meaning can be understood only with reference to a structured background of experience, constituting a kind of conceptual prerequisite for understanding the meaning*' (Fillmore & Atkins 1992:76-77). That is, verbs which share a conceptual background belong to an identical class, which is named as 'frame' in the theory. Since a frame means a specific conceptual background, the essential participant roles are considered 'frame elements'. The differences among the verbs can be exhibited through the diverse distributions of the frame elements. Besides, the verbs also show differences in grammatical representations which interact closely with the semantic properties, frame elements. Following the arguments, this paper attempts to analyze Mandarin

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perception verbs with a balanced observation between semantics and syntax.

In addition, this thesis also adopts two theories which are developed from the basis of frame semantics. One is the Berkeley FrameNet Project (Baker, Fillmore, & Lowe 1998; Fillmore & Baker 2001) (URL: http://framenet.icsi.berkeley.edu/) and the other one is the construction of Mandarin VerbNet proposed by Liu and Chiang (2008).

1.3.1 The Berkeley FrameNet Project

The Berkeley FrameNet Project provides an online lexical resource for English. It contributes to a classification of English verbs into more than two hundred groups on the basis of Frame Semantics by examining the collected corpus. Each frame is labeled with a frame description containing a set of frame elements (FE), which refer to the semantic roles. Besides, to present the frame-to-frame relevance aroused by the combination of semantic and syntactic valence of lexical items, FrameNet displays the relevance in a lexicographic form. The types of frame-to-frame relations are shown as Table 3 (Ruppenhofer *et al*, 2006:104).
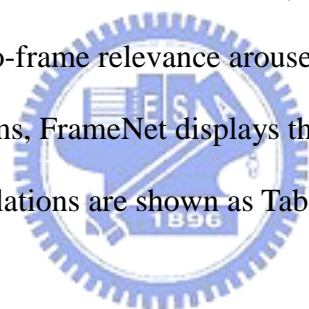
Table 3. Types of Frame-to-frame Relations in FrameNet

Relation	Sub	Super
1. Inheritance	Child	Parent
2. Perspective_on	Perspectivized	Neutral
3. Subframe	Component	Complex
4. Precedes	Later	Earlier
5. Inchoative_of	Inchoative	State
6. Causative_of	Causative	Inchoative/ State
7. Using	Child	Parent
8. See_also	Referring Entry	Main Entry

Out of the types, *Inheritance* and *Using* are the two relations that will be discussed most among the conceptual structure of perception verbs in this study. Thus, here we give a brief

review of *Inheritance* and *Using* while the other relations are not included. Both *Inheritance* and *Using* relate a Super_frame (the less dependent, or more abstract) and a Sub_frame (the more dependent, less abstract) as a parent-child relationship. *Inheritance* is the strongest relation between frames (Ruppenhofer et al, 2006:104). That is, what is specific semantically to the Parent frame must correspond to its Child frame, such as frame elements, semantic types and frame relations with other frames, etc. As for the relation of *Using*, the Child frame describes the possible properties of its Parent frame. In other words, the Child frame uses the Parent frame since words in the Child frame characterize the events which are exhibited by the words of the Parent frame.

   Since FrameNet has looked at a lot of English verbs, it offers a resource for other languages to be probed into the similar or different features semantically and syntactically.

1.3.2 The Construction of Mandarin VerbNet

   According to the Frame Semantics, Liu and Chiang (2008) proposed a construction of Mandarin VerbNet with an illustration from the analysis of Mandarin statement verbs. They aim '*to establish an infrastructure and principles of constructing the Mandarin lexical database*' and '*to provide a linguistically motivated database with detailed lexical semantic information on the basis of grammatical and collocational analysis*' (Liu & Chiang 2008:242). To make the frame-based analysis more systematic, some characterizations are added to specify each frame and frame-to-frame relationship in their argument. Liu and Wu (2003) suggested that a Conceptual Schema which is plotted according to the specifications of a frame can clarify the conceptual link between the highlighted frame elements. In this way, a frame is specified with a Definition, a set of core vs. non-core Frame Elements, Conceptual Schema, Basic Patterns, Collocational Associations, and Semantic Attributes.

   Besides the specification of each frame, they also proposed a verbal classificational scheme. To capture the different scopes of semantic properties mapping on syntactic features

in various frames, four layers of frame types provide their conceptual backgrounds. From top to down, the four layers are Archiframe, Primary Frame, Basic Frame, and Micro-frame. The definitions and the distinguishing criteria of these layers of frames are summarized in Table 4.

Table 4.

Summary of Four-layered Working Taxonomy of Grouping Frames (Liu & Chinag 2008)

Type of Frame	Definition	Distinguishing Criteria
Archiframe	a broad semantic domain, providing the maximal scope of background information for a unique event type	self-containing conceptual schema
Primary frame	a major relational subpart of an archi-frame, corresponding to primary categories to primary categories in cognition with frequently used or generic lemma	subpart of the schema with a unique set of core frame elements
Basic frame	a frame which highlights a particular role or relation within a primary frame	syntactically expressed foregrounding or backgrounding of certain frame elements
Microframe	a subframe which shows a finer specification of the features of participant roles by being identified from a basic frame,	syntactically revealed specifications of frame attributes (features of frame element)

The hierarchical presentation of taxonomy of frames provides a systematic explanation of frame-to-frame relations. It makes clear that a sense of a verb can be captured depending on the semantic scope. That is why this study adopts the approach proposed by Liu and Chiang (2008).

1.4 Scope and Goal

The scope of the study focuses on the verbs denoting perception-related events. As for their variety of the meaning extensions (Sweetser 1990), only the semantic shift from perception to cognition is discussed in the research. The verbs in question are 感知 *ganzhi* 'perceive', 感覺 *ganjue* 'feel', 覺得 *juede* 'feel', 感到 *gandao* 'feel', 看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch', 聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see', 聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch'、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch', 看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來 *changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、感覺起來 *ganjueqilai* 'feel'、看出 *kanchu* 'detect'、聽出 *tingchu* 'detect'、聞出 *wenchu* 'detect'、嗅出 *xiuchu* 'detect'、感覺出 *ganjuechu* 'detect'、察覺出 *chajuechu* 'detect', 疼 *teng* 'ache'、痛 *tong* 'ache'、痠 *suan* 'muscular pain'、癢 *yang* 'itch'、疼痛 *tengtong* 'ache'、澀 *se* 'rough'、乾澀 *gangse* 'rough'、餓 *e* 'hungry'、飢餓 *ji-e* 'starving'、飽 *bao* 'full', 酸 *suan* 'sour'、甜 *tian* 'sweet'、苦 *ku* 'bitter'、辣 *la* 'spicy'、鹹 *xian* 'salty'、臭 *chou* 'stinky'、香 *xiang* 'fragarant'、嗆 *qiang* 'choking'、冰 *bing* 'icy'、涼 *liang* 'cool'、溫 *wen* 'warm'、熱 *re* 'hot'、燙 *tang* 'heated'、硬 *ying* 'hard'、軟 *ruan* 'soft'、清晰 *qingxi* 'clear'、清楚 *qingchu* 'clear'、朦朧 *menglong* 'vague'、模糊 *mohu* 'vague'、吵 chao 'noisy'、靜 jing 'quiet' and so forth.

The goal of this study is to classify the Mandarin perception verbs into frames on the basis of corpus observation and to represent a systematic analysis of the verbs. Also, we aim to depict the interrelationship of different perception frames in a clear way.

1.5 Outline of the Thesis

The thesis contains six chapters. Chapter one is an introduction of the thesis. Chapter two reviews the previous researches concerning perception verbs. Chapter three presents the database and the methodology. Chapter four shows the findings which motivate this study to probe into. Chapter five provides a frame-based semantic analysis of Mandarin perception verbs. Finally, Chapter six makes a conclusion of this study and gives a suggestion of further topics to be investigated.

Chapter 2

Literature Review

In this chapter, the studies which probe into perception verbs are reviewed from three dimensions: the classification of perception verbs, the complements of perception verbs, and the multiple senses of perception verbs. Therefore, we arrange the chapter into four main sections. Section 2.1 looks at the studies which concern the classification of perception verbs. Section 2.2 discusses the studies which concentrate on the complements of perception verbs. Section 2.3 reviews the studies which explore the multiple senses of perception verbs. Section 2.4 comments on the reviewed studies.

2.1 Studies on Perception Verb Classification

This section reviews the studies which research the classification of perception verbs. To present the literatures in a clear way, we introduce them from three aspects. Therefore, Section 2.1.1 discusses typological observations. Section 2.1.2 focuses on verbal behavior observations. Section 2.1.3 displays a frame-based approach to categorize the verbs.

2.1.1 Typological Observation

A cross-linguistic study contributes to remarkable language universals. Viberg (1984) made his efforts towards a typological study on perception verbs. Investigating fifty-three languages, Viberg discovers some significant representations of perception verbs in various aspects. In his analysis, there are criteria to differentiate perception verbs: *dynamic system*, *base selection*, and *sense modality*, shown as Table 5. The *dynamic system* is the criterion to classify perception verbs according to the event types of the verbs. There are mainly three types in the *dynamic system*: *Activity*, *Experience*, and *Copulative*. Namely, the three types show different event structures. *Activity* indicates a perception event which can be controlled to occur or not by a conscious agent, such as *Peter was **looking at** the birds / Peter stopped **looking at** the*

birds. As for *Experience* and *Copulative*, it is possible for *Experience* to display a stative event type or an inchoative type, such as *Peter saw the birds*, while *Copulative* only allows the event type of state, such as *Peter looked happy*. Moreover, with the criterion of the *base selection*, the three types are separated by the semantic role of the grammatical subject as two categories. One is *Experiencer-based*, and the other is *Source-based*. That is, the subject might be either an experiencer or a source in a perception experience. In this way, *Activity* and *Experience* are included in the *Experiencer-based* category of the *base selection* because the subjects both carry the semantic role of the experiencer; on the contrary, *Copulative* belongs to the *Source-based* category for its subject only takes the semantic role of the source. In addition to the two criteria, a basic criterion to classify the perception verbs is the *sense modality*. The basic five sense modalities are *sight*, *hearing*, *touch*, *taste*, and *smell*. Integrating the three principles, Viberg (1984) presents the correspondent perception verbs and sentences in the following tables.

Table 5. The basic paradigm of the verbs of perception (Viberg 1984:125)

	Experiencer-based		Source-based
	Activity	**Experience** (state/ inchoative)	**Copulative** (state)
sight	look at	see	look
hearing	listen to	hear	sound
touch	feel	feel	feel
taste	taste	taste	taste
smell	smell	smell	smell

Table 6. The basic paradigm of the verbs of perception and sentences (Viberg 1984:125)

	Activity	**Experience**	**Copulative**
sight	Peter **looked at** the birds. Peter was **looking at** the birds.	Peter **saw** the birds.	Peter **looked** happy.
hearing	Peter **listened to** the birds. Peter was **listening to** the birds.	Peter **heard** the birds.	Peter **sounded** happy.

touch	Peter **felt** the cloth. Peter was **feeling** the cloth.	Peter **felt** a stone under his foot.	The cloth **felt** soft.
taste	Peter **tasted** the food. Peter was **tasting** the food. /to see if he could eat it.	Peter **tasted** garlic in the food.	The food **tasted** good/bad. The food **tasted** of garlic.
smell	Peter **smelled** the cigar. Peter was **smelling** the cigar. /to see if he could smoke it.	Peter **smelled** cigars in the room.	Peter **smelled** good/bad. Peter **smelled** of cigars.

In addition, Viberg (1984) proposes that there is a lexicalization hierarchy of sense modalities, shown in (2).

(2) The modality hierarchy:

$$\textbf{sight > hearing > touch >} \begin{cases} \textbf{smell} \\ \textbf{taste} \end{cases}$$

As (2) shows, sight and hearing are the top two sense modalities of the hierarchy. It is aroused by the complexity of lexical items. Compared with the other three sense modalities, sight and hearing are expressed with much more lexical items to present the differences in the dynamic system under the Experienced-based base selection. It can be seen from Table 7 that the lexical items of sight and hearing vary while the other three do not.

Table 7. The Basic Paradigm of the Verbs of Perception:

The lexical items of sight and hearing are marked to show the variation.

	Experiencer-based		Source-based
	Activity	**Experience (state/ inchoative)**	**Copulative (state)**
sight	look at	see	look
hearing	listen to	hear	sound
touch	feel	feel	feel
taste	taste	taste	taste
smell	smell	smell	smell

Viberg's study on perception verbs provides some insightful analyses for this study to refer. Mandarin perception verbs exhibit the properties which Viberg suggested above, such as the distinction of the base selection of the subject, the dynamic system for the event type, and the modality hierarchy shown by lexical complexity. It provides remarkable observations for this study to concern.

2.1.2 Verbal Behavior Observation

Focusing on the expression and the interpretation of the arguments of a verb, Levin (1990: 185) claimed that verbal behaviors provide key evidence to investigate the lexical realization of a verb. Based on the assumption, English verbs are classified by Levin (1990), including perception verbs. According to a general observation of the diverse grammatical representations, perception verbs are distinguished into four categories: See verbs, Sight verbs, Peer verbs, and Stimulus Subject Perception verbs. Levin's analysis of perception verbs is shown in the following table.

Table 8. Levin's Classification of Perception Verbs (1990)

	Introduction	**Role of Subject**	**Verbal Behavior**	**Class Members**
See verbs	The verbs specify an actual perception of some entity.	Perceiver	1. Transitive use: The direct object is taken as what is perceived. 2. Aspectual restriction: Seldom do the verbs take a progressive aspect unless a special meaning is presented.	*detect, discern, feel, hear, notice, see, sense, smell, taste*

Sight verbs	The verbs are differentiated from the *See* verbs because the complements are shown in a more limited range.	Perceiver	1. Transitive use: The direct object is taken as what is perceived. 2. Form of complement: Unlike *See* verbs, *Sight* verbs do not take sentential complements. (except: *observe*, *note*, *perceive*)	*descry, discover, espy, examine, eye, glimpse, inspect, investigate, note, observe, overhear, perceive, recognize, regard, savor, scan, scent, scrutinize, sight, spot, spy, study, survey, view, watch, witness*
Peer verbs	The verbs don't necessarily illustrate the understanding of something though a sense.	Perceiver	1. Intransitive use: The verbs do not have direct objects. 2. Form of complement: The verbs mostly take preposition phrases as the complements.	*check (on), gape, gawk, gaze, glance, glare, goggle, leer, listen (to), look, peek, peer, peep, sniff, snoop (on), squint, stare*
Stimulus Subject Perception verbs	The verbs are sometimes viewed under the scope of psych-verbs.	Stimulus	1. Intransitive use: The verbs do not have direct objects. 2. Form of complement: The verbs take adjective phrases as the complements to describe the perceiver's evaluation of the stimulus. 3. Collocation with *to*-phrase: The perceiver is expressed in a *to*-phrase.	*feel, look, smell, sound, taste*

From Table 8, it is found that the perception verbs are classified on the basis of crucial differences of verbal behaviors. In this way, the four categories of perception verbs show contrasts with each other semantically. It reminds this study to attach attention to the interaction between verbal behaviors and semantic properties. Still, it is noticed that Levin's classification tends to represent the most transparent syntactic distinctions without further depictions about the semantic characteristic of each category. The combination of semantics and syntax thus does not seem to reveal close relation from the classification.

2.1.3 Frame-based Approach

In FrameNet, verbs of perception involve some frames. The representative frame, Perception Frame, is inherited by five frames and used by three frames. As Figure 1 shows, the red lines which link frames stand for a relation of *inheritance* while the green lines a relation of *using*.
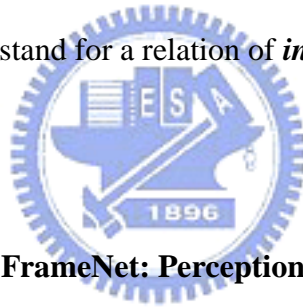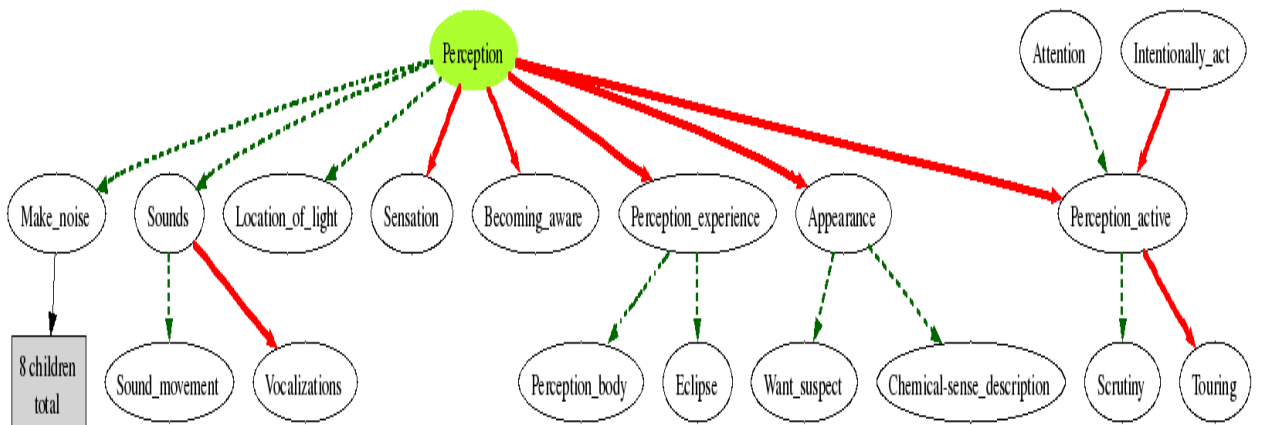
Figure 1. The FrameGrapher in FrameNet: Perception Frame and other Relative Frames

From Figure 1, it can be seen that Perception Frame is inherited by Sensation Frame, Becoming_aware Frame, Appearance Frame, Perception_experience Frame, and Perception_active Frame. A set of frame elements is shared by these frames while each of them highlights different frame elements, such as Phenomenon, Ground, and Body_part, etc.

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In this way, there are also some syntactic distinctions among the frames. On the other hand, Perception Frame is used by Make_noise Frame, Sounds Frame, and Location_of_light Frame. In terms of the three frames, Perception Frame offers a setting for them to describe.

FrameNet proposed an analysis which attempts to strike a balance between semantic and syntactic behaviors. Different from other studies, it pays more attention to the semantic denotations. Though it provided an organized categorization of the perception verbs, we wonder whether it is equivalently found in Mandarin or not.

2.2 Studies on Perception Verb Complements

Berman (1998) investigated the types of perception verb complements (shortened as PVC in the following) in English. In his arguments, there are eleven PVC types: finite, interrogative, adverbial, full infinitive, naked infinitive, present participle, past participle, AdjP, PP, NP, and nominalization.

Nevertheless, according to Schüle (2000), not all the eleven types of complements are taken by perception verbs. Instead, Schüle claimed that there are only five syntactic types of PVC in English. She labeled each of the types with a defined structure and a name, which are listed in Table 9.

Table 9. PVC Types (adopted from Schüle (2000:54))

Complement type	Structure	PVC	Name
Finite complement	*Φ/that* + sentence	+	*that*-PVC
To-infinitive	ACC-NP *to* V (ACC-NP)	+	*to*-PVC
POSS-*ing*	(GEN-NP) V-*ing* (ACC-NP)	-	INOM
Ing-of	(GEN-NP) V-*ing* (of NP)	+	PNOM
ACC-*ing*	ACC-NP V-*ing* (ACC-NP)	+	*ing*-PVC
Naked infinitive	ACC-NP V (ACC-NP)	+	NI-PVC

From the table, except for the POSS-*ing* complement type, the others are PVC in Schüle's statement. The reason why POSS-*ing* complement type is not a PVC is because of being an imperfective nominal (INOM), which is not considered grammatical in terms of perception

verbs by Schüle. On the contrary, the structure '(GEN-NP) V-*ing* (of NP)'of PNOM, is

possible for perception verbs because it is perfective. The examples are shown in (3) and the

contrast between INOM and PNOM are displayed as (3a) and (3b).

(3)   (a) **INOM**: * *I heard [John's singing the song].*

   (b) **PNOM**: *I heard [John's singing of the song].*

   (c) *that*-**PVC**: *John saw that Jim brought a bottle of wine.*

   (d) *to*-**infinitive**: *I saw them to be obnoxious.*

   (e) *ing*-**PVC**: *I saw Mary entering the house.*

   (f) **NI-PVC**: *John saw him bring a bottle of wine.*

Besides analyzing the complements into five syntactic types, following Vendler (1967),

Schüle distinguished three classes of ontological entities to interpret the five structural PVC

types. Table 10 shows the semantic properties of the five structural PVC types.

Table 10. The Semantic Properties of the Five Structural PVC Types (Schüle 2000)

PVC type	Name	Semantic property	Example
Finite complement	that-PVC	**PROPOSITION** **EVENT**	1. John saw [that [Jim brought a bottle of wine]]. 2. John saw [him bring a bottle of wine].
To-infinitive	to-PVC	**PROPOSITION**	I saw [him to be obnoxious].
Ing-of	PNOM	**EVENT**	John heard [his singing of the Marseillaise].
ACC-ing	ing-PVC	**EVENT**	I saw [Mary entering the house].
Naked infinitive	NI-PVC	**EVENT**	I saw [him cross the street].

Schüle observed the complements of perception verbs not only from syntactic perspective

but also from semantic perspective to give a balanced explanation. It prompts this study to

notice syntactic-semantic interrelations of verbs. Nevertheless, Schüle's analysis of English

PVC types seems too simplified form Berman's (1998). Some of the skipped types are still the features we shall notice to examine Mandarin perception verbs.

2.3 Studies on Multiple Senses of Perception Verbs

Sweetser (1990) proposed "MIND-AS-BODY METAPHOR" to explain the close relationship between perception and cognition. By observing English perception verbs, she constructed a structure of metaphors of perception to show the linking between physical senses and mental states, which is summarized in Table 11.

Table 11. The Structure of Metaphors of Perception (Sweetser 1990:38)

Type	Route of Semantic Change	Example
objective + intellectual	a. sight → knowledge, mental vision	"I see." "a clear presentation" "an opaque statement" "a transparent ploy"
	b. sight → physical manipulation→ mental manipulation	grasping = controlling understanding = grasping
interpersonal + communication	hearing → internal receptivity →obedience	I hear you. (I understand you.) (I obey you.)
subjective + emotional	FEEL → EMOTION	"wounded" "stroked" "touched (to the heart)"
	TASTE → PERSONAL PREFERENCE	*One man's meat is another's poison.*

From this structure shown in Table 11, it is found that perception verbs reveal a strong link with mental activities or states. Sweetser argued that the connection of physical perception and internal sensations are not random. Rather, it is systematic and highly motivated. As Table 11 shows, we see that the metaphors of perception involve a lot with cognitive activities. Especially, in terms of the type 'objective + intellectual', verbs of seeing in English are frequently used to describe one's understanding of something. Also, one of the shifted meanings of hearing verbs is associated with understanding. Sweetser suggested that '*some aspects of the instantiation of this metaphor may be fairly common crossculturally…*'(1990:45). It provides a crucial observation and analysis for this study to look at Mandarin perception verbs.

As for Mandarin, Zhung (2002) made efforts to research on the meaning extensions of 看 *kan*'see' ,聽 *ting* 'hear' and 聞 *wen* 'smell'. She claimed that the meaning extensions of the three verbs are categorized into three types: *physical*, *mingle*, and *mental*. By observing the corpus data from Sinica Corpus, she attempted to list all the possible senses of the verbs. From the perspectives of grammaticalization and metaphorical change, she analyzed the verbs and found that 看 *kan*'see' ,聽 *ting* 'hear', and 聞 *wen* 'smell' show highly relevance with mental domain, just as Sweetser (1990) argued.

In terms of Taiwan Southern Min, Lien (2005) explored three of the vision verbs, *khoann3* 看, *kinn3* 見, and *siong3* 相 with a cognitive approach. With his considerable attention to the multiple senses of the verbs, it is evident that visual perception provides a basis for us to know the world so that vision verbs carry perception senses as well as non-perception senses.

2.4 Remarks

From Section 2.1, we see that there are various angles to classify perception verbs. They all contribute to key observations of the characteristics of perception verbs. Still, except for the frame-based approach, most of the classifications do not devote efforts to an explanation of group-to-group relations. That is what this study aims to complete. Even, the study

attempts to present the group-to-group relations in a hierarchical structure to make the classification systematic transparently.

As for Section 2.2, it provides a noticeable property of perception verbs. That is, they interact with other semantic domains sizably, especially the cognition domain. To account for the semantic mappings more clearly, this study intends to explain perception-to-cognition semantic shift by applying the frame-based analysis of perception verbs which shall be done first.

Chapter 3

The Database and Methodology

3.1 Database

The analysis of this study is essentially based on the corpus data from Academia Sinica

Balanced Corpus of Modern Mandarin Chinese (Sinica Corpus,

http://www.sinica.edu.tw/SinicaCorpus/). In addition, the resources contain the English lexical

database FrameNet (http://framenet.icsi.berkeley.edu/), the Academia Sinica Bilingual

Ontological WordNet (Sinica Bow, http://bow.sinica.edu.tw/), the

dictionary software - Dr. Eye 7.0 Professional, and the on-line word database 搜文解字

souwenjiezi (http://words.sinica.edu.tw/). Also, two daily-updated databases are used to verify

the linguistic intuition which is not found in the collected corpus. They are Yahoo

(http://tw.yahoo.com/) and Google(http://www.google.com.tw/).

3.2 Methodology

Firstly, since the study attempted to research Mandarin perception verbs, in addition to

the native linguistic intuition, the English lexical items in FrameNet were also mainly referred

for this study to find the lemmas of Mandarin perception verbs. Secondly, after ascertaining

the lemmas, to observe the corpus was the next step. Sinica corpus is the main resource for

this study to collect corpus and to make an observation. High-frequency verbs were chosen to

be the representative lemmas to start the corpus research. Syntactic patterns and collocational

tendencies were the two important principles for this study to examine. Through the

examination, some other grammatical features become more transparent for this study to

classify the verbs into different groups.

Chapter 4

Findings

This chapter aims to show some findings which are obtained from the corpus observation. These findings reveal clues for the classification of Mandarin perception verbs. We introduce the findings from five dimensions: the aspectual variation, the diversity of participant roles, the variety of syntactic patterns, the morphological types, and the semantic changes. They are discussed respectively in Section 4.1, Section 4.2, Section 4.3, Section 4.4, and Section 4.5. In Section 4.6, a summary of this chapter is given. After the chapter, the analysis shall be exhibited in Chapter five.

4.1 Aspectual Variation of the Verbs

Aspectual properties of verbs cause effect on the argument realization and reveal involvement with the event types (Levin & Rappaport 2005, Voorst 1988). In terms of perception verbs, the aspectual properties are varied (Tobin 1993). On the basis of the previous studies (Comrie1976, Quirk *et al* 1985, Zhuang 2002), Chang (2004) observed Mandarin vision verbs and found a phenomenon concerning the relationship between event types and aspectual characteristics. In her analysis, 看 *kan* 'watch' can represent either the event type of 'activities' or the event type of 'accomplishments' while 看到 *kandao* 'see' only exhibits the event type of 'momentary events'(cf. Smith 1997, Quirk et al 1985, Vendler 1967). Moreover, the event type of the verb 看 *kan* 'look' determines its aspectual properties. That is, when 看 *kan* 'watch' represents the event type of 'activities', it is flexible for the verb to collocate with any aspectual marker, such as 了 *le*,著 *zhe*, and 過 *guo*; on the other hand, when it represents the event type of 'accomplishments', only 了 $_1$ *le* (perfective aspectual marker) can collocate with it. As for 看到 *kandao* 'see', the aspectual markers 了 $_1$ *le* and 過 *guo* are allowable to collocate with it. (Chang 2004: 61-77).

In addition to the findings which focused on 看 *kan* 'look' and 看到 *kandao* 'see' in the

literatures, the study notices that other perception verbs also display a difference of aspectual properties. Such aspectual variation is shown in (4).

(4) Aspectual Variation of Mandarin Perception Verbs

1. Collocation with the PROGRESSIVE aspectual marker 在 *zai*

a. 我在看這張海報。

wo   zai   kan   zhe-zhang   haibao

I PROG look-at this-CL poster

'I am looking at the poster.'

我在聽超級星光大道的音樂會。

wo   zai   ting   chaoji   xingguang   dadao   de   yinyuehui

I PROG listen to super star boulevard DE concert

'I am listening to the concert of Super Star Boulevard. '

我在聞這道香噴噴的辣炒年糕。

wo   zai   wen   zhe-dao   xiangpenpen   de   la chao niangao

I PROG smell this-CL appetizing DE spicy fry rice cake

'I am smelling the appetizing spicy fried rice cakes.'

我在嚐百草。

wo   zai   chang   bai   cao

I PROG taste hundred herb

'I am tasting hundreds of herbs.'

我在摸這隻黃金獵犬的毛。

wo   zai   mo   zhe-zhi   huangjin-liequan   de   mao

I PROG touch this-CL golden-retriever DE hair

'I am touching this golden retriever's hair.'

b. *我<u>在</u>**看到**這張海報。

wo zai kan-dao zhe-zhang haibao

I PROG see-reach this-CL poster

'I am seeing the poster.'

*我在**聽到**超級星光大道的音樂會。

wo zai ting-dao chaoji xingguang dadao de yinyuehui

I PROG hear- reach super star boulevard DE concert

'I am hearing the concert of Super Star Boulevard.'

*我<u>在</u>**聞到**這道香噴噴的辣炒年糕。

wo zai wen-dao zhe-dao xiangpenpen de la chao niangao

I PROG smell- reach this-CL appetizing DE spicy fry rice cake

'I am smelling the appetizing spicy fried rice cakes.'

*我<u>在</u>**嚐到**百草。

wo zai chang-dao bai cao

I PROG taste- reach hundred herb

'I am tasting hundreds of herbs'

*我<u>在</u>**摸到**這隻黃金獵犬的毛。

wo zai mo-dao zhe-zhi huangjin-liequan de mao

I PROG touch- reach this-CL golden-retriever DE hair

'I am touching this golden retriever's hair.'

c. *我在**看出**這張海報上的墨漬。

wo   zai   kan-chu   zhe-zhang   haibao   shang   de   mozi

I PROG see-out this-CL poster upon DE ink

'I am detecting the ink on the poster by seeing.'

*我在**聽出**弦外之音。

wo   zai   ting-chu   xian-wai-zhi-yin

I PROG hear-out string-outside-ZHI-sound

'I am detecting the implications by hearing.'

*我在**聞出**這道辣炒年糕的香味。

*wo   zai   wen-chu   zhe-dao   la chao niangao   de   xiang-we*i

I PROG smell-out this-CL spicy fry rice cake DE aroma-flavor

'I am detecting the aroma of the spicy fried rice cakes by smelling.'

*我在**嚐出**苦味。

wo   zai   chang-chu   ku-wei

I PROG taste-out bitter-flavor

'I am detecting the bitterness by tasting.'

*我在**摸出**這隻黃金獵犬身上的跳蚤。

wo   zai   mo-chu   zhe-zhi   huangjin-liequan   shen-shang   de   tiaozao

I PROG touch-out this-CL golden-retriever body-upon DE flea

'I am detecting the flea on this golden-retriever by touching.'

d. *這張海報在**看起來**很繽紛。

   zhe-zhang   haibao   zai   kan-qilai   hen   binfen

   this-CL poster PROG see-rise very colorful

   'The poster is looking very colorful.'

   *音樂在**聽起來**很悅耳。

   yinyue   zai   ting-qilai   hen   yueer

   music PROG hear-rise very tuneful

   'The music is sounding very tuneful.'

   *辣炒年糕在**聞起來**香噴噴。

   la chao niangao   zai   wen-qilai   xiangpenpen

   spicy fry rice cake PROG smell-rise aromatic

   'The spicy fried rice cake is smelling aromatic. '

   *眼淚在**嚐起來**很苦。

   yanlei   zai   chang-qilai   hen   ku

   tear PROG smell-rise very bitter

   Tears are tasting very bitter.

   *黃金獵犬的毛在**摸起來**好舒服。

   huangjin-liequan   de   mao   zai   mo-qilai   hao   shufu

   golden-retriever DE hair PROG touch-rise very comfortable

   'The hair of golden retrievers is touching very comfortable.

2. Collocation with the PERFECTIVE aspectual marker 了 ₁ *le*

e.　　我**看**了這張海報。

wo　kan　le　zhe-zhang　haibao

I look PERF this-CL poster

'I have looked at the poster.'

我**聽**了超級星光大道的音樂會。

wo　ting　le　chaoji　xingguang　dadao　de　yinyuehui

I listen PERF super star boulevard DE concert

'I have listened to the concert of Super Star Boulevard.'

我**聞**了這道辣炒年糕。

wo　wen　le　zhe-dao　la chao　niangao

I smell PERF this-CL spicy fry rice cake

'I have smelt the spicy fried rice cake.'

我**嚐**了百草。

wo　chang　le　bai　cao

I taste PERF hundred herb

'I have tasted hundreds of herbs

'

我**摸**了這隻黃金獵犬的毛。

wo　mo　le　zhe-zhi　huangjin-liequan　de　mao

I touch PERF this-CL golden-retriever DE hair

'I have touched the hair of the golden retriever.'

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f.　　　我**看到**了這張海報。

wo　kan-dao　le　zhe-zhang　haibao

I see-arrive PERF this-CL poster

'I have seen the poster.'

我**聽到**了超級星光大道的音樂會。

wo　ting-dao　le　chaoji　xingguang　dadao　de　yinyuehui

I hear-arrive PERF super star boulevard DE concert

'I have heard the concert of Super Star Boulevard.'

我**聞到**了這道辣炒年糕。

wo　wen-dao　le　zhe-dao　la chao　niangao

I smell-arrive PERF this-CL spicy fry rice cake

'I have smelt the spicy fried rice cake.'

我**嚐到**了百草

wo　chang-dao　le　bai　cao

I taste-arrive PERF hundred herb

'I have tasted hundreds of herbs.'

我**摸到**了這隻黃金獵犬的毛

wo　mo-dao　le　zhe-zhi　huangjin-liequan　de　mao

I touch-arrive PERF this-CL golden-retriever DE hair

'I have touched the hair of this golden retriever.'

g.   我**看出**了這張海報的墨漬。

 wo   kan-chu   le   zhe-zhang   haibao   de   mozi

 I see-out PERF this-CL poster DE ink

 'I have detected the ink on the poster by seeing.'

我**聽出**了弦外之音。

wo   ting-chu   le   xian-wai-zhi-yin

I hear-out PERF string-outside-ZHI-music

'I have detected the implication by hearing.'

我**聞出**了這道辣炒年糕的香味。

*wo   wen-chu   le   zhe-dao   la chao niangao   de   xiang-we*i

I smell-out PERF this-CL spicy fry DE aroma-flavor

'I have detected the aroma of the spicy fried rice cake by smelling.'

我**嚐出**了苦味。

wo   chang-chu   le   ku-wei

I taste-out PERF bitter-flavor

'I have detected the bitterness by tasting.'

我**摸出**了這隻黃金獵犬身上的跳蚤。

wo   mo-chu   le   zhe-zhi   huangjin-liequan   shen-shang   de   tiaozao

 I touch-out PERF this-CL golden-retriever body-upon DE flea

 'I have detected the flea on the golden retriever by touching.'

h.　　　*這張海報**看起來**了很繽紛。

　　zhe-zhang　haibao　kan-qilai　le　hen　binfen

　　this-CL poster see-rise PERF very colorful

　　'The poster has looked very colorful.'

　　*音樂**聽起來**了很悅耳。

　　yinyue　ting-qilai　le　hen　yueer

　　music hear-rise PERF tuneful

　　'The music has sounded tuneful.'

　　*辣炒年糕**聞起來**了香噴噴。

　　la chao niangao　wen-qilai　le　xiangpenpen

　　spicy fry rice cake smell-rise PERF aromatic

　　'The spicy fried rice cake has smelt aromatic.'

　　*眼淚**嚐起來**了很苦。

　　yanlei　chang-qilai　le　hen　ku

　　tear taste-rise PERF very bitter

　　'Tears have tasted very bitter.'

　　*黃金獵犬的毛**摸起來**了好舒服。

　　huangjin-liequan　de　mao　mo-qilai　le　hao　shufu

　　golden-retriever DE hair touch-rise PERF very comfortable

　　'The hair of the golden retriever has touched very comfortable.'

The examples in (4) show that the perception verbs are varied in aspectual properties. In terms of the collocation with the PROGRESSIVE aspectual marker 在 *zai*, only the set of examples in (a) are grammatical. The set of perception verbs in (a) are 看 *kan* 'look', 聽 *ting* 'listen', 聞 *wen* 'smell', 嚐 *chang* 'taste', and 摸 *mo* 'touch'. On the other hand, as for the collocation with the PERFECTIVE marker 了$_1$ *le*, the sets of examples in (e), (f), and (g) are grammatical while (h) is not. In other words, it is grammatical to occur with the PERFECTIVE aspectual marker 了 *le* for the perception verbs: 看 *kan* 'look', 聽 *ting* 'listen', 聞 *wen* 'smell', 嚐 *chang* 'taste', 摸 *mo* 'touch', 看到 *kandao* 'see', 聽到 *tingdao* 'hear', 聞到 *wendao* 'smell', 嚐 *changdao* 'taste', 摸 *modao* 'touch', 看出 *kanchu* 'detect', 聽出 *tingchu* 'detect', 聞出 *wenchu* 'detect', 嚐出 *changchu* 'detect', and 摸出 *mochu* 'detect'. However, the perception verbs 看起來 *kanqilai* 'look', 聽起來 *tingqilai* 'sound', 聞起來 *wenqilai* 'smell', 嚐起來 *changqilai* 'taste' and 摸起來 *moqilai* 'touch' can neither occur with 在 *zai* nor collocate with 了$_1$ *le*. Chang (1994:90) explained that V-*qilai* construction has such aspectual limits because it belongs to a general or a habitual statement in Mandarin.

Aspectual properties serve to convey event types of sentences (Smith 1983, Vendler 1967, Voorst 1988). Based on the observations concerning the aspectual properties of the Mandarin perception verbs, it is found that the verbs denote diverse event types. To discriminate the event types of the verbs, the following criteria in (5) are also followed besides the examinations in (4).

(5) Criteria to Distinguish Lexical Aspects

(Smith 1991, Tang 1992, Tang 2000, Huang et al 2000, Hu 2007)

    a. reduplication of verb

       ex: 聞聞這泡茶。

          wen   wen   zhe-pao   cha

smell smell this-CL tea

'Smell the tea.'

b. repetition of verb

ex: 她聞了又聞。

ta   wen   le   yo   wen

she smell PERF again smell

'She smelt again and again.'

c. collocation with aspectual verbs: 開始 *kaishi* 'start', 繼續

jixu 'continue', and 停止 *tingzhi* 'stop'

ex: Fafa 立刻開始聞地板

fafa   like   kaishi   wen   diban

Fafa (Name) immediately start smell floor

'Fafa started to smell the floor immediately.'

大家繼續聞這嗆鼻的稻草味。

dajia   jixu   wen   zhe   qiang-bi   de   daocao   wei

everyone continue smell this arid-nose DE straw smell

'Everyone continued smelling the arid smell of straws.'

我們停止聞這怪東西。

women   tingzhi   wen   zhe   guai   dongxi

we stop smell this odd thing

'We stop smelling the odd thing.'

d.   collocation with the verb 一直 *yizhi* 'keep (doing something)'

ex: 幹嘛<u>一直</u>聞我的魚？

ganma yizhi wen wo de yu

why keep smell I DE fish

'Why do you keep smelling my fish?'

e.   collocation with duration phrase

ex: 我閉著眼睛聞了<u>好久</u>。

wo bi zhe yanjing wen le hao jiu

I close ZHE eye smell LE very long

'I closed my eyes and smelt it for a long time.'

According to the examinations with the criteria in (4) and (5), it is found that the Mandarin perception verbs are divided into diverse event types, as Table 12 shows.

Table 12. The Event Types of the Mandarin Perception Verbs

Event types	Mandarin perception verbs
Activity	看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'
Achievement	看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see', 聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch'、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'看出 *kanchu* 'detect'、聽出 *tingchu* 'detect'、聞出 *wenchu* 'detect'

Stative	看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來 *changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、

4.2 Participant Roles of the Verbs

According to the corpus observation, it is found that the participant roles of Mandarin perception verbs are in a variety. The following represents the discovered roles with syntactic categories, definitions, and examples. Section 4.2.1 introduces the agents of perception events, which are often subjects syntactically. Section 4.2.2 presents the perceived phenomenon taken as stimulus in perception events, which are mostly objects syntactically. Section 4.2.3 displays the percept which is resulted after perceptual experiences. These are the main roles in perception events.

4.2.1 The Agents of Perception Events

(6) **Perceiver [NP]**: the animate being who undergoes a perceptual experience

> Examples:

    (a)   [我/Perceiver]**覺得**很冷。

        wo   juede   hen   leng

        I   feel   very   cold

        'I feel very cold.'

    (b)   [他/Perceiver]一下子就**察覺出**食物的鮮度。

        ta   yixiazi   jiu   chajue-chu   shiwu   de   xiandu

        he   soon   solely   detect out   food   DE   freshness

        'He soon detected the freshness of the food.'

(7) **Perceiver_agentive [NP]**: the animate being who performs some action volitionally in

order to have a perceptual experience

➢ Example:

[大家/Perceiver_agentive]都來看流星雨。

dajia   dou   lai   kan   liuxingyu

everyone   all   come   watch   meteor shower

'Everyone comes to see the meteor shower.'

(8) **Perceiver_experiencer [NP]**: the animate being who has a perceptual experience without

any intention or volition

➢   Example:

[小蘭/Perceiver_experiencer]看見門上四個大字，

xiaolan   kanjian   men   shang   si-ge   da   zi

Name   see   door   above   four-CL   big   word

'Xiaolan saw the four big words on the door.'

(9) **Body part [NP]**: the body part which a perceiver obtains a perceptual experience with

➢   Example:

[我的手/Body part]摸到左胸有塊硬硬的東西，

wo   de   shou   modao   zuo   xiong   you   kuai   ying   ying   de

dongxi

I   DE   hand touch left breast have CL hard hard DE thing

'My hand touched something hard in my left breast.'

4.2.2 The Perceived as the Stimulus of Perception Events

(10) **Phenomenon_entity [NP]**: the animate or inanimate entity which a perceiver perceives

➢   Example:

小蘭看見[門上四個大字/Phenomenon_entity]，

xiaolan   kanjian   men   shang   si-ge   da   zi

Name   see   door   above   four-CL   big   word

'Xiaolan saw the four big words on the door.'

(11) **Phenomenon_state [CL]**: the stative phenomenon which a perceiver perceives

➢ Example:

我的手**摸到**[左胸有塊硬硬的東西/ Phenomenon_state]，

wo de shou modao zuo xiong you kuai ying ying de

dong xi

I DE hand touch left breast have CL hard hard DE thing

'My hand touched something hard in my left breast.'

(12) **Phenomenon_event [CL]**: the dynamic phenomenon which a perceiver perceives

➢ Example:

她**看到**[蘇普正在和桑斯兒搏鬥，旁觀的人興高采烈地叫嚷著

/Phenomenon_event]。

ta kandao supu zhengzai han sangsier bodou pang-guan de ren

xing-gao-cai-lie di jiao-rang zhe

she watch-reach Supu (Name) PROG and Sangsier fight aside-watch DE person

pleasure-high-delight-strong DI yell-shout PROG

'She saw that Supu and Sansier were fighting while the onlookers were yelling and

shouting very excitedly.'

4.2.3 The Percept as the Output of Perception Events

(13) **Percept [AdjP] [CL]**: the sensation or impression which is evoked by a perceptual

experience

➢ Examples:

a. 我**覺得**[很冷/ Percept]。

wo   juede   hen   leng

I   feel   very   cold

'I feel very cold.'

b. 我**感到**[肚子開始發疼/ Percept]，有如千刀萬剮般難受。

wo   gandao   duzi   kaishi   fateng, youru   qian-dao-wan-gua   ban

nanshou

I feel belly start ache like thousand-knife-ten-thousand-cut alike unbearable

'I felt that the belly started to ache unbearably as if thousands of knives cut it

into pieces.'

(14) **Judgment [AdjP] [VP]**: the positive or negative judgment made by a perceiver about the

features of a perceived phenomenon which is subjective to a great extent

➤   Example:

a.   你衣服黑黑的**看起來**[很髒/Judgment]，

ni   yifu   hei   hei   de kan-qilai   hen   zang

you   clothes   black   black   DE   look   very   dirty

'It looks very dirty that there are some ink spots on your clothes. '

b.   牠的卵**看起來**[是橙紅色球形/Judgment]，

ta   de   luan   kan-qilai   shi   cheng-hong-se   qiu-zhuang

it   DE   egg   see-rise   is   orange-red-color ball-shape

'Its egg appears to be an orange-red ball-shaped thing.'

(15) **Detected entity [NP]**: the entity which is detected by a perceiver through a perceptual

experience

➤   Example:

他一下子就**察覺出** [食物的鮮度/Detected entity]。

ta   yixiazi jiu   chajue-chu   shiwu   de   xiandu

he   soon   solely detect out   food   DE   freshness

'He soon detected the freshness of the food.'

(16) **Detected fact [CL]:** the fact which is detected by a perceiver through a perceptual experience

   ➢   Example:

他也**看出**[我生了病/Detected fact]。

ta   ye   kan-chu   wo   sheng   le   bing

he   also   see-out   I   born   PERF illness

'He also detected that I got sick.'

(17) **Expected information [QP]**: the information which is expected to be obtained from a perceptual experience

   ➢   Example:

你們**看**，[我是不是比較瘦了/Expected information]？

nimen   kan   wo   shi   bu   shi   bijiao   shou   le

you   watch   I   is   NEG   is   more   thin   PERF

'Look! Am I thinner than before? '

(18) **Inference [CL]**: the inference which is drawn by a perceiver through a perceptual experience

➢   Example:

聽起來[妳似乎有點反應過度/Inference]，

tingqilai   ni   sihu   youdian   fanying   guodu

sound   you   seem   a little   reaction   over

It sounds that you seem to be a little overreacting to this matter.

4.3 Syntactic Patterns of the Verbs with the Participant Roles

On the basis of the findings shown in Section 4.2, a remarkable diversity of syntactic patterns is constituted by the participant roles and the perception verbs. In the following, the patterns are listed with the participant roles from (19) to (24). But it has to be noted that not all of the patterns can be taken by the perception verbs. In this way, after representing the patterns from (19) to (24), a table shall be given to show which verbs the syntactic patterns belong to.

(19) **NP < V < NP**

    a. Perceiver [NP] < * < Phenomenon_entity [NP]

    ➢ Example:

      [他/Perceiver]在黑暗中**感知**了[寒風的吹嘯/Phenomenon_entity]。

      ta   zai   heian   zhong   ganzhi   le   han-feng   de   chuixiao

      he   in   dark   middle   perceive   PERF   cold-wind   DE   blow

      'He perceived the blowing of the cold wind in the darkness.'

    b. Perceiver_agentive [NP] < * < Phenomenon_entity [NP]

    ➢ Example:

      [我們/Perceiver_agentive]轉到主人的臥房看[陶瓷和銅器/Phenomenon_entity]，

      women   zhuan-dao   zhuren   de   wofang   kan   taoci   han   tongqi

      we   turn-reach   host   DE   bedroom   see   pottery   and   brass

      'We turned to the host's bedroom to see the pottery and the brass.'

    c. Perceiver_experiencer [NP] < * < Phenomenon_entity [NP]

    ➢ Example:

      [小蘭/Perceiver_experiencer]**看見** [門上四個大字/Phenomenon_entity]，

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xiaolan   kan-jian   men   shang   si   ge   da   zi

Xiaolan (Name) watch-see door above four CL big word

'Xiaolan saw the four big words on the door.'

d. Perceiver [NP] < * < Detected entity [NP]

➢ Example:

這時[他/Perceiver_cognizer]才嗅出[撲面而至的濃烈酒氣/Detected entity]，

zheshi   ta   cai   xiu-chu   pu   mian   er   zhi   de   nonglie   jiu-qi

now he until smell-out lunge face then arrive DE strong wine-aroma

'Not until now does he detect the coming-to-face strong aroma of wine.'

e. Body part [NP] < * < Phenomenon_entity [NP]

➢ Example:

剛剛[我的手/Body part]不小心摸到[他的頭髮/Phenomenon_entity]，

ganggang   wo de   shou   buxiaoxin   mo-dao   ta   de   toufa

only-just I DE hand accidentally touch-reach he DE hair

'My hand only just touched his hair accidentally.

(20) **NP < V < CL**

a. Perceiver [NP]< * < Percept [CL]

➢ Example:

[我/Perceiver]感到[肚子開始發疼/ Percept]，有如千刀萬剮般難受。

wo   gandao   duzi   kaishi   fateng, youru   qian-dao-wan-gua   ban   nanshou

I feel belly start ache like thousand-knife-ten-thousand-cut alike unbearable

'I felt that the belly started to ache unbearably as if thousands of knives cut it into

  pieces.'

b. Perceiver_agentive [NP] < * < Phenomenon_event [CL]

➢ Example:

[觀眾/Perceiver_agentive]看[他打籃球/Phenomenon_event]不只在意其得分多

寡，更以欣賞他的賞心悅目動作技巧為樂事，

guanzhong kan ta da lanqiu bu-zhi zaiyi qi defen duo-gua, geng

yi xinshang ta de shang-xin-yue-mu dongzuo jiqiao wei le-shi

audience see he hit basketball not-only care QI score much-little even take admire

he DE admire-heart-please-eye action as happy-matter

'The audience watched him play basketball not only for the scores but also for the

joy by appreciating his admirable actions and skills.'

c. Perceiver_experiencer [NP] < * < Phenomenon_event [CL]

➢ Example:

[她/Perceiver_experiencer]看到[蘇普正在和桑斯兒搏鬥，旁觀的人興高采烈地叫

嚷著/Phenomenon_event]。

ta kan-dao supu zhengzai han sangsier bodou pang-guan de ren

xing-gao-cai-lie di jiao-rang zhe

she watch-reach Supu (Name) PROG and Sangsier fight aside-watch DE person

pleasure-high-delight-strong DI yell-shout PROG

'She saw that Supu and Sansier were fighting while the onlookers were yelling and

shouting very excitedly.'

d. Perceiver_agentive [NP] < * < Phenomenon_state [CL]

➢ Example:

[我/Perceiver_experiencer]急忙跑到甲板上，恰好瞥見 [白帝城隱約在高山上

/Phenomenon_state]，

wo   ji-mang   pao   dao   jiaban   shang   qiahao   pie-jian   bodi-cheng

yinyue   zai   gao-shan   shang

I hurry-busy run reach deck above just glimpse Bodi-city darkling in high-mountain

above

'I ran to the deck and just glimpsed that Bodi City is located in the mountain

darklingly.'

e. Perceiver [NP] < * < Detected fact [CL]

➢ Example:

[他/Perceiver_cognizer]也**看出** [我生了病/Detected fact]。

ta   ye   kan-chu   wo   sheng   le   bing

he   also   see-out   I   born   PERF   illness

'He also detected that I got sick.'

(21) **NP < V < QP**

Perceiver_agentive [NP] < * < Expected information [QP]

➢ Example:

[你們/Perceiver_agentive]看[我是不是比較瘦了/Expected information]？

nimen   kan   wo   shi   bu   shi   bijiao   sho   le

you   watch   I   is   NEG   is   more   thin   PERF

'Look! Am I thiner?'

(22) **NP < V < AdjP**

Phenomenon_entity [NP] < * < Judgment [AdjP]

➢ Example:

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[那個餐廳/Phenomenon_entity]**看起來**[富麗堂皇/Judgment_evaluation]，

nage   canting   kan-qilai   fu-li-tang-huang

that restaurant see-rise rich-beautiful-hall-emperor

'That restaurant looks gorgeous.'

(23) **NP < V < VP**

Phenomenon_entity [NP] < * < Judgment [VP]

➢ Example:

[牠的卵/Phenomenon_entity]**看起來**[是橙紅色球形/Judgment]，

ta   de   luan   kan-qilai   shi   cheng-hong-se   qiu-zhuang

it   DE   egg   see-rise   is   orange-red-color ball-shape

'Its egg appears to be an orange-red ball-shaped thing.'

(24) **V < CL**

* < Inference [CL]

➢ Example:

聽起來[妳似乎有點反應過度/Inference]，

tingqilai   ni   sihu   youdian   fanying   guodu

sound   you   seem   a little   reaction   over

'It sounds that you seem to be a little overreacting to this matter.'

As the above shows, the examples from (19) to (24) provide an overview of the syntactic patterns which are constituted of perception verbs and the participant roles. But each pattern is specific to some perception verbs. That is, some perception verbs share a set of syntactic patterns so that they seem to be in a particular group. In Table 13, the correspondence between the syntactic patterns and the verbs is displayed.

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Table 13. The Representative Syntactic Patterns of Perception Verbs

Syntactic Pattern	Pattern of Participant Roles	Perception Verbs which Share the Listed Pattern
NP < V < NP	Perceiver < * < Phenomenon_entity	感知 *ganzhi* 'perceive', 感覺 *ganjue* 'feel', 覺得 *juede* 'feel', 感到 *gandao* 'feel'
	Perceiver_agentive < * < Phenomenon_entity	看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'
	Perceiver_experiencer < * < Phenomenon_entity	聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see', 聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch' 、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'
	Perceiver < * < Detected entity	看出 *kanchu* 'detect'、聽出 *tingchu* 'detect'、聞出 *wenchu* 'detect'、嗅出 *xiuchu* 'detect'、感覺出 *ganjuechu* 'detect'、察覺出 *chajuechu* 'detect'
	Body part < * < Phenomenon_entity	看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch', 聽

			到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see', 聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch' 、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'
NP < V < CL	Perceiver < * < Percept		感知 *ganzhi* 'perceive', 感覺 *ganjue* 'feel', 覺得 *juede* 'feel', 感到 *gandao* 'feel'
	Perceiver_agentive < * < Phenomenon_event		看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'
	Perceiver_experiencer < * < Phenomenon_event		聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see', 聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch' 、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'
	Perceiver_agentive < * <		看 *kan* 'watch'、見 *jian*

	Phenomenon_state	'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'
	Perceiver < * < Detected fact	看出 *kanchu* 'detect'、聽出 *tingchu* 'detect'、聞出 *wenchu* 'detect'、嗅出 *xiuchu* 'detect'、感覺出 *ganjuechu* 'detect'、察覺出 *chajuechu* 'detect'
NP < V < QP	Perceiver_agentive < * < Expected information	看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'
NP < V < AdjP	Phenomenon_entity < * < Judgment	看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來 *changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、感覺起來 *ganjueqilai* 'feel'
NP < V < VP	Phenomenon_entity < * < Judgment	看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來 *changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、感覺起來 *ganjueqilai* 'feel'
V < CL	* < Inference	看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來 *changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、感覺起來 *ganjueqilai* 'feel'

Table 13 reveals that there is indeed a correspondence between certain syntactic patterns with participant roles and some perception verbs. Especially, the groups of verbs which are differentiated by syntactic patterns with participant roles show a systematic diversity on the morphological characteristics. This finding shall be discussed in the following part, Section 4.4.

4.4 Morphological Characteristics of the Verbs

With the findings exhibited from 4.1 to 4.3, numbers of differences among Mandarin perception verbs are revealed in some dimensions, such as aspectual properties, participant roles, and basic syntactic patterns. In addition to the findings, it is found that the morphological elements which are incorporated in the verbs seem influential to cause these differences. Take 看 *kan* 'look' for illustration. When 看 *kan* 'look' associates with diverse words as the suffix morpheme, even it remains to be the root morpheme, the combination of 看 *kan* 'look' and a suffix will result in changes from the properties of 看 *kan* 'look', the mono-syllabic word. Such circumstance is briefly described by displaying Mandarin vision verbs which take 看 *kan* 'look' as root morphemes in Table 14 to represent that the morphological make-ups reveal some relation to the behaviors of Mandarin perception verbs.

Table 14.

Morphological Make-ups and Grammatical Behaviors of Mandarin Vision Verbs

	Morphological Make-up	Aspectual Property	Event Type (situation type)	Complement Type
看 *kan* 'look'	Mono-syllabic V	✓ 了 le ✓ 著 zhe ✓ 過 guo ✓ 在 zhai	Activity	NP CL QP (Interrogative)
看到 *kandao* 看見 *kanjian* 'see'	V + Resultative	✓ 了 le ✓ 過 guo	Achievement	NP CL
看出 *kanchu* 'detect'	V + Resultative	✓ 了 le	Achievement	NP CL
看起來 *kanqilai* 'seem','look'	V + Resultative	ø	Stative	AP VP CL

Table 14 shows that the verbs are varied in the grammatical representations. In terms of the morphological feature, a distinction is also noticed. It reminds this study to pay closer attention to the morphological make-ups when analyzing the classification of Mandarin perception verbs. Further discussion shall be depicted in Chapter 5.

4.5 Semantic Extensions of the Verbs

Perception verbs perform a variety of semantic extensions (Viberg 1984, Sweetser 1990, Schüle 2000). Especially, vision verbs have much more shifted meanings than other perception verbs (Chang 2004, Lien 2005, Zhung 2002). In this thesis, besides 看 *kan* 'see', it is found that Mandarin perception verbs are frequently used to describe non-perception events,

particularly, the cognition events. The examples with appropriate interpretations are shown in the following.

(25) Extended Senses of Mandarin Perception Verbs:

a. 感覺 *ganjue* **'feel'**、覺得 *juede* **'feel'**

➢ from FEELING to THINKING

Example 1:

有時我**感覺**我並不屬於任何一個國家。

youshi wo ganjue wo bing bu shuyu renhe yi-ge guojia

sometimes I feel I even NEG belong any one-CL nation

'Sometimes I feel that I don't belong to any country.'

Interpretation→'Sometimes I think that I don't belong to any country.'

Example 2:

我**覺得**毒蛇代表危險。

wo juede du-she daibiao weixian

I feel poisonous-snake represent danger

'I feel that poisonous snakes signify dangers.'

Interpretation→'I think that poisonous snakes signify dangers.'

b. 看 *kan* **'watch'**、聽 *ting* **'listen'**、摸 *mo* **'touch'**

➢ from WATCHING to THINKING

Example:

我**看**她倒是在撒謊。

wo kan ta dao -shi zai sahuang

I watch she actually PROG lie

'I watch that she is lying actually.'

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Interpretation→'I think that she is lying actually.'

> from LISTENING to UNDERSTANDING

Example:

你有試著去聽他內心的痛嗎？

ni you shi zhe qu ting ta nei-xin de tong ma

you have try Dur go listen he inside-heart ache Question

'Have you ever tried to listen to his pain?'

Interpretation→'Have you ever tried to understand his pain?'

> from TOUCHING to UNDERSTANDING

Example:

去摸一下這個人的個性好不好相處。

qu mo ixia zhe-ge ren de gexing hao bu hao xiangchu

go touch for-a-while this-CL person DE personality good NEG good get-along

'Try to touch whether it is easy or not to get along with this guy.'

Interpretation→'Try to understand whether it is easy or not to get along with this guy.'

c. 看到 *kandao* **'see'**、聽到 *tingdao* **'hear'**、嗅到 *xiudao* **'smell'**

> from SEEING to KNOWING

Example:

我從這次合作經驗**看到**他的深度。

wo cong zhe-ci hezuo jingyan kandao ta de shendu

I from this-CL cooperative experience see he DE depth

'I saw his profundity from the experience of cooperation with him.'

Interpretation →'I knew his profundity from the experience of cooperation with him.'

➢ from HEARING to UNDERSTANDING

Example:

總統聽到了人民的心聲。

zongtong tingdao le renmin de xinsheng

president listen to PERF people de thoughts

'The president has heard of the thoughts of the people.'

Interpretation→ 'The president has understood the thoughts of the people.'

➢ from SMELLING to DETECTING

Example:

有創意的年輕人嗅到了商機。

you chuangyi de nianqing ren xiudao le shangji

have creativity DE young people smell PERF business

'Creative young people have smelt the business.'

Interpretation → 'Creative young people have detected the business.'

In (25), the examples show an intimate interrelationship between perception and cognition in terms of the semantic extensions. The senses of four main perception verbs, seeing, hearing, smelling, and touching, get involved with the senses in cognition domain, such as discovering, understanding, and detecting. Besides, morphological make-up forms various groups of perception verbs which display a close relation with the cognition domain. These are all clues for the study to look at.

4.6 Summary

   Chapter four represents the findings which show the differences among Mandarin

perception verbs. These distinctions are realized in aspectual property, syntactic patterns with

semantic participant roles, morphological make-ups, and semantic extensions. It provides a

transparent basis to distinguish the verbs. In this way, Chapter five shall show a frame-based

analysis of the findings.

Chapter 5

Analysis

This chapter presents a frame-based analysis of Mandarin perception verbs. In this chapter, five sections are included.

Section 5.1 shows an overview of the perception frames. Section 5.2 exhibits the conceptual schema of the core participant roles in perception-related events. Section 5.3 specifies the perception-related frames identified in this study. Section 5.4 investigates the metaphorical extensions from perception frames to cognition frames. Section 5.5 discusses the correspondence between the frames and their morphological make-ups.

5.1 Overview of the Frames

This section provides an overview of the categorized Mandarin perception verbs, the frames. According to the findings stated in Chapter four, we classify the verbs into different frames. As Section 1.3 states, the study adopts the frame semantics (Fillmore & Atkins 1992) and the four-layered working taxonomy of grouping frames proposed by Liu and Chiang (2008) to analyze the perception verbs. The following table offers a preview of the distinguished frames in this study.

Table 15. Overview of the Perception Frames in Mandarin

Layer of Frame	Perception-related Frame
Archiframe	Perception Frame
Primary Frame	Feel Frame
	Perception_active Frame
	Perception_experience Frame
	Perception_judgment Frame

	Detect Frame
	Perception_body Frame
	Perception_attribute Frame
Basic Frame	Observe Frame
	Perception_active_central Frame
	Perception_active_peripheral Frame
	Perception_experience_central Frame
	Perception_experience_peripheral Frame
Micro-frame	Perception_active_visual Frame
	Perception_active_audio Frame
	Perception_active_ olfactory Frame
	Perception_active_gustatory Frame
	Perception_active_tactile Frame
	Perception_experience_visual Frame
	Perception_experience_audio Frame
	Perception_experience_ olfactory Frame
	Perception_experience_gustatory Frame
	Perception_experience_tactile Frame

From the table above, we can see there are one archiframe, seven primary frames, five basic frames, and ten micro-frames in this study. The following figure exhibits the hierarchical interrelationship between the frames.

**Figure 2. Hierarchical Interrelationship between the Frames**
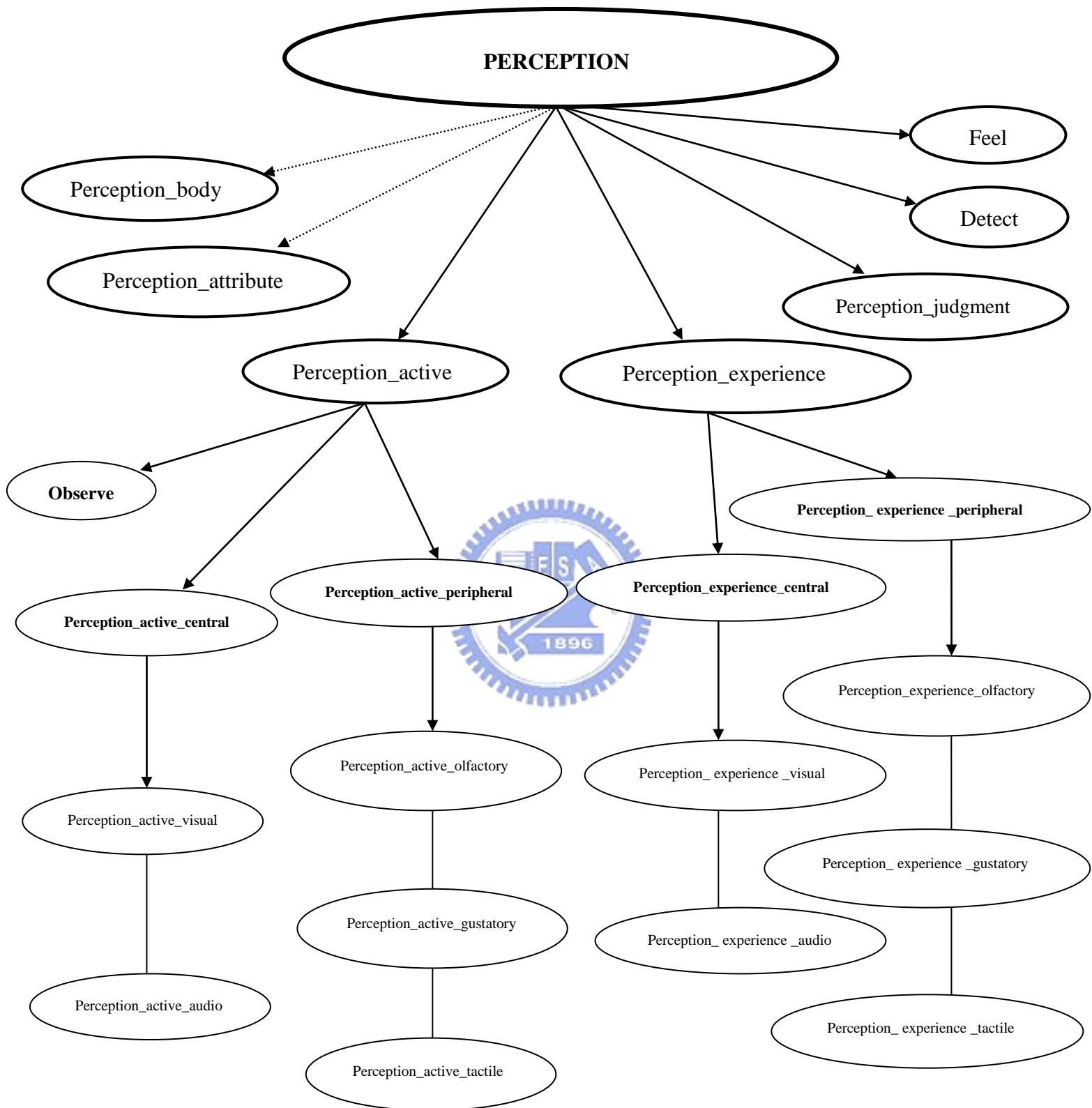
After the preview of the frames and the frame-to-frame interrelationship, Section 5.2 introduces the conceptual schema of Perception Archi-frame and Section 5.3 gives detailed specifications of the identified frames.

5.2 Conceptual Schema of Perception Archi-frame

In 4.2, the essential participant roles in perception-related events have been introduced. With a frame-based approach, they are taken as the core frame elements. This section arranges the core frame elements into a conceptual schema, which is displayed as Figure 3 to provide an overview of core frame elements in this frame and to offer a background for the introduction of every layer of frames which are equipped with some highlighted parts of the whole conceptual schema.

Figure 3. Conceptual Schema of Perception Archi-frame
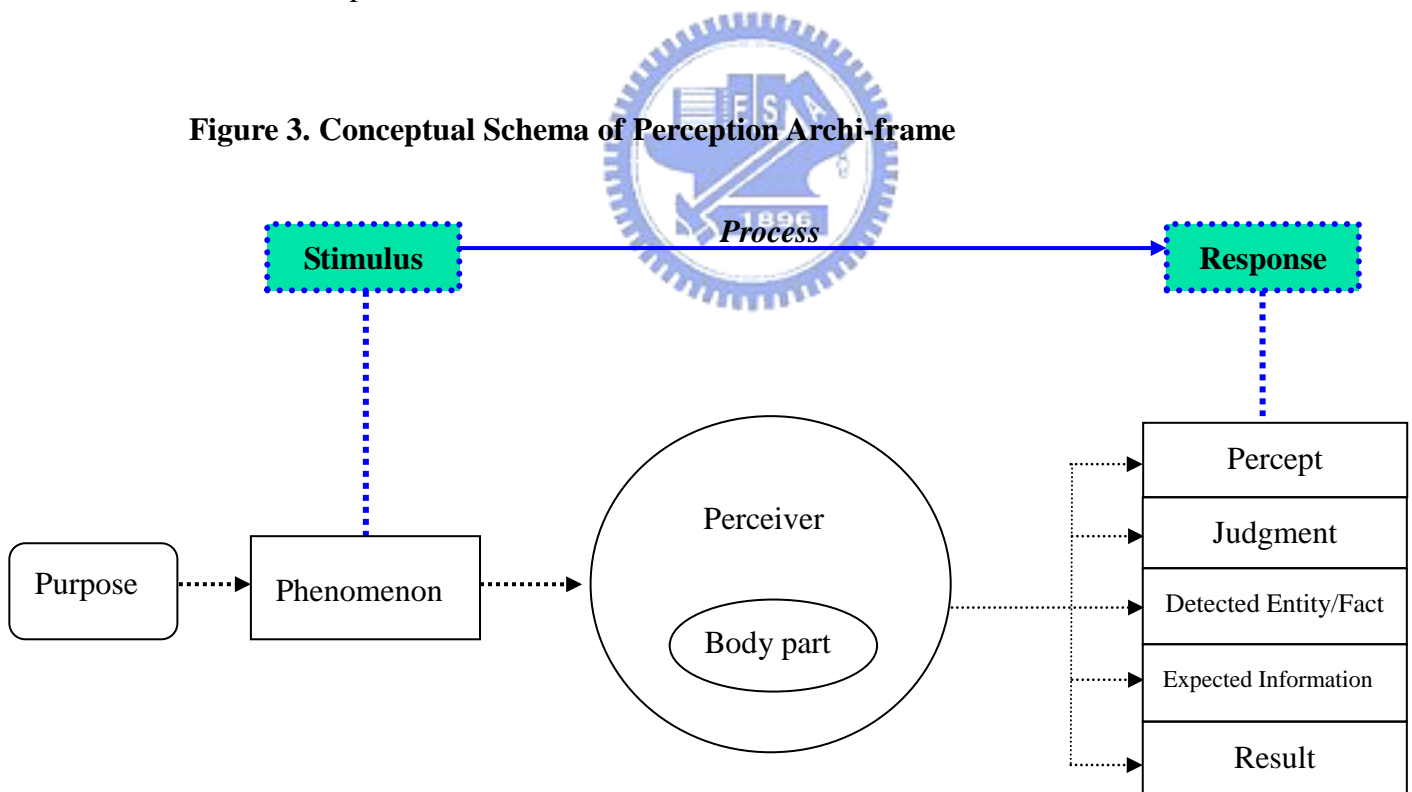
The postulated conceptual schema in Figure 3 not only shows the frame elements in perception frames but also represents a sequential relationship between the frame elements. As the blue-dotted line guides, three stages are involved with the perception events: Stimulus,

Process, and Response. It indicates that the initiation of a perception event requires a Stimulus as an input, realized as the frame element **Phenomenon**; as for the stage of Process, a **Perceiver** perceives a **Phenomenon** with his or her **Body part**; after the Process of perceiving, a **Perceiver** may react with a Response, such as **Percept**, **Judgment**, or awareness of a **Detected Entity/Fact** or an **Expected Information**, and even a **Result** serving to depicting the degree of the response. In addition, before the initiation of perceiving, whether a **Perceiver** has a **Purpose** also gets involved with a perception event. That is what the conceptual schema attempts to clarify.

The conceptual schema provides a cognitive basis to describe the perception frames. Each frame is specific with a set of frame elements which are partly highlighted in the conceptual schema. It is concerned with the variation of core arguments and grammatical behaviors among the frames.
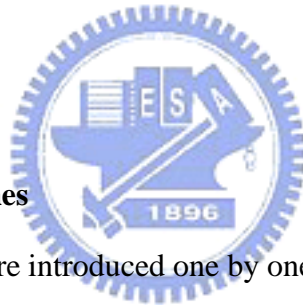
5.3 Specifications of the Frames

In this section, the frames are introduced one by one with their specifications, including the conceptual schema, the definition, the lemma, the core frame elements[1], and the basic patterns. As Section 5.1 discusses, the frames are represented in a hierarchy. The layers of frames from top to down are Archiframe, Primary Frame, Basic Frame, and then Micro-frame. Besides, frame-to-frame interrelationship contains two main types: inheritance and using, which has been introduced in Section 1.3.1. To present the frames in a systematic way, this section introduce the frames according to the hierarchical relationship as well as the frame-to-frame interrelationship. In this way, Section 5.3.1 represents the Perception Archiframe; and then Section 5.3.2 represents the primary frames under the archiframe; Section 5.3.3 the basic frames and Section 5.3.4 the micro-frames.

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[1] The definitions of the core frame elements are introduced in Section 4.

5.3.1 Layer 1: Archi-frame

**Figure 4. The PERCEPTION Archiframe**
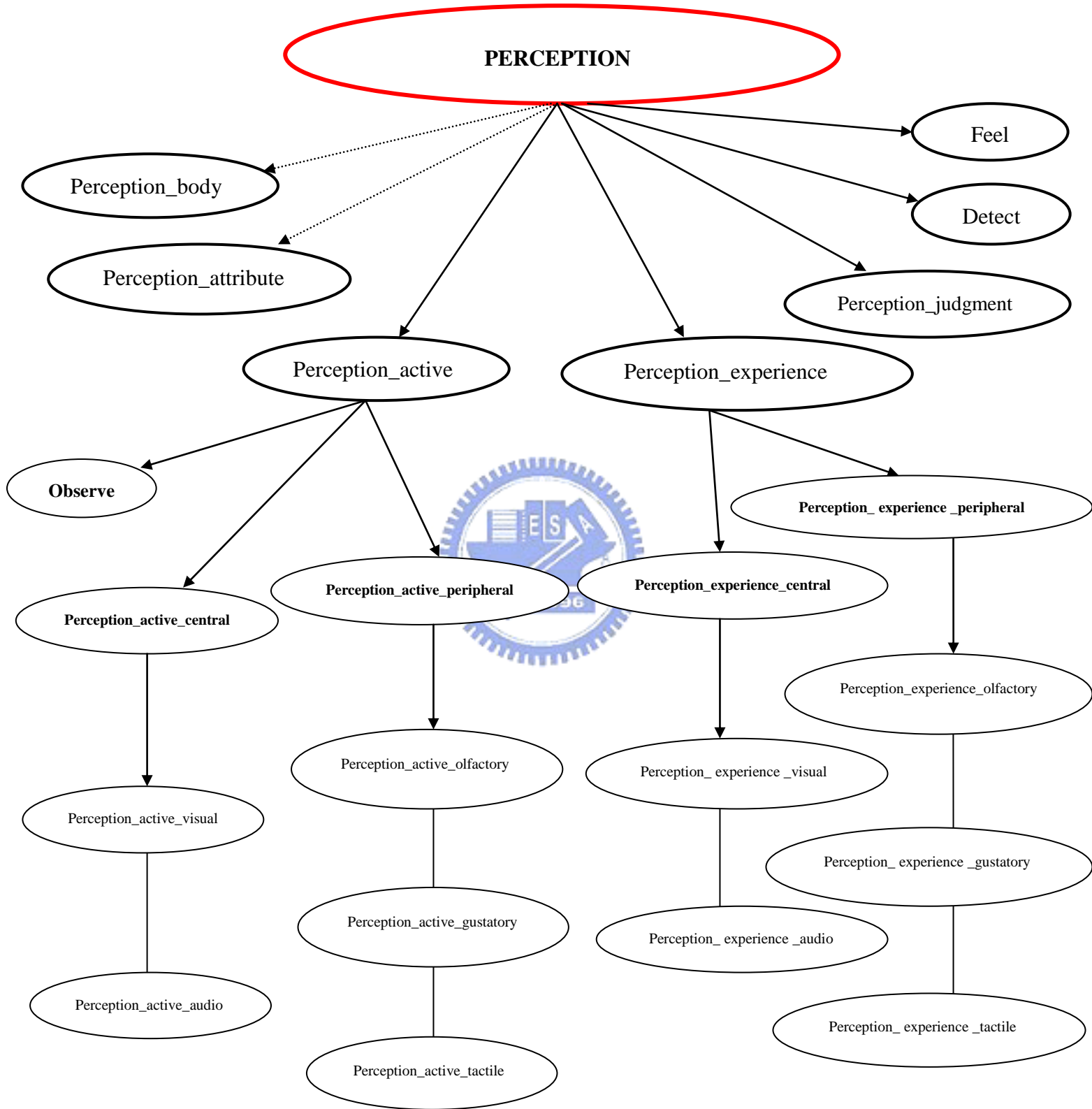
As Figure 4 shows, the Perception archi-frame is situated in the highest layer of the frame-to-frame semantic hierarchy. Since Liu and Chiang (2008) claimed that an archi-frame serves as the semantic prerequisite by providing an overarching conceptual schema, it reveals that the frame elements in the conceptual schema are viewed as a set of default participant roles to constitute perception-related events, just as Section 5.2 displays. As for the representative lemma, it is lexicalized to contain the widest semantic scope because it is established on the basis of background understanding. In the following, the information is given.

Def.: A Perceiver perceives a Phenomenon through his or her Body part with or without a Purpose. Due to the perceptual experience, the Perceiver may respond with various kinds of response.

Representative Lemma: 感知 *ganzhi* 'perceive'

Frame Elements: Purpose, Phenomenon, Perceiver, Body part, Percept, Judgment, Characterization, Judgment_inference, Detected entity, Detected fact, Expected entity

Conceptual Schema:
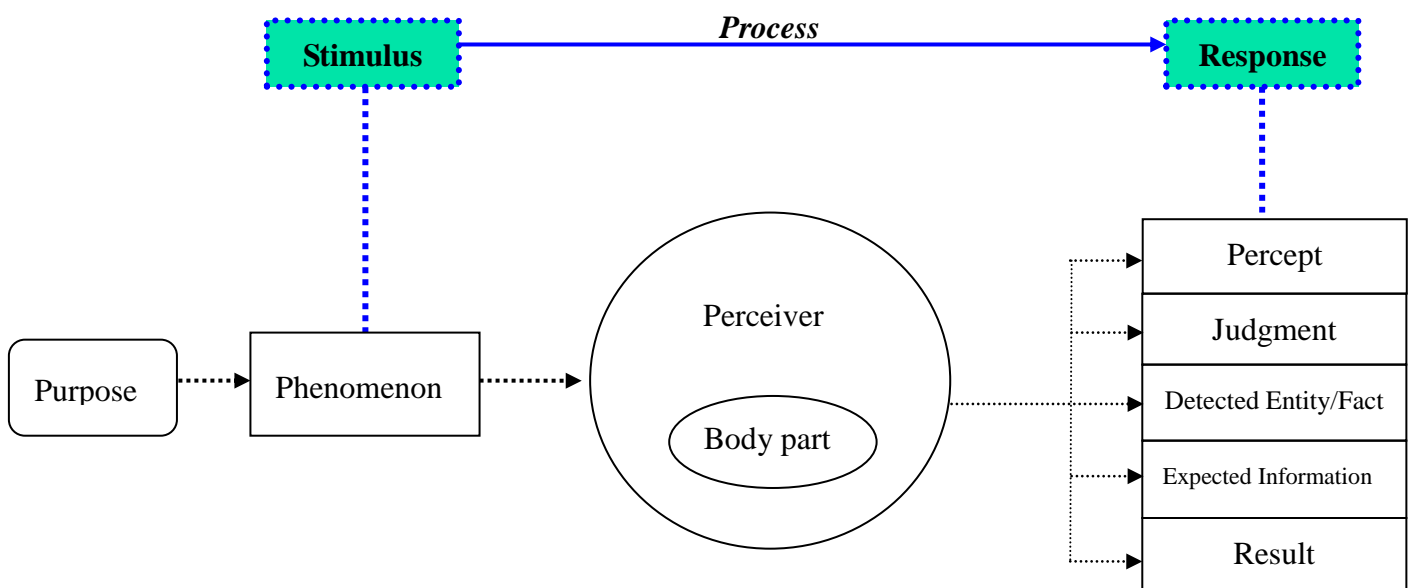
Basic Patterns:

a. Perceiver [NP] < * < Phenomenon [NP]

Ex: [他/Perceiver]在黑暗中[感知/Perception]了[寒風的吹嘯/Phenomenon]。

    ta   zai   heian   zhong   ganzhi   le   han-feng   de   chuixiao

    he   in   dark   middle   perceive PERF   cold-wind   DE   blow

    'He perceived the blowing of the cold wind in the darkness.'

b. Body part [NP] < * < Phenomenon [NP]

Ex: [視線模糊的雙眼/Body part]，依然[感知/Perception][你的出現/Phenomenon]。

    shixian   mohu   de   shuang-yan   yiran   ganzhi   ni   de   chuxian

   sight   blurry   DE bi-eye   still   perceive you DE apperance

    'The eyes which see things in a blurry sight still could perceive your presence.**'**

5.3.2 Layer 2: Primary Frame

In this section, the primary frames, which are in the second layer under the scope of Perception archiframe, are introduced. Among the primary frames, some relate to the archiframe by **inheritance** and the others by **using**. The primary frames which are related to Perception archiframe by inheritance, Feel frame, Perception_active frame, Perception_experience frame, Perception_judgment frame, Detect frame, are amplified in 5.3.2.1 whereas those which are related to Perception archiframe by using, Perception_body frame and Perception_attribute frame are exhibited in 5.3.2.2.

5.3.2.1 Inheritance

Figure 5. The Primary Frames under Perception Archi-frame by Inheritance
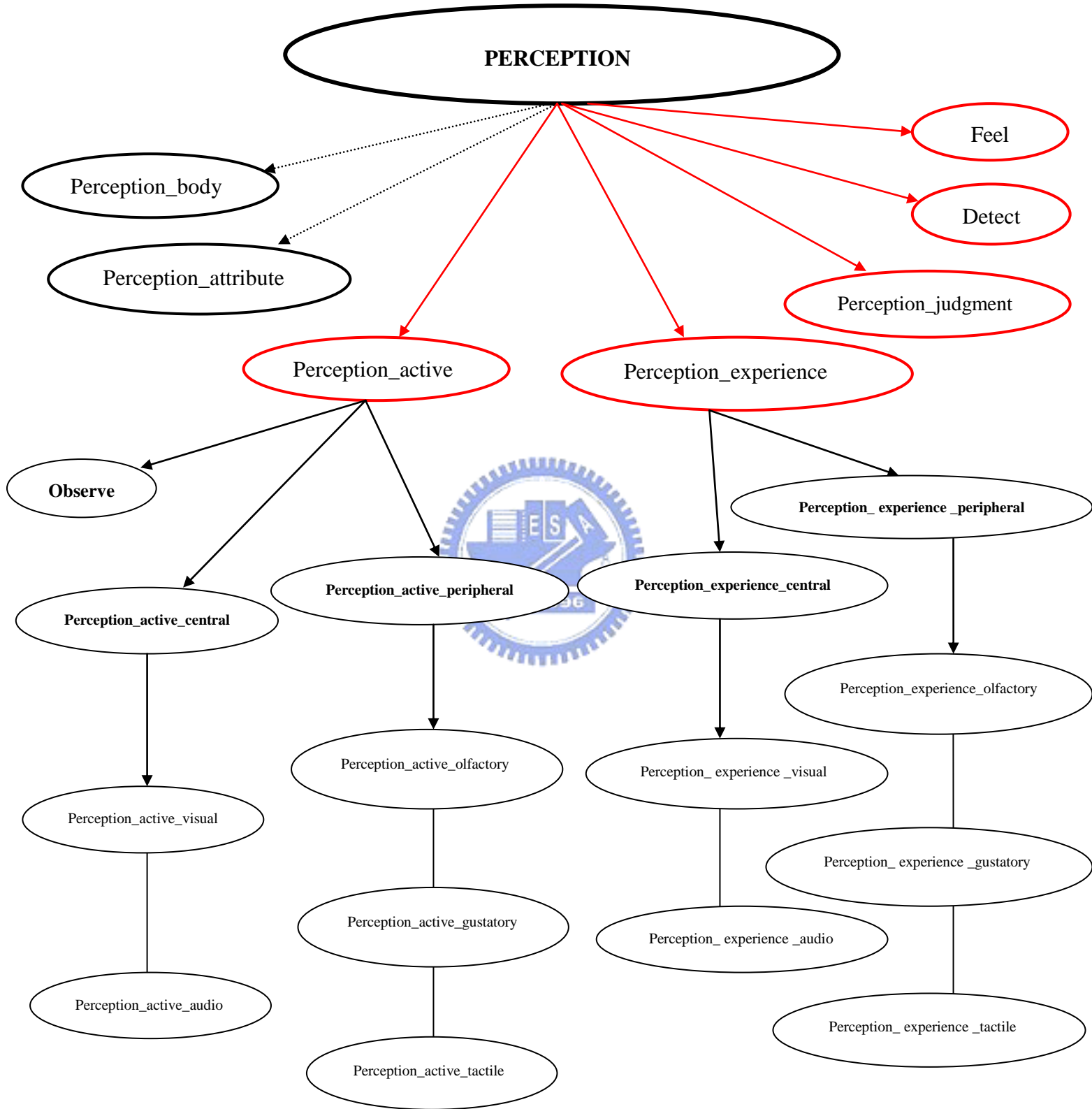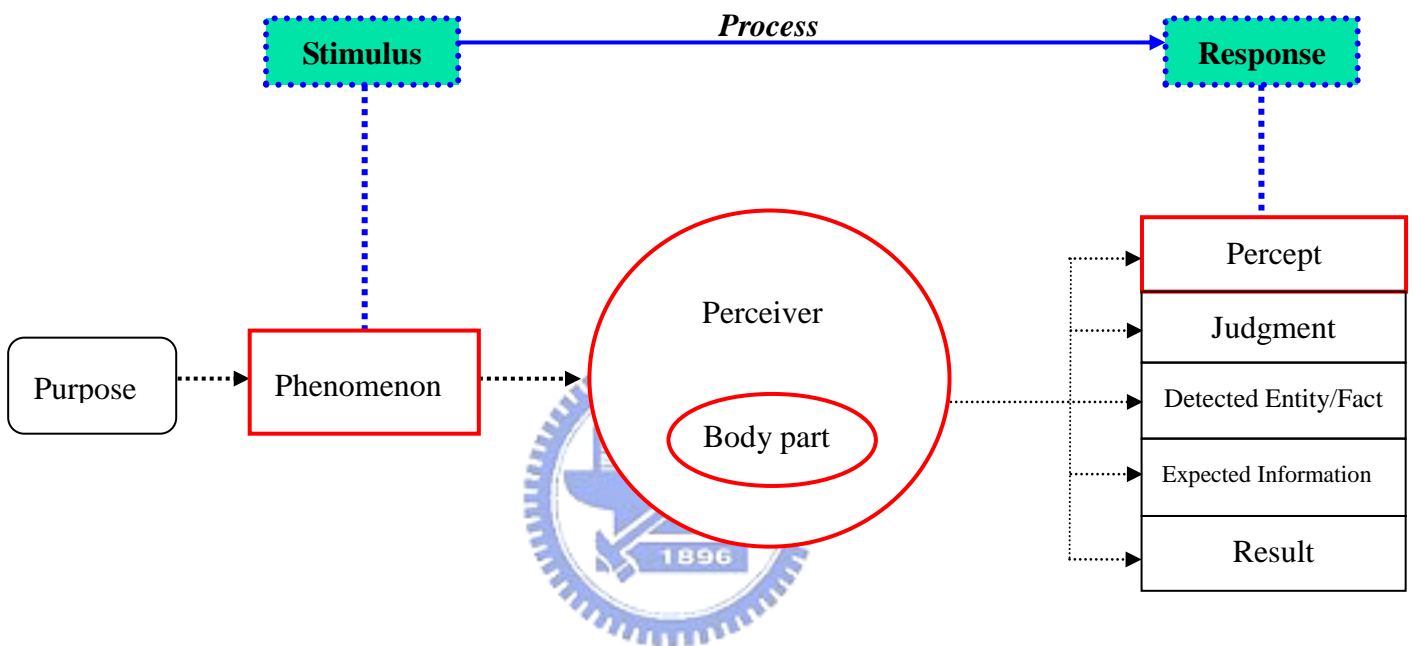
5.3.2.1.1 Feel Frame

Def.: This frame describes a stimulus-response process that a Perceiver, under the stimulation of some Phenomenon, feels a sensory Percept through his/her Body part.

Representative Lemma: 感覺 *ganjue* 'feel', 覺得 *juede* 'feel', 感到 *gandao* 'feel'

Core Frame Elements: Perceiver, Body part, Phenomenon, Percept

Conceptual Schema:

Basic Patterns:

    a. Perceiver [NP]< * < Percept [AdjP][NP][CL]

    Ex:

    1) [我/Perceiver] [覺得/Feel] [很冷/ Percept]。

        wo juede hen leng

        I feel very cold

        'I feel very cold.'

    2) [我/Perceiver] [感到/Feel] [一股寒意/Percept]。

        wo gandao yi-gu han-yi

        I feel one-CL coldness

        'I feel the coldness.'

3) [我/Perceiver] [感到/Feel] [肚子開始發疼/ Percept]，有如千刀萬剮般難受。

wo   gandao   duzi   kaishi   fateng, youru   qian-dao-wan-gua   ban

nanshou

I feel belly start ache like thousand-knife-ten-thousand-cut alike unbearable

'I felt that the belly started to ache unbearably as if thousands of knives cut it into

pieces.   '

b. Body part [NP] < * < Percept [AdjP][NP][CL]

Ex:

1) 人的體質若呈現酸性，則[腦部/Body part]較易[感到/Feel][疲勞/Percept]。

ren   de   tizhi   ruo   chengxian   suanxing, ze   naobu   jiao   yi   gandao

pilao

human DE constitution if present acidity then brain more easy feel tiredness

'If the constitution of a person presents the acidity, it is easier for the brain to feel

tired.'

2) [我的肩膀/Body part][感到/Feel][很重的負擔/Percept]，

wo   de   jianbang   gandao   hen   zhong   de   fudan

I DE shoulder feel very heavy DE burden

'My shoulders feel a very heavy burden.'

3) [小腿/Body part][感覺/Feel][有股熱氣散發不出去/Percept]。

xiaotui   ganjue   you   gu   re-qi   sanfa   bu   chuqu

leg feel have CL hot-air emanate NEG out

'It is felt that a hot air in the leg couldn't emanate.'

c. Phenomenon[NP] < {使/令/讓/教/…} + Perceiver [NP] < * < Percept [AdjP]NP]

[CL]

Ex: [今天上海早晨的大霧/Phenomenon]讓[人/Perceiver][感覺/Feel][很冷/Percept]

jintian   shanghai   zaochen   da-wu   rang   ren   ganjue   hen   leng

today SHANGHAI (Name) morning big-fog make human feel very cold

'The heavy fog in Shanghai this morning made people feel very cold.'

5.3.2.1.2 Perception_active Frame

Def.: In this frame, for certain Purpose, the Perceiver volitionally and even intentionally directs his or her attention to some Phenomenon for a period of Duration in order to have a perceptual experience.

Representative Lemma: 看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'

Core Frame Elements: Perceiver_agentive, Phenomenon_entity, Phenomenon_event, Expected information, Duration, Purpose

Conceptual Schema:
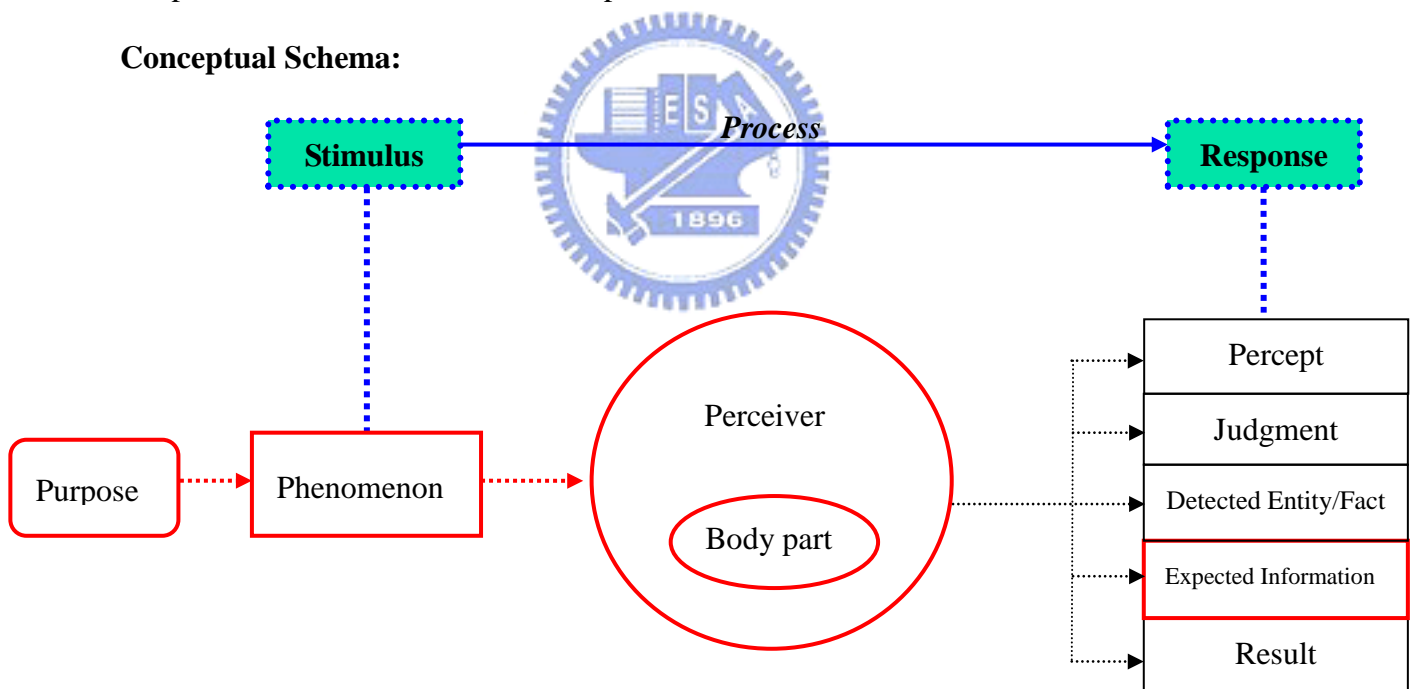
Basic Patterns:

  a. Perceiver_agentive [NP] < * < Phenomenon_entity [NP]

   Ex: [我們/Perceiver_agentive]轉到主人的臥房[看/Perception_active][陶瓷和銅器/Phenomenon_entity]，

   women   zhuan-dao   zhuren   de   wofang   kan   taoci   han   tongqi

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we turn-reach host DE bedroom see pottery and brass

'We turned to the host's bedroom to see the pottery and the brass.'

b. Perceiver_agentive [NP] < * < Phenomenon_event [CL]

Ex: [觀眾/Perceiver_agentive][看/Perception_active][他打籃球/Phenomenon_event]
不只在意其得分多寡，更以欣賞他的賞心悅目動作技巧為樂事，

guanzhong kan ta da lanqiu bu-zhi zaiyi qi defen duo-gua, geng yi

xinshang ta de shang-xin-yue-mu dongzuo jiqiao wei le-shi

audience see he hit basketball not-only care QI score much-little even take admire he

DE admire-heart-please-eye action as happy-matter

'The audience watched him play basketball not only for the scores but also for the

joy by appreciating his admirable actions and skills.'

c. Perceiver_agentive [NP] < * < Expected information [QP]

Ex: [你們/Perceiver_agentive][看/Perception_active]，[我是不是比較瘦了/Expected
information]？

nimen kan wo shi bu shi bijiao sho le

you   watch I   is NEG is   more thin PERF

'Look! Am I thiner?'

d. Perceiver_agentive [NP] < *+ Aspectual Marker { 了 } < Duration

Ex: [他/Perceiver_agentive]伏在車窗口[看/Perception_active]了[許久/Duration]，

ta fu zai che-chuang-kou kan le xujiu

he lie at car-window-mouth see PERF long

'He lay his head down at the window of the car and watched outside for such a long

time.'

e. {為了 [Prep]} + Purpose[VP] < Perceiver_agentive[NP] < * < Phenomenon_entity
[NP]

Ex: 為了[分辨真假/Purpose]，[他/Perceiver_agentive]仔細地[看/Perception_active]

著[這個古董花瓶/Phenomenon_entity]。

weile   fenbian   zhen-jia, ta   zixi di   kan   zhe   zhe-ge   gudong   huaping

for discriminate true-fake he careful DI see PROG this-CL antique vase

'To discriminate between originals and fakes, he looked at the antique vase carefully.'

f. Perceiver_agentive [NP] < Aspectual Marker {正在/在} + * < Phenomenon_entity [NP]

Ex: [剛出世的嬰兒/ Perceiver_agentive]正在[聽/Perception_active]著[莫扎特和韋瓦爾第的音樂/Phenomenon_entity]。

gang   chushi   de   ying-er   zhengzai   ting   zhe   mozhate   han   weiwaerdi   de   yinyue

just born DE infant PROG listen PROG Mozart (Name) and Vivaldi (Name) DE music

'The new-born infant is listening to the music of Mozart and Vivaldi.'

g. Perceiver_agentive [NP] < * + Aspectual Marker {著} < Phenomenon_entity [NP]

Ex: [她/Perceiver_agentive]無言地[看/Perception_active]著[我/Perception_entity]。

ta   wuyan   di   kan   zhe   wo

she speechless DI look-at PROG I

'She was looking at me speechlessly.'

h. Perceiver_agentive [NP] < Deictic Motion Verb{來/去[V]} + * < Phenomenon_entity[NP]

Ex:

1) [大家/Perceiver_agentive]都來[看/Perception_active][流星雨/Phenomenon_entity]。

   dajia   dou   lai   kan   liuxing-yu

   everybody all come watch shooting-star-rain

'Everybody comes to watch the meteor shower.'

2) [他們/ Perceiver_agentive]騎著腳踏車去[看/Perception_active][海 /Phenomenon_entity]。

tamen qi zhe jiaotache qu kan hai

they ride PROG bike go watch sea

'They rode the bicycles to watch the sea.'

i. Imperative: (Perceiver_agentive) < *

Ex:

1) [你/Perceiver_agentive] [看/Perception_active]！我把老鼠打跑了吧？

ni kan wo pa laoshu ta pao le pa

you look I PA rat hit run PERF PA

'You look! I hit the rat away, right?'

2) [看/Perception_active]！這裡還有一張。

kan zheli hai you yi zhang

look here still have one CL

'Look! There is still one here.'

Some of the basic patterns are evident to show that the perception verbs in this frame are volitional verbs. Ma (2004:12-41) proposed a set of principles which provide syntactic as well as semantic considerations to examine volitional verbs. Three of the principles are included in the basic patterns as (f), (h), and (i). Respectively, they are progressive aspectual markers, deictic motion verbs, and imperatives. These grammatical patterns are frequent with the verbs in Perception_active frame. That is why we name the frame as Perception_active frame and the agent as Perceiver_agentive in order to display the importance and effect of 'volition' realized semantically and syntactically.
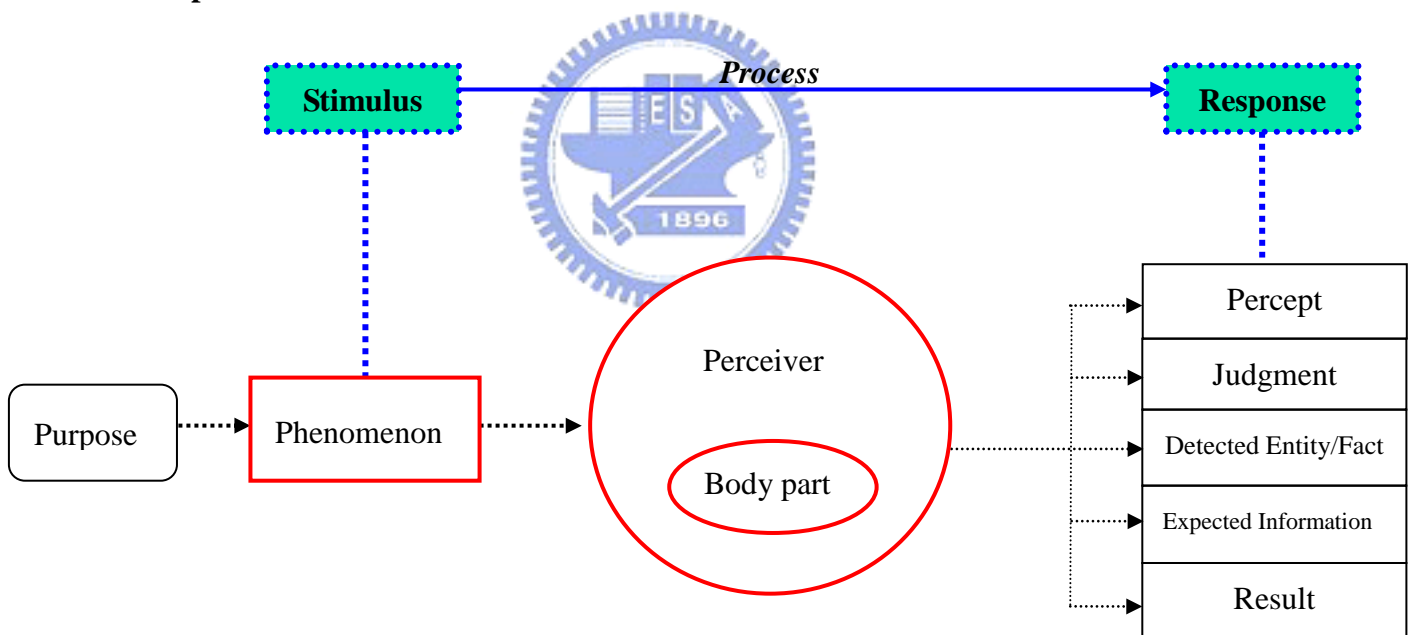
5.3.2.1.3 Perception_experience Frame

Def.: In this frame, a Perceiver has perceptual experiences through his or her Body part without any volition or intention.

Representative Lemma: 聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see'，聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch' 、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'

Core Frame Elements: Perceiver_experiencer, Body part, Phenomenon_entity, Phenomenon_event, Phenomenon_state

Conceptual Schema:

Basic Patterns:

a. Perceiver_experiencer [NP]< * < Phenomenon_entity [NP]

Ex: [小蘭/Perceiver_experiencer][看見/Perception_experience][門上四個大字/Phenomenon_entity]，

xiaolan   kan-jian   men   shang   si   ge   da   zi

Xiaolan (Name) watch-see door above four CL big word

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'Xiaolan saw the four big words on the door.'

b. Perceiver_experiencer [NP] <*< Phenomenon_event [CL]

Ex: [她/Perceiver_experiencer][看到/Perception_experience][蘇普正在和桑斯兒搏鬥，旁觀的人興高采烈地叫嚷著/Phenomenon_event]。

ta kan-dao supu zhengzai han sangsier bodou pang-guan de ren xing-gao-cai-lie di jiao-rang zhe

she watch-reach Supu (Name) PROG and Sangsier fight aside-watch DE person pleasure-high-delight-strong DI yell-shout PROG

'She saw that Supu and Sansier were fighting while the onlookers were yelling and shouting very excitedly.'

c. Perceiver_experiencer [NP]<*<Phenomenon_state [CL]

Ex: [我/Perceiver_experiencer]急忙跑到甲板上，恰好[瞥見/Perception_experience][白帝城隱約在高山上/Phenomenon_state]，

wo ji-mang pao dao jiaban shang qiahao pie-jian bodi-cheng yinyue zai gao-shan shang

I hurry-busy run reach deck above just glimpse Bodi-city darkling in high-mountain above

'I ran to the deck and just glimpsed that Bodi City is located in the mountain darklingly.'

d. Body part [NP]<*<Phenomenon_entity [NP]

Ex: 剛剛[我的手/Body part]不小心[摸到/Perception_experience][他的頭髮/Phenomenon_entity]，

ganggang wo de shou buxiaoxin mo-dao ta de toufa

only-just I DE hand accidentally touch-reach he DE hair

'My hand only just touched his hair accidentally.'

e. Body part [NP]<*<Phenomenon_event [CL]

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Ex: [眼梢/Body part]卻[瞟見/Perception_experience][鮑小姐把兩張帆布椅子拉到距離較遠的空處併放著/Phenomenon_Event]，

yan-shao   que   piao-jian   bao   xiaojie   ba   liang-zhang   fanbu   yizi   la   dao

juli   jiao   yuan   de   kong-chu   bing-fang   zhe

eye-end yet glance-see Bao (Name) lady BA two-CL sailcloth chair pull reach distance

more far DE empty-space combine-put zhe

'The eye glanced that Miss Bao pulled two sailcloth-chairs to another farer space and

put them close.'

f. Body part [NP]<*< Phenomenon_state [CL]

Ex: 昨天洗澡時，[我的手/Body part][摸到/Perception_experience][左胸有塊硬硬的東西/ Phenomenon_State]，

zuotian   xizao   shi   wo   de   shou   mo-dao   zuo-xiong   you   kuai   ying-ying

de   dongxi

yesterday bathe when I DE hand touch-reach left-breast have CL hard-hard DE thing

'My hand touched that there was something hard in my left breast when I took a bathe

yesterday.'

Contrary to Perception_active frame, this frame contains non-volitional perception verbs.

Unlike agents in Perception_active frame, the agents in this frame have perceptual

experiences unintentionally. Such semantic difference also causes a variation in grammatical

realizations. From the basic patterns listed above, it shows that the collocations with

progressive aspectual markers, deictic motion verbs, or imperatives are all absent in this

frame. Besides exploring the characteristics of Mandarin volitional verbs, Ma (2004) also

argued that volitional verbs will turn into non-volitional verbs when suffixing with 到 *dao*

'reach'. It can be seen that the verbs in this frame are mostly composed of a volitional

perception verb associating with the word 到 *dao* 'reach', such as 嗅到 *xiudao* 'smell'、嚐

到 *changdao* 'taste'、摸到 *modao* 'touch', etc. The correspondence with morphological make-ups will be discussed in Section 5.5.

In addition to the grammatical patterns that occur with volitional verbs, one of the complement types is a key point to indicate the difference between Perception_experience frame and Perception_active frame. That is, Phenomenon_state is one of the core frame elements in Perception_experience frame but not so in Perception_active frame. From Section 4.2, it has been depited that Phenomenon_state is one of the essential participants for perception verbs. Syntactically, Phenomenon_state is a clause; semantically, it stands for a phenomenon which is perceived by a perceiver. More specifically, Phenomenon_state refers to a stative event as a perceived phenomenon, which is differentiated from Phenomenon_event, a dynamic event as a perceived phenomenon. Take the example in (f) of this frame for illustration.

(f) 昨天洗澡時，[我的手/Body part][摸到/Perception_experience][左胸有塊硬硬的東西 / Phenomenon_State]，

zuotian xizao shi wo de shou mo-dao zuo-xiong you kuai ying-ying de dongxi

yesterday bathe when I DE hand touch-reach left-breast have CL hard-hard DE thing

'My hand touched that there was something hard in my left breast when I took a bathe yesterday.'

*昨天洗澡時，[我的手/Body part][摸/Perception_active][左胸有塊硬硬的東西/ Phenomenon_State]，

zuotian xizao shi wo de shou mo zuo-xiong you kuai ying-ying de dongxi

yesterday bathe when I DE hand touch left-breast have CL hard-hard DE thing

*'My hand touched there was something hard in my left breast when I took a bathe

yesterday.'

From the comparison above, it shows that Phenomenon_state is not taken by the verbs in Perception_active frame as a complement.
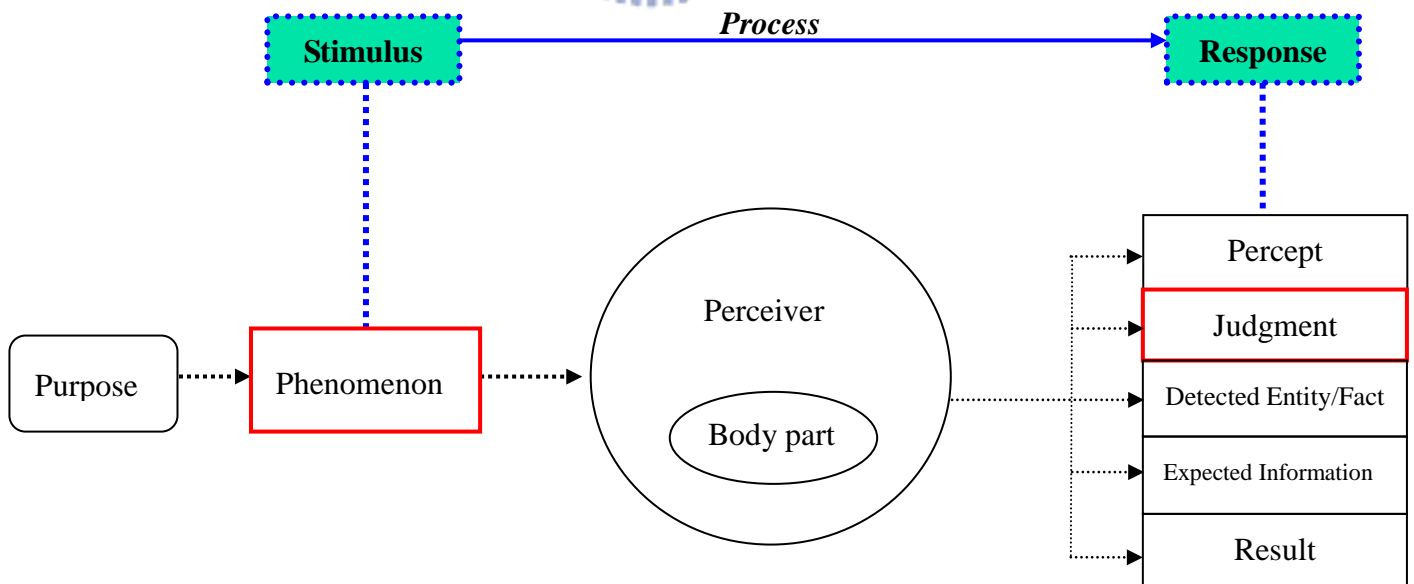
5.3.2.1.4 Perception_judgment Frame

Def.: This frame contains perception words expressing a Judgment made by a perceiver about a Phenomenon through perceptual experiences. The perceiver is not syntactically expressed and thus the perceiver is backgrounded in this frame.

Representative Lemma: 看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來 *changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、感覺起來 *ganjueqilai* 'feel'、看上去 *kanshangqu* 'look', 'appear', 'seem'、聽上去 *tingshangchu* 'sound'、摸上去 *moshangchu* 'feel'

Core Frame Elements: Phenomenon_entity, Phenomenon_event, Phenomenon_state, Judgment, Inference

Conceptual Schema:

Basic Patterns:

a. Phenomenon_entity [NP] < * < Judgment [AdjP][VP]

Ex 1:

[那個餐廳/Phenomenon_entity][看起來/Perception_judgment][富麗堂皇/Judgment]，

nage   canting   kan-qilai   fu-li-tang-huang

that restaurant see-rise rich-beautiful-hall-emperor

'That restaurant looks gorgeous.'

Ex 2:

[牠的卵/Phenomenon_entity][看起來/Perception_judgment][是橙紅色球/Judgment]，

ta   de   luan   kan-qilai   shi   cheng-hong-se   qiu-zhuang

it   DE   egg   see-rise   is   orange-red-color ball-shape

'Its egg appears to be an orange-red ball-shaped thing.'

b. Phenomenon_state [CL] < * < Judgment [AdjP] [VP]

Ex 1:

[你全身黑黑的/Phenomenon_state]，[看起來/Perception_Judgment][真不起眼
/Judgment]，

ni   quan-shen   hei-hei   de   kan-qilai   zhen   bu   qi-yan

you whole-body black-black DE see-rise really no rise-eye

'It doesn't look attracting at all that you dress yourself in black.'

Ex 2:

[阿姨頭髮的捲度適中/Phenomenon_state]，[看起來/Perception_judgment][是用電棒
燙燙的/ Judgment]。

ayi   toufa   de   juan-du   shi-zhong   kan-qilai   shi   yong   dian-bang-tang

tang   de

aunt hair DE curl-degree proper-middle see-rise is use electric-stick-perm perm DE

'Aunt has nicely-curled hair, which seems permmed by electric crimper.'

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c. Phenomenon_event [CL] < * < Judgment [AdjP]

　　Ex: [他跑得這麼快/Phenomenon_state]，[看起來/Perception_judgment][很匆忙、很

　　　急躁/Judgment]。

　　　ta　pao　de　zheme　kuai　kan-qilai　hen　congmang　hen　jizao

　　　he run DE so fast see-rise very hurry very impetuous

　　　'He ran so fast, which seemed to be in such a hurry and impetuosity.'
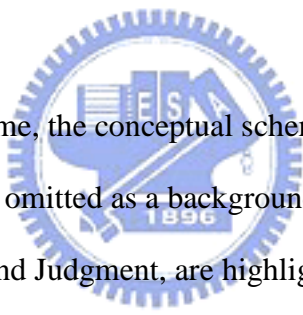
d.　* < Inference [CL]

　　Ex: [聽起來/Perception_judgment][妳似乎有點反應過度/Inference]，

　　　tingqilai　ni　sihu　youdian　fanying　guodu

　　　sound you seem a little reaction over

　　　'It sounds that you seem to be a little overreacting to this matter.'

　　In Perception_judgment frame, the conceptual schema and the basic patterns reveal that the frame element, Perceiver, is omitted as a backgrounded frame element. However, the frame elements, Phenomenon and Judgment, are highlighted in this frame. And the syntactic realizations are also especially different from other perception verbs. It involves the V-*qilai* construction in Mandarin. Liu (2007) claimed that V-*qilai* denotes a semantic property of evaluation. Sung (1994) suggested that V-*qilai* construction can be viewed as a middle construction while Wang (2005) assumed that V-*qilai* construction for perception verbs is categorized into the raising construction like the function of *seem* in English. Based on the perspective of the raising construction for V-*qilai* in terms of perception verbs, he argued that it is allowable for the verb V-*qilai* either to be raised to the matrix subject position or even to be omitted because it results in no influence on the interpretation. Following the assumption, this thesis lists the raising construction as one of the basic patterns in the frame, shown as (d).

5.3.2.1.5 Detect Frame

Def.: A Perceiver is aware of some Detected entity or Detected fact through a perceptual experience from a Phenomenon.

Representative Lemma: 看出 *kanchu* 'detect'、聽出 *tingchu* 'detect'、聞出 *wenchu* 'detect'、嗅出 *xiuchu* 'detect'、感覺出 *ganjuechu* 'detect'、察覺出 *chajuechu* 'detect'

Core Frame Elements: Perceiver, Body part, Detected entity, Detected fact, Phenomenon_entity

Conceptual Schema:
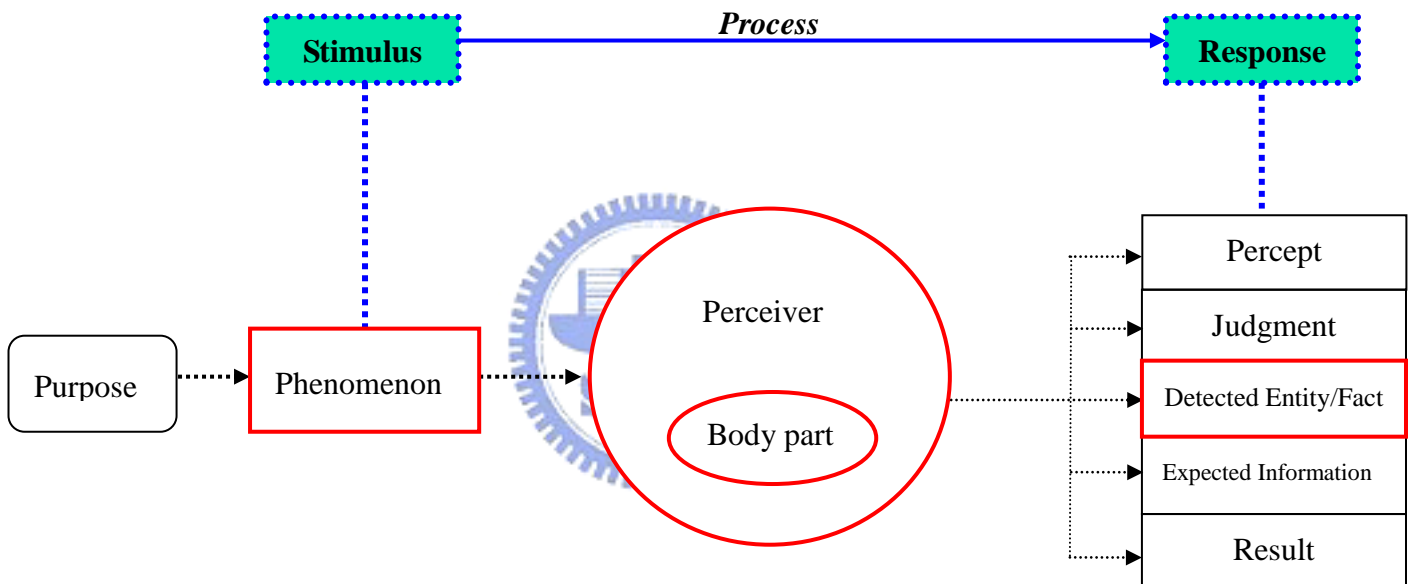
Basic Patterns:

    a. Perceiver [NP] < * < Detected entity [NP]

       Ex: 這時[他/Perceiver]才[嗅出/Detect][撲面而至的濃烈酒氣/Detected entity]，

          zheshi   ta   cai   xiu-chu   pu   mian   er   zhi   de   nonglie   jiu-qi

          now he until smell-out lunge face then arrive DE strong wine-aroma

          'Not until now does he detect the coming-to-face strong aroma of wine.'

    b. Perceiver [NP] < * < Detected fact [CL]

       Ex: [他/Perceiver]也[看出/Detect][我生了病/Detected fact]。

          ta   ye   kan-chu   wo   sheng   le   bing

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he also see-out I born PERF illness

'He also detected that I got sick.'

c. Body part [NP] < * < Detected entity [NP]

Ex: [舌頭的味蕾/Body part]可以[嚐出/Detect][哪些味道/Detected entity]？

shetou de wei-lei keyi chang-chu naxie weidao

tongue DE taste-bud can taste-out which taste

'Which tastes can a taste-bud detect?'

d. Perceiver [NP] < {由/從/在…中/在…上[Prep]} + Phenomenon_entity

[NP] < * < Detected entity [NP]

Ex: 他從[冰箱/Phenomenon_entity] [聞出/Detect][魚的腥味/Detected entity]，

ta cong bingxiang wen-chu yu de xing-wei

he from refrigerator smell-out fish DE raw-taste

'He detected the smell of raw fish from the refrigerator.'

e. (Perceiver [NP]) <{由/從/在…中/在…上[Prep]}+

Phenomenon_entity [NP] < * < Detected fact [CL]

Ex: 從[遊戲場地圖的比較/Phenomenon_entity]中可以[看出/Detect][兒童遊戲的空
間愈來愈少了/Detected fact]，

cong youxi-chang ditu de bijiao zhong keyi kan-chu ertong youxi
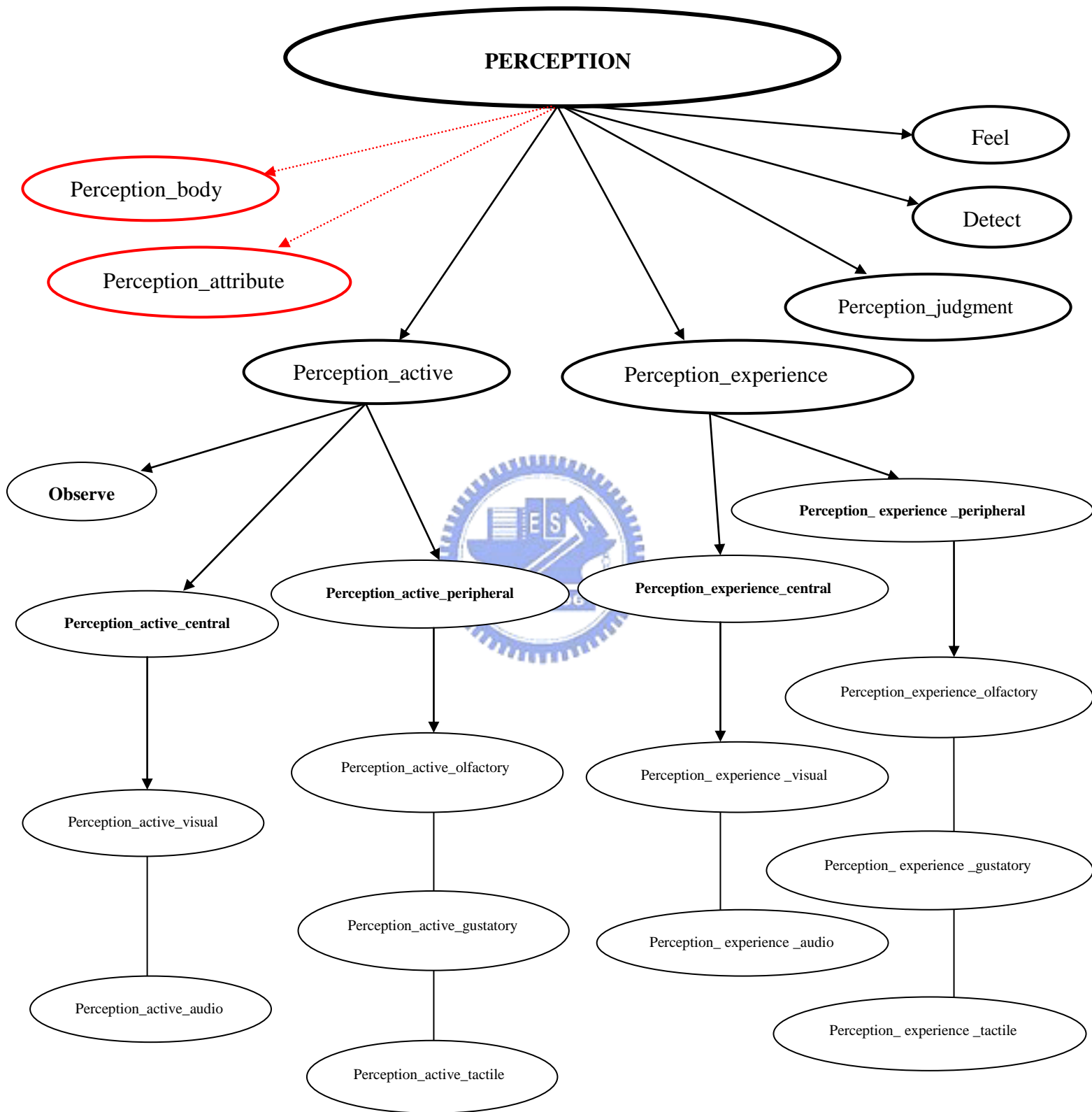
de kongjian yu lai yu shao le

from game-field map DE comparison middle can see-out child play DE space

more come more little PERF

'It can be detected that there is less and less space for children's playing fields

from the comparison between the maps of playing fields.'

5.3.2.2 Using

Figure 6. The Primary Frames under Perception Archi-frame by Using

As Figure 6 highlights, there are two frames under Perception archiframe by one of the frame-to-frame relationship, using. One is Perception_body frame, and the other is Perception_attribute frame. They shall be introduced in the following two parts.

5.3.2.2.1 Perception_body Frame

Def.: This frame contains words describing physical experiences that can affect virtually any Body part. A Perceiver has a Degree of such perceptual experience due to a Phenomenon which causes the experience. Sometimes the Degree is described as a Result to show the perceiver's sensory feeling transparently.

Representative Lemma: 疼 *teng* 'ache'、痛 *tong* 'ache'、痠 *suan* 'muscular pain'、癢 *yang* 'itch'、疼痛 *tengtong* 'ache'、澀 *se* 'rough'、乾澀 *gangse* 'rough'、餓 *e* 'hungry'、飢餓 *ji-e* 'starving'、飽 *bao* 'full'

Core Frame Elements: Phenomenon_cause, Perceiver_experiencer, Body part, Degree, Result

Conceptual Schema:
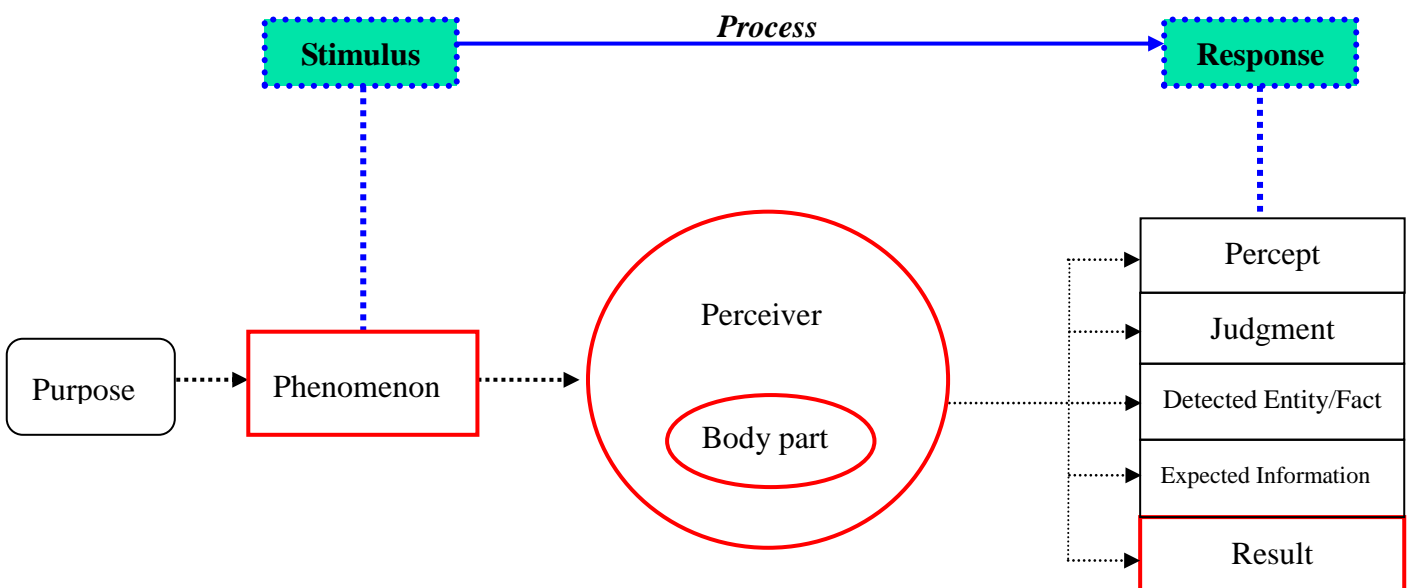
Basic Patterns:

a. Body part [NP] < Degree [AdvP] < *

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Ex: 可是正當他要去拿糖時，[牙齒/Body part]忽然[好/Degree][痛/Perception_body]

[好/Degree][痛/Perception_body]，

keshi zheng dang ta yao qu na tang shi yachi huran hao tong

hao tong

but just when he will go take sugar when teeth suddenly very

ache very ache

'But when he was going to take the sugar, his teeth suddenly ached very much.'

b. Perceiver_experiencer [NP] < Body part [NP] < Degree [AdvP] < *

Ex: 老實說，[我/Perceiver_experiencer][肚子/Body part][好/Degree][餓

/Perception_body]呀！

laoshi shuo wo duzi hao e ya

honest say I belly very hungry YA

'To be honest, I am very hungry!"

c. Phenomenon_cause [NP] < {叫/讓/使/令[V]}+ Perceiver_experiencer [NP] + Body part

[NP] < Degree [AdvP] < *

Ex: [外面的噪音/Phenomenon_cause]讓[我/Perceiver_experiencer][頭/Body part][好/

Degree][痛/Perception_body]。

waimian de zaoyin rang wo tou hao tong

outside DE noise make I head very ache

'The noise outside caused my headache.'

d. Body part [NP] < * + {得/到} < Perceiver _experiencer [NP] < Result [VP]

Ex: [那顆牙齒/Body part]不但沒掉下來，反而[痛/Perception_body]得[我

/Perceiver_experiencer][哇哇大哭/Result]。

na-ke yachi bu-dan mei diao xialai fan-er tong de wo wawa

da-ku

that-CL tooth not-only no fall downward rather ache DE I wawa

(onomatopoeia) big-cry

'That tooth didn't fall down. Rather, the toothache made me cry out loudly.'

e. Perceiver _experiencer [NP] (+ Body part [NP]) < * +{得/到} < Result [VP]

Ex: [她/Perceiver_experiencer][痛/Perception_body]得[大哭/Result]，

ta   tong   de   da-ku   le

she ache DE big-cry PERF

'She was aching so much that she cried out loudly.'

f. Body part < Aspectual marker {在/正在} < *

Ex: [我的心/Body part]正在[痛/Perception_body]。

wo   de   xin   zhengzai   tong

I   DE   heart   PROG   ache

'My heart is aching.'
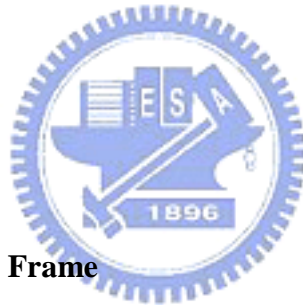
5.3.2.2.2 Perception_attribute Frame

Def.: This frame contains words which describe the sensory properties of a Phenomenon which a Perceiver perceives.

Representative Lemma: 酸 *suan* 'sour'、甜 *tian* 'sweet'、苦 *ku* 'bitter'、辣 *la* 'spicy'、鹹 *xian* 'salty'、臭 *chou* 'stinky'、香 *xiang* 'fragarant'、嗆 *qiang* 'choking'、冰 *bing* 'icy'、涼 *liang* 'cool'、溫 *wen* 'warm'、熱 *re* 'hot'、燙 *tang* 'heated'、硬 *ying* 'hard'、軟 *ruan* 'soft'、清晰 *qingxi* 'clear'、清楚 *qingchu* 'clear'、朦朧 *menglong* 'vague'、模糊 *mohu* 'vague'、吵 chao 'noisy'、靜 jing 'quiet'

Core Frame Elements: Phenomenon_entity, Perceiver_experiencer, Degree, Result

Conceptual Schema:
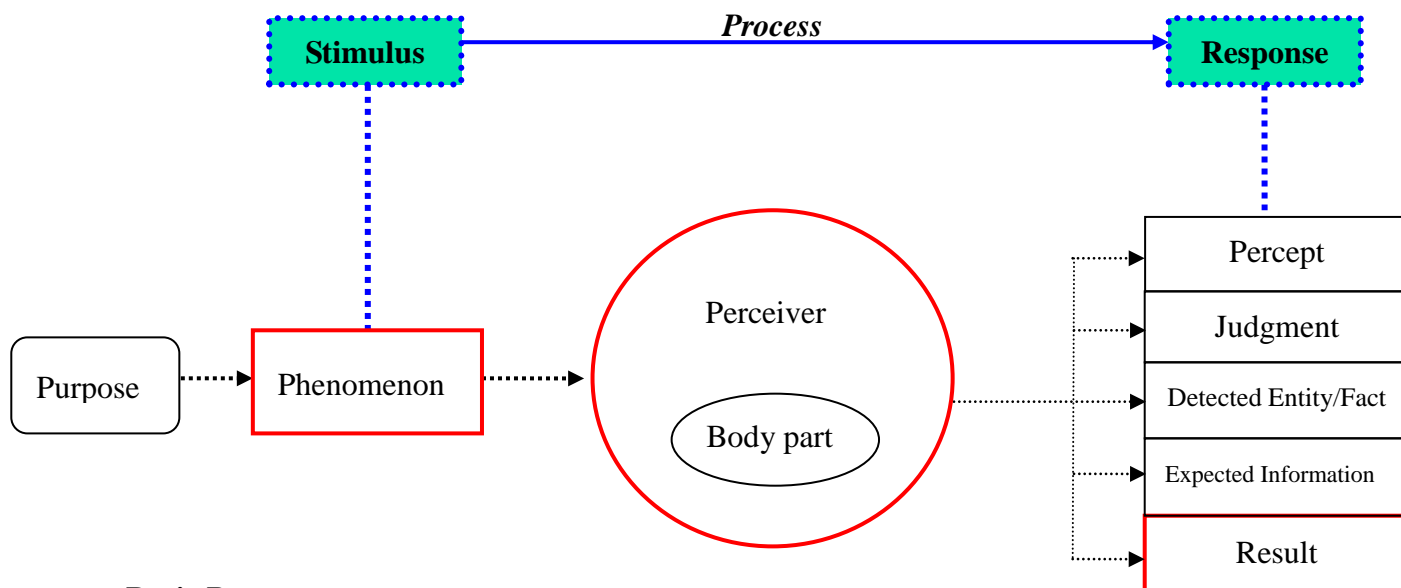
Basic Patterns:

a. Phenomenon_entity [NP] < Degree < *

Ex: [你們的玉蘭花/Phenomenon_entity] [好/Degree][香/Perception_attribute]喔！

nimen   de   yulanhua   hao   xiang   o

you   DE   magnolia   very   fragrant   o

'Your magnolias are so fragrant!'

b. Phenomenon_entity [NP]< * + {得/到}< Perceiver_experiencer [NP]< Result
[VP]

Ex: [濃煙/Phenomenon_entity][嗆/Perception_attribute]得[人
/Perceiver_experiencer][快窒息了/Result]，

nong-yan   qiang   de   ren   kuai   zhixi   le

thick-smoke   choke   DE   person   quick   suffocate   PERF

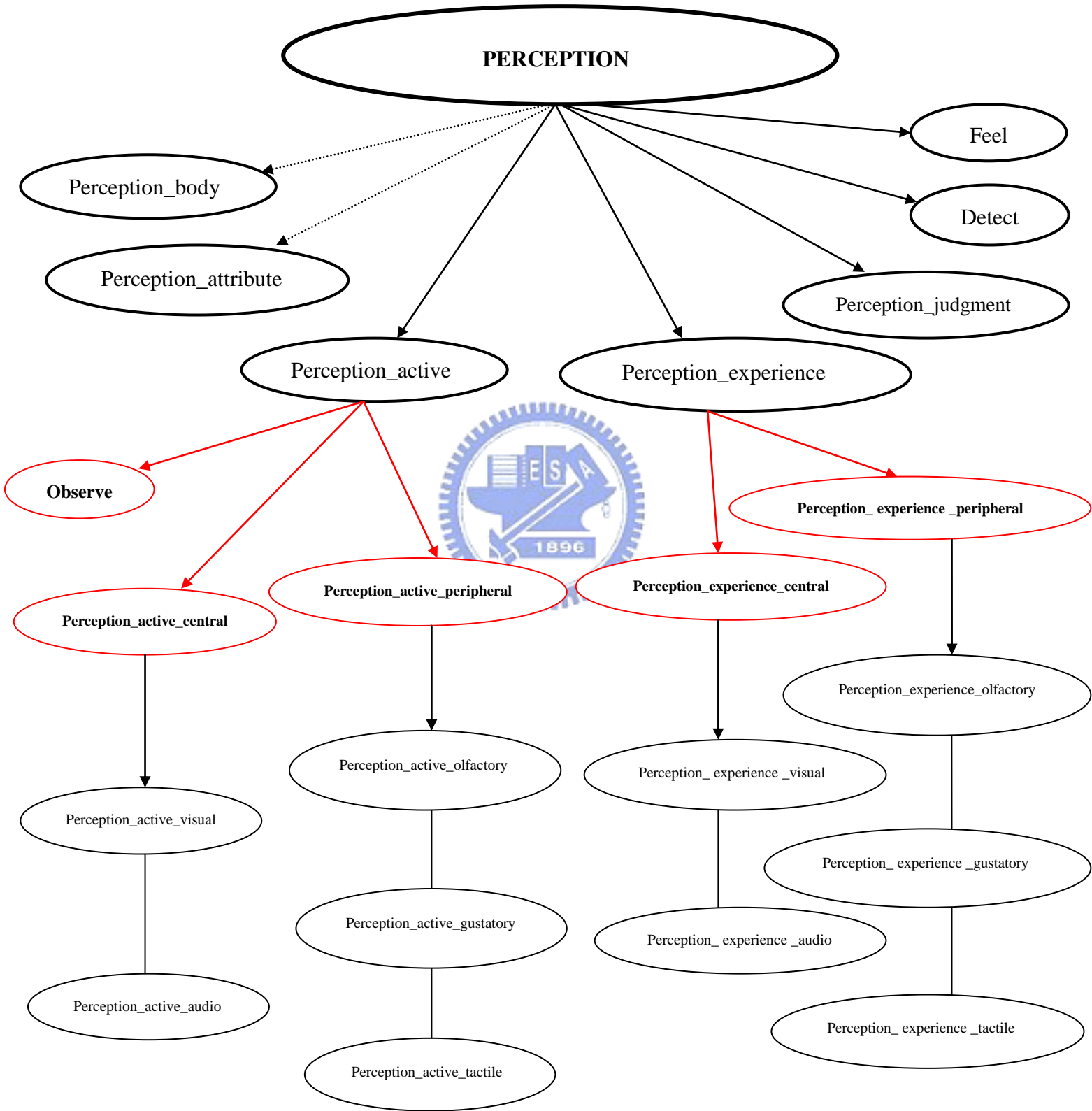'The thick smoke is so choking that it made people almost suffocate.'

5.3.3 Layer 3: Basic Frame

Figure 7.

The Basic Frames under Perception_active Frame and Perception_experience Frame

The seven primary frames under Perception archiframe have been displayed one by one in Section 5.3.2. Through the amplifications of each primary frame, it shows that the frames are distinguished from others due to the differences in highlighted parts of the shared conceptual schema, a set of core frame elements, and basic patterns which denote the default syntactic representations and event types. However, it is necessary to further classify the verbs in a primary frame into basic frames (Liu & Chang 2005, Liu 2007) if they exhibit detailed differences for expressing a narrower scope of meaning. Therefore, according to the principle, it is found that there are basic frames identified under Perception_active frame and Perception_experience frame. They shall be introduced in Section 5.3.3.1.

5.3.3.1 The Basic Frames under Perception_active Primary Frame

From Section 5.3.2.1.2, it is assumed that the representative lemma of Perception_active frame contains the verbs, 看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 *mo* 'touch'、碰 *peng* 'touch'. Besides, there are other verbs regarded in Perception_active frame because of the semantic and syntactic features, such as 觀察 *guancha* 'observe'、檢查 *jiancha* 'check'、查看 *chakan* 'check through'、檢視 *jianshi* 'check through', etc. They share the highlighted parts of the conceptual schema, the set of core frame elements, the event types, and the basic patterns. However, they can be divided into subclasses because the distributions of some core frame elements represent an asymmetrical frequency among different verbs.

In terms of Perception_active frame, two of the core frame elements show their preferences in collocating with different verbs. The two core frame elements are **Phenomenon_event** and **Expected information**. By observing the corpus from Academia Sinica Balanced Corpus of Modern Chinese (http://www.sinica.edu.tw/SinicaCorpus/), the statistics of the frame element distributions is represented below.

Table 16.   Frequency of 'Phenomenon_event' in Perception_active Frame

	看	聽	聞	嗅	嚐	摸	觀察	檢查	檢視
Phenomenon_event	12.4% (31/250)	9.6% (24/250)	0.54% (1/185)	0% (0/7)	0% (0/40)	0.68% (1/146)	0.4% (1/250)	0.8% (2/250)	0% (0/81)

Table 17.   Frequency of 'Expected information' in Perception_active Frame

	看	聽	聞	嗅	嚐	摸	觀察	檢查	檢視
Expected information	0.8% (2/250)	0.4% (1/250)	0.54% (1/185)	0% (0/7)	0% (0/40)	0.68% (1/146)	3.6% (9/250)	2.4% (6/250)	2.4% (2/81)

As Table 16 shows, the higher frequency of Phenomenon_event is distributed in the collocation with vision verbs and hearing verbs. Although such pattern is possibly seen with all the verbs in Perception_active frame, it still reveals a differentiation in the frequency.

On the other hand, as for the frequency of the core frame element, Expected information, there also exists a higher frequency among some verbs, such as 觀察 *guancha* 'observe', 檢查 *jiancha* 'check', 檢視 *jianshi* 'through'.

Since the verbs are varied in the frequency of the core frame elements, it provides a consideration for us to further distinguish the verbs. Firstly, based on the frequency of Phenomenon_event, vision verbs and hearing verbs are grouped into one category. As described before, Phenomenon_event indicates a perceived phenomenon which is a dynamic event. Such property involves with the speed of receiving a response. Among the senses of perception, seeing and hearing are more direct for one person to perceive external stimulus than other senses and this might explain why vision verbs and hearing verbs are more frequent to take Phenomenon_event as complements. Secondly, in terms of the frequency of Expected information, the verbs which display higher frequency are all concerned with an attitude of

seriousness and an intention of examining something undiscovered. In this way, the verbs are additionally grouped. Thus, the verbs in Perception_active Primary Frame are divided as three basic frames. They are respectively labeled as Perception_active_central frame, Perception_active_peripheral frame, and Observe frame. Each of the three frames shall be introduced in the following.

5.3.3.1.1 Observe Frame

Def.: A Perceiver observes an external Phenomenon for a Duration of time and intends to obtain some Expected information through the perceptual experience.

Lemma: 觀察 *guancha* 'observe'、觀測 *guance* 'observe'、檢查 *jiancha* 'check'、查看 *chakan* 'check through'、視察 *shicha* 'inspect'、檢視 *jianshi* 'check through'、檢驗 *jianyan* 'check'、審視 *shenshi* 'inspect'

Foregrounded Frame Elements: Perceiver_agentive, Phenomenon_entity, Expected information, Duration

Basic Patterns:

a. Perceiver_agentive [NP] < * < Phenomenon_entity [NP]

Ex: [記者/Perceiver_agentive]一邊發問，一邊[觀察/Observe][被訪問者的表情/Phenomenon_entity]，

jizhe yi-bian fawen yi-bian guancha bei fangwen zhe de biaoqing

reporter one-side ask one-side observe BEI interview person DE facial-expression

'The reporter asked the person and observed his/her facial expression at the same time.'

b. Perceiver_agentive [NP] < * < Phenomenon_entity [NP] < Duration [AdvP/NP]

Ex: [她/Perceiver_agentive]偷偷[觀察/Observe][你/Phenomenon_entity][很久/Duration]了。

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ta toutou guancha ni hen jiu le

she secretly observe you very long SFP

'She has observed you secretly for a long time.'

c. Perceiver_agentive [NP] < *< Expected information [QP]

Ex: 在她把所有的花朵都銜起來之後，就由[酋長/Perceiver_agentive][察看/Observe][花朵是否受到損傷/Expected information]，

zai ta ba suoyou de huaduo dou xian-qilai zhi hou jiu you qiuzhang chakan huaduo shifou shoudao sunshang

'After she picked up all the flowers, it was the chief to check whether the flowers were damaged.'

5.3.3.1.2 Perception_active_central Frame

Def.: A Perceiver volitionally perceives a Phenomenon for a period of Duration through watching or listening.

Lemma: 看 *kan* 'watch'、瞪 *deng* 'stare'、盯 *ding* 'stare'、瞧 *qiao* 'look'、偷看 *toukan* 'peep'、偷窺 *toukui* 'peep'、窺視 *kuishi* 'peep'、監視 *jianshi* 'monitor'、掃視 *saoshi* 'glance'、凝視 *ningshi* 'gaze'、訪視 *fangshi* 'visit'、探視 *tanshi* 'visit'、注視 *zhushi* 'gaze'、俯視 *fushi* 'look down at'、仰視 *yangshi* 'look up at'、仰望 *yangwang* 'look up at'，怒視 *nushi*、眺望 *tiaowang* 'oversee'、瀏覽 *liulan* 'skim'、傾聽 *qingting* 'listen'、聆聽 *lingting* 'listen'、監聽 *jiangting* 'monitor'、偷聽 *touting* 'overhear' 、竊聽 *quieting* 'overhear'、試聽 *shiting* 'try to listen'

Foregrounded Frame Elements: Perceiver_agentive, Phenomenon_entity, Phenomenon_event, Duration

Basic Patterns:

a. Perceiver_agentive [NP] < * < Phenomenon_entity [NP]

Ex: [華輝/Perceiver_agentive][凝視/Perception_active_central]著[她

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/Phenomenon_entity],

huahui   ningshi   zhe   ta

Huahui (Name)   gaze   Dur   she

'Huahui gazed at her.'

b. Perceiver_agentive [NP] < * < Phenomenon_entity [NP] < Duration

[AdvP/NP]

Ex: [警方/Perceiver_agentive]已經[監視/Perception_active_central][他

/Phenomenon_entity][三天/Duration],

jingfang   yijing   jianshi   ta   san   tian

police   PERF   monitor   he   three   day

'The police had monitored him for three days.'

c. Perceiver_agentive [NP] < * < Phenomenon_event [CL]

Ex: [妻/Perceiver_agentive]支著頭，[注視/Perception_active_central]著[螢幕裡那

個男人虛偽的啜著咖啡/Phenomenon_event]，

qi   zhi   zhe   tou   zhushi   zhe   yingmu   li   na   ge   nanren   xuwei   de

chuo   zhe   kafei

wife   hold   Dur   head   gaze   Dur   screen   inside   that   CL   man

hypocritical   DE   sip   Dur   coffee

'The wife was holding her head and gazing at the man in the screen sip at coffee

hypocritically.'

5.3.3.1.3 Perception_active_peripheral Frame

Def.: A Perceiver volitionally perceives a Phenomenon for a period of Duration through

smelling, tasting, or touching.

Lemma: 嗅 *xiu* 'smell'、聞 *wen* 'smell'、嗅聞 *xiuwen* 'smell'、嚐 *chang* 'taste'、品嚐

pinching 'taste'、品味 *pinwei* 'taste'、摸 *mo* 'touch'、撫摸 *fumo* 'caress'、愛撫 *aifu*

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'caress'、觸摸 *chumo* 'touch'、碰 *peng* 'contact'、觸碰 *pengchu* 'contact'

Foregrounded Frame Elements: Perceiver_agentive, Phenomenon_entity, Duration

Basic Patterns:

a.　Perceiver_agentive [NP] < * < Phenomenon_entity [NP]

　Ex:　或許[你/Perceiver_agentive]正在[品嚐/Perception_active_peripheral][那份酸

甜的滋味/Phenomenon_entity]，

huoxu　ni　zhengzai　pinchang　na　fen　suan-tian　de　ziwei

perhaps you PROG taste that CL sour-sweet DE flavor

'Perhaps you are tasting the sour-sweet flavor.'

b.　Perceiver_agentive [NP] < * < Phenomenon_entity [NP] < Duration

[AdvP/NP]

　Ex:　[他/Perceiver_agentive][聞/Perception_active_peripheral]了[這件 被子

/Phenomenon_entity][好一陣子/Duration]，

ta　wen　le　zhe　jian　beizi　hao　yizhenzi

he　smell PERF this CL　blanket　good　duration

'He smelt the blanket for a period of time.'

5.3.3.2 The Basic Frames under Perception_experience Primary Frame

Among the verbs in Perception_experience frame, the frequency of Phenomenon_event motivates a subclassification. As Table 18 shows, it is much more frequent for visual verbs and audio verbs to collocate with the core frame element, Phenomenon_event.

Table 18.

Frequency of 'Phenomenon_event' in Perception_experience Frame

	看到	聽到	看見	聽見	聞到	嗅到	嚐到	摸到	觸到
Phenomenon_event	17.5% (35/200)	14.4% (36/250)	18% (36/200)	17% (18/108)	2.1% (1/47)	0% (0/7)	0% (0/16)	0% (0/13)	0% (0/5)

Therefore, under Perception_experience frame, two basic frames are resulted due to the

differentiated frequency of Phenomenon_event. One is lebeled as

Perception_experience_central frame and the other is Perception_experience_peripheral frame.

They are introduced in Section 5.3.3.2.1 and Section 5.3.3.2.2.

5.3.3.2.1 Perception_experience_central Frame

Def.: A Perceiver perceives a Phenomenon through seeing or hearing without any volition or

intention.

Lemma: 聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian*

'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see'

Foregrounded Frame Elements: Perceiver_experiencer, Phenomenon_entity,

Phenomenon_event, Phenomenon_state

Basic Patterns:

a. Perceiver_experiencer [NP] < * < Phenomenon_entity [NP]

   Ex: [小蘭/Perceiver_experiencer][看見/Perception_experience_central][門上四個大字

   /Phenomenon_entity]，

   xiaolan   kan-jian   men   shang   si   ge   da   zi

   Xiaolan (Name) watch-see door above four CL big word

   'Xiaolan saw the four big words on the door.'

b. Perceiver_experiencer [NP] < * < Phenomenon_event [CL]

   Ex: [她/Perceiver_experiencer][看到/Perception_experience_central][蘇普正在和桑斯

   搏鬥，旁觀的人興高采烈地叫嚷著/Phenomenon_event]。

   ta   kan-dao   supu   zhengzai   han   sangsier   bodou   pang-guan   de   ren

   xing-gao-cai-lie   di   jiao-rang   zhe

   she watch-reach Supu (Name) PROG and Sangsier fight aside-watch DE person

   pleasure-high-delight-strong DI yell-shout PROG

   'She saw that Supu and Sansier were fighting while the onlookers were yelling and

shouting very excitedly.'

c. Perceiver_experiencer [NP] < * < Phenomenon_state [CL]

Ex: [我/Perceiver_experiencer]急忙跑到甲板上，恰好[瞥見

/Perception_experience_central][白帝城隱約在高山上/Phenomenon_state]，

wo ji-mang pao dao jiaban shang qiahao pie-jian bodi-cheng

yinyue zai gao-shan shang

I hurry-busy run reach deck above just glimpse Bodi-city darkling in high-mountain

above

'I ran to the deck and just glimpsed that Bodi City is located in the mountain

darklingly.'

5.3.3.2.2 Perception_experience_peripheral Frame

Def.: A Perceiver perceives a Phenomenon through smelling, tasting or touching without any

volition or intention.

Lemma: 聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到

changdao 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch'、觸到 *chudao* 'touch'、碰

觸到 *pengchudao* 'touch'

Foregrounded Frame Elements: Perceiver_experiencer, Phenomenon_entity,

Phenomenon_state

Basic Patterns:

a. Perceiver_experiencer [NP] < * < Phenomenon_entity [NP]

Ex: [白馬/Perceiver_experiencer][聞到/Perception_experience_peripheral][水草氣息

/Phenomenon_entity]，

bai-ma wen-dao shui-cao qixi

white-horse smell-reach water-grass breath

'The white horse smelt the waterweed in the air.'

b. Perceiver_experiencer [NP] < * < Phenomenon_state [CL]

Ex: [她/Perceiver_experiencer]是在泳場浴室洗澡的時候，[摸到

/Perception_experience_peripheral][胸部有個如花生米大小硬塊

/Phenomenon_state]，

ta shi zai yong-chang yushi xizao de shihou mo-dao xiongbu you

ge ru huasheng-mi da-xiao ying-kuai

she is in swim-field bathroom bathe DE when touch-reach breast

have CL resemble peanut-rice big-small hard-chunk

'It was when she bathed in the bathroom of the swimming field that she touched

and found there was a lump like a peanut in size in her breast.'

5.3.4 Layer 4: Micro-frame

Following Liu and Chiang's assertion (2008) which claimed that smaller classes might

be required under a basic frame if the verbs are varied in terms of role-internal features, we

examine the basic frames also. It is found that the differences of role-internal features exist in

the four basic frames, Perception_active_central frame, Perception_active_peripheral frame,

Perception_experience_central frame, and Perception_experience_peripheral frame. The

micro-frames under each of them are shown in Figure 8 and shall be introduced from Section
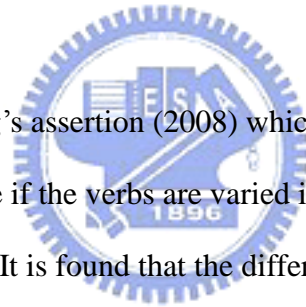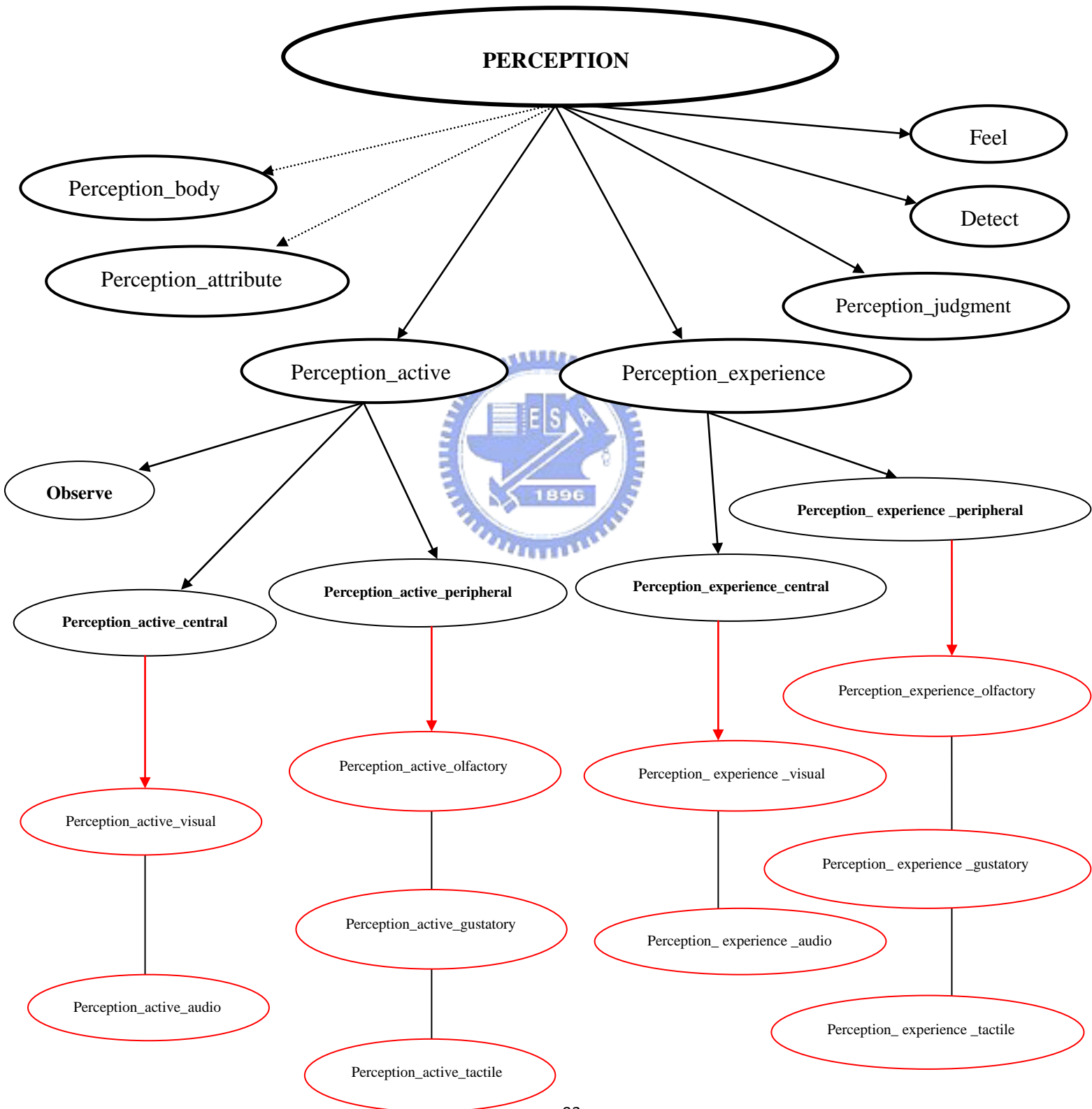
5.3.4.1 to Section 5.3.4.4.

Figure 8.

The Micro-frames under Perception_active_central Frame,

Perception_active_peripheral Frame, Perception_experience_central Frame, and

Perception_experience_peripheral Frame

5.3.4.1 The Micro-frames under Perception_active_central Frame

The verbs in Perception_active_central frame can be further distinguished by the role-internal features of the core frame element, Phenomenon. That is, in terms of some of the verbs, a perceived Phenomenon tends to be a visual stimulus while for other verbs a perceived Phenomenon tends to be an audio stimulus. The comparison is illustrated below.

(26) Differences in Role-internal Features among Verbs of Perception_active_central frame

    1. **[+visual]**

      a. 我看了[這幅畫/Phenomenon_entity+visual]。

      wo　kan　le　zhe　fu　hua

      I　watch　PERF　this　CL　painting

      'I have looked at this painting.'

      b. ???我聽了[這幅畫/Phenomenon_entity+visual]。

      wo　ting　le　zhe　fu　hua

      I　listen　PERF　this　CL　painting

      'I have listened to this painting.'

    2. **[+audio]**

      a. ???我看了[鼓聲/Phenomenon_entity +audio]。

      wo　kan　le　gu-sheng

      I　watch　PERF　drum-sound

      'I have watched the sound of drums'

      b.我聽了[鼓聲/Phenomenon_entity +audio]。

      wo　ting　le　gu-sheng

      I　listen　PERF　drum-sound

      'I have listened to the sound of drums.'

From the examples above, we see that some restrictions limit the complement-selection of the verbs. Such representation is caused by the internal semantic property of a verb. Therefore, we distinguish the verbs further into two micro-frames. One is Perception_active_visual frame, and the other one is Perception_active_audio frame. The former one shows that the perceived phenomenon tends to be visual whereas the latter one one tends to be audio. The lemmas of the two frames are displayed below.

➢ **Perception_active_visual frame:**

看 *kan* 'watch'、瞪 *deng* 'stare'、盯 *ding* 'stare'、瞧 *qiao* 'look'、偷看 *toukan* 'peep'、偷窺 *toukui* 'peep'、窺視 *kuishi* 'peep'、監視 *jianshi* 'monitor'、掃視 *saoshi* 'glance'、凝視 *ningshi* 'gaze'、訪視 *fangshi* 'visit'、探視 *tanshi* 'visit'、注視 *zhushi* 'gaze'、俯視 *fushi* 'look down at'、仰視 *yangshi* 'look up at'、仰望 *yangwang* 'look up at', 怒視 *nushi*、眺望 *tiaowang* 'oversee'、瀏覽 *liulan* 'skim'、

➢ **Perception_active_audio:**

聽 *ting* 'listen', 傾聽 *qingting* 'listen'、聆聽 *lingting* 'listen'、監聽 *jiangting* 'monitor'、偷聽 *touting* 'overhear' 、竊聽 *quieting* 'overhear'、試聽 *shiting* 'try to listen'

5.3.4.2 The Micro-frames under Perception_active_peripheral Frame

In Perception_active_peripheral Frame, the role-internal differences motivate a further classification of the verbs. The differences are shown in (27).

(27) Differences in Role-internal Features among Verbs of Perception_active_peripheral frame

1**. [+olfactory]**

a. 我聞了[這股香氣/Phenomenon_entity +olfactory]。

 wo   wen   le   zhe-gu   xiang-qi

I   smell   PERF   this-CL   fragrant-breath

'I have smelt the fragrance.'

b. ???我嚐了[這股香氣/Phenomenon_entity +olfactory]。

   wo   chang   le   zhe-gu   xiang-qi

   I   taste   PERF   this-CL   fragrant-breath

   'I have tasted the fragrance.'

c. ???我摸了[這股香氣/Phenomenon_entity +olfactory]。

   wo   mo   le   zhe-gu   xiang-qi

   I   touch   PERF   this-CL   fragrant-breath

   'I have touched the fragrance.'

2. [+**gustatory**]

   a. ???我聞了這顆蘋果的滋味。

      wo   wen   le   zhe-ke   pinguo   de   ziwei

      I   smell   PERF   this-CL   apple   DE   taste

      'I have smelt the taste of the apple.'

   b. 我嚐了這顆蘋果的滋味。

      wo   chang   le   zhe-ke   pinguo   de   ziwei

      I   taste   PERF   this-CL   apple   DE   taste

      'I have tasted the taste of the apple.'

   c. ???我摸了這顆蘋果的滋味。

      wo   mo   le   zhe-ke   pinguo   de   ziwei

      I   touch   PERF   this-CL   apple   DE   taste

      'I have touched the taste of the apple.'

3. [+**tactile**]

   a. ???我聞了這件衣服的柔軟。

      wo   wen   le   zhe-jian   yifu   de   rou-ruan

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I   smell   PERF   this-CL   clothes   DE   gentle-soft

'I have smelt the softness of the clothes.'

b. ???我嚐了這件衣服的柔軟。

wo   wen   le   zhe-jian   yifu   de   rou-ruan

I   taste   PERF   this-CL   clothes   DE   gentle-soft

'I have tasted the softness of the clothes.'

c. 我摸了這件衣服的柔軟。

wo   wen   le   zhe-jian   yifu   de   rou-ruan

I   touch   PERF   this-CL   clothes   DE   gentle-soft

'I have touched the softness of the clothes.'

In this way, the verbs are categorized into three subgroups as the following shows according to the diversity of the role-internal features.

➤ **Perception_active_olfactory frame:**

聞 *wen* 'smell'、嗅 xiu 'smell', 嗅聞 xiuwen 'smell'

➤ **Perception_active_gustatory frame:**

嚐 *chang* 'taste'、 品嚐 pinchang 'taste'、品味 pinwei 'taste'

➤ **Perception_active_tactile frame:**

碰 *peng* 'touch' 、觸 *chu* 'touch'、碰觸 *pengchu* 'touch', 摸 *mo* 'touch'、撫摸 *fumo* 'caress'、愛撫 *aifu* 'caress'、觸摸 *chumo* 'touch'

5.3.4.3 The Micro-frames under Perception_experience_central Frame

As (26) shows, the differentiation lies in the role-internal features, [+visual] and [+audio]. Also, the verbs of Perception_experience_central Frame can be classified with the two features. Thus, the micro-frames under Perception_experience_central Frame are shown as below.

> **Perception_experience_visual frame:**

看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、見到 *jiandao* 'see'

> **Perception_experience_audio frame:**

聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'

5.3.4.4 The Micro-frames under Perception_experience_peripheral Frame

The verbs of Perception_experience_peripheral Frame can be differentiated according to the three role-internal features, [+olfactory], [+gustatory], and [+tactile]. In this way, the micro-frames are shown as below.

> **Perception_experience_ olfactory frame:**

聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'

> **Perception_experience_ gustatory frame:**

嚐到 *changdao* 'taste'、 嘗到 *changdao* 'taste'

> **Perception_experience_ tactile frame:**

摸到 *modao* 'touch'、碰到 *pengdao* 'touch' 、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'

5.4 From Perception to Cognition through Metaphorical Extension Mechanism

In Section 5.3, we have presented the classification of perception-related frames in a hierarchical structure by adopting the frame-based approach (Fillmore & Atkins 1992) and the verbal classificational scheme proposed by Liu and Chiang (2008). Since the frames are composed of perception events, the verbs are discussed on the basis of their meanings attaching to perception. However, it has been found and investigated in previous studies that perception verbs frequently undergo semantic shifts to display non-perception senses, especially senses of cognition (Lien 2005; Rojo & Valenzuela 2004; Schüle 2000;Viberg

1984). Such semantic shift mainly relies on the mechanism of metaphorical extension (Lakoff & Johnson 1980; Sweetser 1990), which is structured by a 'source' domain and a 'target' domain to compare an abstract concept to a concrete one[2]. Thus, in this section, we aim to clarify the interrelationship between perception and cognition by exhibiting the metaphorical extensions of the perception frames. Besides, the investigation in the section harmonies with Hu's analysis of Mandarin cognition verbs (2007) for it is also based on Frame Semantics so that the semantic mappings will be explained more clearly by showing the corresponding frames.

5.4.1 From Perception to Cognition: Feel Frame

The verbs in Feel frame are not only used to express perceptual experiences but also used to assume a personal opinion. (28) contains a set of examples to show non-perception uses of the perception verbs 感覺 *ganjue* 'feel', 覺得 *juede* 'feel', and 感到 *gandao* 'feel'. (29) provides the interpretations of (28) by replacing the verbs in Feel frame with cognition verbs in Opinion frame proposed by Hu (2007) to represent the semantic shift.

(28) **Non-perception Uses of the Verbs in Feel Frame**

   a. 有時我**感覺**我並不屬於任何一個國家。

   youshi   wo   ganjue   wo   bing   bu   shuyu   renhe   yi   ge   guojia

   sometimes   I   feel   I   even   NEG   belong   any   one-CL   nation

   'Sometimes I think that I don't belong to any country.'

   b. 我**覺得**毒蛇代表危險。

   wo   juede   du-she   daibiao   weixian

   I   feel   poisonous-snake   represent   danger

---

[2] For example, LOVE IS A JOURNEY. (Lakoff & Johnson 1980)

'I think that poisonous snakes signify dangers.'

c. 我**感到**自己像個少爺。

wo gandao ziji xiang ge shaoye

I   feel   self   resemble CL   childe

'I think that I myself seem to be a childe.'

(29)   Transcriptions of (28) by Replacing Perception Verbs with Cognition Verbs

a. 有時我**認為**我並不屬於任何一個國家。

youshi wo renwei wo bing bu shuyu renhe yi ge guojia

sometimes I   think I   even NEG belong any one-CL nation

'Sometimes I think that I don't belong to any country.'

b. 我**認為**毒蛇代表危險。

wo renwei dushe daibiao weixian

I   think poisonous-snake represent danger

'I think that poisonous snakes signify dangers.'

c. 我**認為**自己像個少爺。

wo renwei ziji xiang ge shao ye

I   think self resemble CL   childe

'I think that I myself seem to be a childe.'

From the correspondence between (28) and (29), we see that the verbs in Feel frame can be transcribed into the verbs in Opinion frame. One remarkable clue for the semantic shift is the complement. That is, the complement also undergoes a shift from a concrete concept to an abstract concept, which is a key proposal about metaphor by Lakoff and Johnson (1980).

In this way, we adopt the mechanism of metaphorical extension to illustrate the interaction between Feel frame and Opinion frame. Therefore, for the semantic shift of this

frame, we suggest that **THINKING IS FEELING**. (30) represents the introductions of the source domain and the target domain for this metaphorical extension.

(30) THINKING IS FEELING

    a. Source Domain: Feel frame

        i. **Def.:** This frame describes a stimulus-response process that a Perceiver, under the stimulation of some Phenomenon, feels a sensory Percept through his/her Body part

        ii. **Representative Lemma:** 感覺 *ganjue* 'feel', 覺得 *juede* 'feel', 感到 *gandao* 'feel'

        iii. **Frame Elements:** Perceiver, Body part, Phenomenon, Percept

    b. Target Domain: Opinion Frame (quoted from Hu (2007:71))

        i. **Def.**: A Cognizer has a particular Content, which may be portrayed as being about a particular Topic.

        ii. **Representative Lemma:** 想 *xiang* 'think', 認為 *renwei* 'think', 以為 *yiwe* 'think', 覺得 *juede* 'feel', 感覺 *ganjue* 'feel'

        iii. **Frame Elements:** Cognizer, Content, Topic

With the introduction of the source domain and the target domain of the frame-to-frame metaphorical mapping, in the following, (31) and (32) shows the shift of frame elements due to the metaphorical extension, THINKING IS FEELING.

(31)   Frame Elements in Basic Patterns of Source Domain: Feel Frame

    a. 有時[我/Perceiver][**感覺/Feel**][我並不屬於任何一個國家/Percept]。

    youshi wo ganjue wo bing bu shuyu renhe yi-ge guojia

    sometimes I feel I even NEG belong any one-CL nation

    'Sometimes I think that I don't belong to any country.'

b. [我/Perceiver][**覺得/Feel**][毒蛇代表危險/Percept]。

wo   juede   du-she   daibiao   weixian

I   feel   poisonous-snake   represent   danger

'I think that poisonous snakes signify dangers.'

c. [我/Perceiver][**感到/Feel**][自己像個少爺/Percept]。

wo   gandao   ziji   xiang   ge   shaoye

I   feel   self   resemble   CL   childe

'I assume that I myself seem to be a childe.'

(32)   Frame Elements in Basic Patterns of Target Domain: Opinion Frame

a. 有時[我/Cognizer][**認為/Opinion**][我並不屬於任何一個國家/Content]。

youshi   wo   renwei   wo   bing   bu   shuyu   renhe   yige   guojia

sometimes   I   feel   I   even   NEG   belong   any   one-CL   nation

'Sometimes I think that I don't belong to any country.'

b. [我/Cognizer][**認為/Opinion**][毒蛇代表危險/Content]。

wo   renwei   du-she   daibiao   weixian

I   think   poisonous-snake   represent   danger

'I think that poisonous snakes signify dangers.'

c. [我/Cognizer][**認為/Opinion**][自己像個少爺/Content]。

wo   renwei   ziji   xiang   ge   shaoye

I   think   self   resemble   CL   childe

'I think that I myself seem to be a childe.'

5.4.2 From Perception to Cognition: Perception_active Frame

In Perception_active frame, as Section 5.3.2.1.2 introduces, the verbs are volitional

perception verbs. Through a semantic shift, the senses of the verbs are highly involved with

the senses of thinking verbs and knowing verbs. Such correspondence is revealed in (33) and (34).

(33)   Non-perception Uses of the Verbs in Perception_active Frame

    a. 我**看**她倒是在撒謊。

      wo   kan   ta   dao -shi   zai   sahuang

      I   watch   she   actually   PROG   lie

      'I think that she is lying actually.'

    b. 你有試著去**聽**他內心的痛嗎？

      ni   you   shi   zhe   qu   ting   ta   nei-xin   de   tong   ma

      you have try   Dur   go   listen   he   inside-heart   ache   Question

      'Have you ever tried to understand his pain?'

    c. 去**摸**一下這個人的個性好不好相處。

      qu   mo   ixia   zhe-ge   ren   de   gexing   hao   bu   hao   xiangchu

      go   touch   for-a-while   this-CL person DE personality good NEG good get-along

      'Try to understand whether it is easy or not to get along with this guy.'

(34)   Transcriptions of (33) by Replacing Perception Verbs with Cognition Verbs

    a. 我**認為**她倒是在撒謊。

      wo   huaiyi   ta   dao -shi   zai   sa-huang

      I   think   she   actually   PROG   lie

      'I doubt that she is lying actually.'

    b. 你有試著去**了解**他內心的痛嗎？

      ni   you   shi   zhe   qu   liaojie   ta   nei-xin   de   tong   ma

      you   have try   Dur   go   understand   he   inside-heart   ache   Question

      'Have you ever tried to understand his pain?'

c. 去了解一下這個人的個性好不好相處。

qu liaojie ixia zhe-ge ren de gexing hao bu hao xiangchu

go understand for-a-while this-CL person DE personality good NEG good

get-along

'Try to understand whether it is easy or not to get along with this guy.'

For (33a), the metaphorical extension of 看 *kan* 'watch' is frequently discussed in previous studies. For instance, Zhong (2002:59-60) looked at 看 *kan* 'watch' and listed various uses of it. One of the uses connects to a sense of thinking or believing, such as 我看時機已經成熟 *wo kan shiji yijing chengshou* 'I think now is the time to do.', which resembles (33a). In addition, she also looked at 聽 *ting* 'listen' and argued that it has mingled senses; and one of them expresses 'understanding', such as 我真正開始聽我的問題…*wo zhenzheng kaishi ting wode wenti* 'I really started to understand my questions…'(Zhong 2002), which resembles (33b). Besides, she reviewed Lin's statement (1999:182-184) which indicated that '*Verbs of perception are also used to frame a thought.*' Thus, for the verbs in Perception_active, we see that they interact with verbs of thinking and knowing significantly. In this way, here, we suggest that **THINKING IS PERCEIVING VOLITIONALLY** and **UNDERSTANDING IS PERCEIVING VOLITIONALLY**.

(35) UNDERSTANDING IS PERCEIVING VOLITIONALLY

a. **Source Domain**: Perception_active Frame

i. **Def.:** For certain Purpose, the Perceiver volitionally and even intentionally directs his or her attention to some Phenomenon for a period of Duration in order to have a perceptual experience.

ii. **Representative Lemma:** 看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'

iii. **Frame Elements:** Perceiver_agentive, Phenomenon_entity, Phenomenon_event,

Expected information, Duration, Purpose

b. **Target Domain**: Knowing Frame (quoted from Hu(2007:74))

i. **Def.:** A Cognizer has some Knowledge, which may be portrayed as

Knowledge_Description about certain Topic; sometimes the Degree or

strength of the Cognizer's knowing the fact is of concern.

ii. **Representative Lemma:** 知道 *zhidao* 'know', 曉得 *xiaode* 'know'，清楚

qingchu 'be clear about'，明白 *mingbai* 'understand' ,懂 *dong*

'understand'

iii. **Frame Elements:** Cognizer, Knowledge, Knowledge_Description,

Degree

(36)   THINKING IS PERCEIVING VOLITIONALLY

a. **Source Domain:** Perception_active Frame (introduced in (35a))

b. **Target Domain:** Opinion Frame (quoted from Hu(2007:73), introduced in (30b))

Two types of the metaphorical extension from this frame to cognition frames have been

introduced above. In the following, the mappings of semantic roles are displayed.

(37)   Frame Elements in Basic Patterns of Source Domain: Perception_active Frame

a. [我/Perceiver_agentive][**看/Perception_active**][她倒是在撒謊

/Phenomenon_event]。

wo   kan   ta   dao -shi zai   sahuang

I   watch   she   actually   PROG   lie

'I think that she is lying actually.'

b. [你/Perceiver_agentive]有試著去[**聽/Perception_active**][他內心的痛

/Phenomenon_entity]嗎？

ni you shi zhe qu ting ta nei-xin de tong ma

you have try Dur go listen he inside-heart ache Question

'Have you ever tried to understand his pain?'

c. 去[摸/Peception_active]一下[這個人的個性好不好相處/Expected

information]。

qu mo ixia zhe-ge ren de gexing hao bu hao xiangchu

go touch for-a-while this-CL person DE personality good NEG good

get-along

'Try to understand whether it is easy or not to get along with this guy.'

(38)   Frame Elements in Basic Patterns of Target Domain: Opinion Frame and

Knowing Frame

a. [我/Cognizer][認為/Opinion][她倒是在撒謊/Content]。

wo huaiyi ta dao -shi zai sa-huang

I think she actually PROG lie

'I doubt that she is lying actually.'

b. [你/Cognizer]有試著去[了解/Knowing]他內心的痛/Knowledge]嗎？

ni you shi zhe qu liaojie ta nei-xin de tong ma

you have try Dur go understand he inside-heart ache Question

'Have you ever tried to understand his pain?'

c. 去[了解/Knowing]一下[這個人的個性好不好相處

/Knowledge_propositon]。

qu liaojie ixia zhe-ge ren de gexing hao bu hao xiangchu

go understand for-a-while this-CL person DE personality good NEG good

get-along

'Try to understand whether it is easy or not to get along with this guy.'

5.4.3 From Perception to Cognition: Perception_experience Frame

The verbs in Perception_experience are also used to express senses of cognition, jusy as the following shows.

(39) Non-perception Uses of the Verbs in Perception_experience Frame

a. 我從這次合作經驗中**看到**他的深度，更加敬佩他了。

wo   cong   zhe-ci   hezuo   jingyan   zhong   kandao   ta   de   shendu   gengjia

jingpei   ta   le

I   from   this-CL   cooperate   experience   middle   see   he   DE   depth

more   admire   he   SFP

'I saw his depth from the experience of cooperation, and thus I admired him more.'

b. 老百姓只希望總統能**聽到**他們的心聲。

laobaixing   zhi   xiwang   zongtong   neng   tingdao   tamen   de   xinsheng

commoner   only   hope   president   could   hear   they   DE   thought

'All the commoners hope is that the president could understand their thoughts'

c. 「第二軍」中的明星馬來西亞，在近年高成長的喜悅中，開始**嚐到**「錢多」的煩惱。

dier-jun   zhong   de   mingxing   malaixiya   zai   jin-nian   gao   chengzhang

de   xiyue   zhong   kaishi   changdao   qian   duo   de   fannao

second-army   middle   DE   star   Malaysia   in   recent-year   high   grow

DE   joy   middle   start   taste   money   much   DE   trouble

'Malaysia, the star of the 'second army'', started to understand the trouble of being

rich in the joy of growing highly these years.'

d. 我們溫州商人就算是在伊拉克的砲火硝煙中也能**嗅到**商機，

women   wenzhou   shangren   jiusuanshi   zai   yilake   de   paohuo   xiaoyan

zhong   ye   neng   xiudao   shang-ji

we   Wenzhou (Name of place)   businessman   even   in   Iraq   DE   gunfire

gunpowder   also   could   smell   business-chance

'We the businessmen of Wenzhou could discover the chance for business even in

Iraq during the war.'

e. 鬥到後來，對敵人的劍法已漸漸**摸到**了門路，

dou   dao   houlai   dui   diren   de   jian-fa   yi   jianjian   modao   le   men-lu

fight   reach   later   toward   enemy   DE   sword-way   PERF   gradually

touch   PERF   door-road

'Till the end, (I) have gradually discovered the way he fights with a sword.'

(40)   Transcriptions of (39) by Replacing Perception Verbs with Cognition Verbs

a. 我從這次合作經驗中**了解**他的深度，更加敬佩他了。

wo   cong   zhe-ci   hezuo   jingyan   zhong   liaojie   ta   de   shendu   gengjia

jingpei   ta   le

I   from   this-CL   cooperate   experience   middle   understand   he   DE

depth   more   admire   he   SFP

'I understood his depth from the experience of cooperation, and thus I admired him

more.'

b. 老百姓只希望總統能**了解**他們的心聲。

laobaixing   zhi   xiwang   zongtong   neng   liaojie   tamen   de   xinsheng

commoner   only   hope   president   could   understand   they   DE   thought

'All the commoners hope is that the president could understand their thoughts'

c. 「第二軍」中的明星馬來西亞，在近年高成長的喜悅中，開始**了解**「錢

多」的煩惱。

dier-jun   zhong   de   ming   xing   malaixiya   zai   jin-nian   gao

chengzhang   de   xiyue   zhong   kaishi   liaojie   qian   duo   de   fannao

second-army   middle   DE   star   Malaysia   in   recent-year   high   grow

DE   joy   middle   start   understande   money   much   DE   trouble

'Malaysia, the star of the 'second army'', started to understand the trouble of

being rich in the joy of growing highly these years.'

d. 我們溫州商人就算是在伊拉克的砲火硝煙中也能**發現**商機，

women   wenzhou   shangren   jiusuan   shi   zai   yilake   de   paohuo   xiaoyan

zhong   yeneng   faxian   shangji

we   Wenzhou (Name of place)   businessman   even   in   Iraq   DE   gunfire

gunpowder   also   could   discover   business-chance

'We the businessmen of Wenzhou could discover the chance for business even in

Iraq during the war.'

e. 鬥到後來，對敵人的劍法已漸漸**發現**了門路，

dou   dao   houlai   dui   diren   de   jian-fa   yi   jianjian   faxian   le   men-lu

fight   reach   later   toward   enemy   DE   sword-way   PERF   gradually

discover   PERF   door-road

'Till the end, (I) have gradually discovered the way he fights with a sword.'

From the examples shown above, it implies that this frame represent a semantic shift to

knowing verbs and discovering verbs. In ths way, two types of metaphorical extensions are

assumed in terms of Perception_experience frame. One is **KNOWING IS PERCEIVING**

UNINTENTIONALLY, and the other is **DISCOVERING IS PERCEIVING**

UNINTENTIONALLY. The introduction of the source domains and target domains are

depicted below.

(41) KNOWING IS PERCEIVING UNINTENTIONALLY

a. Source Domain: Perception_experience Frame

    i. **Def.:** In this frame, a Perceiver has perceptual experiences through his or her Body

      part without any volition or intention.

    ii. **Representative Lemma:** 聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao*

      'see'、看見 *kanjian* 'see'、聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅

      到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'

    iii. **Frame Elements:** Perceiver_experiencer, Body part, Phenomenon_entity,

      Phenomenon_event, Phenomenon_state

  b.Target Domain: Knowing Frame (introduced in (35b))

(42) DISCOVERING IS PERCEIVING UNINTENTIONALLY

a. Source Domain: Perception_experience Frame (introduced in (41a))

b. Target Domain: Becoming-aware Frame (quoted from Hu(2007))

    i. **Def.:** A Cognizer adds some Phenomenon to their model of the world

      through some Instruments.

    ii. **Representative Lemma:** 發現 *faxian* 'find'，發覺 *fajue* 'discover'，察覺

      chajue 'be aware of'，注意到 *zhuyidao* 'note'

    iii. **Frame Elements:** Cognizer, Phenomenon, Phenomenon_Proposition,

      Instrument

    Therefore, with the introduction of the source domain and the target domain of the

frame-to-frame metaphorical mapping, in the following, (43) and (44) shows the shift of

frame elements due to the metaphorical extensions.

(43) Frame Elements in Basic Patterns of Source Domain: Perception_experience Frame

a. [我/Perceiver_experiencer]從這次合作經驗中[**看到/Perception_experience**][他的深度/Phenomenon_entity]，更加敬佩他了。

wo cong zhe-ci hezuo jingyan zhong liaojie ta de shendu gengjia jingpei ta le

I from this-CL cooperate experience middle understand he DE depth more admire he SFP

'I understood his depth from the experience of cooperation, and thus I admired him more.'

b. 老百姓只希望[總統/Perceiver_experiencer]能[**聽到/Perception_experience**][他們的心聲/Phenomenon_entity]。

laobaixing zhi xiwang zongtong neng liaojie tamen de xinsheng

commoner only hope president could understand they DE thought

'All the commoners hope is that the president could understand their thoughts'

c. [「第二軍」中的明星馬來西亞/Perceiver_experiencer]，在近年高成長的喜悅中，開始[**嚐到/Perception_experience**][「錢多」的煩惱/Phenomenon_entity]。

dier-jun zhong de ming xing malaixiya zai jin-nian gao chengzhang de xiyue zhong kaishi liaojie qian duo de fannao

second-army middle DE star Malaysia in recent-year high grow DE joy middle start understande money much DE trouble

'Malaysia, the star of the 'second army'', started to understand the trouble of being rich in the joy of growing highly these years.'

d. [我們溫州商人/Perceiver_experiencer]就算是在伊拉克的砲火硝煙中也能[**嗅到/Perception_experience**][商機/Phenomenon_entity]，

women wenzhou shangren jiusuan shi zai yilake de paohuo xiaoyan zhong yeneng faxian shangji

we   Wenzhou (Name of place)   businessman   even   in   Iraq   DE   gunfire

gunpowder   also   could   discover   business-chance

'We the businessmen of Wenzhou could discover the chance for business even in

Iraq during the war.'

e. 鬥到後來，對敵人的劍法已漸漸[摸到/**Perception_experience**]了[門路

/Phenomenon_entity]，

dou   dao   houlai   dui   diren   de   jian-fa   yi   jianjian   faxian   le   men-lu

fight   reach   later   toward   enemy   DE   sword-way   PERF   gradually

discover   PERF   door-road

'Till the end, (I) have gradually discovered the way he fights with a sword.'

(44) Frame Elements in Basic Patterns of Target Domain: Knowing Frame and

Becoming-aware Frame

a. [我/Cognizer]從這次合作經驗中[**了解/Knowing**][他的深度/Knowledge]，更加敬

佩他了。

wo   cong   zhe-ci   hezuo   jingyan   zhong   liaojie   ta   de   shendu   gengjia

jingpei   ta   le

I   from   this-CL   cooperate   experience   middle   understand   he   DE

depth   more   admire   he   SFP

'I understood his depth from the experience of cooperation, and thus I admired him

more.'

b. 老百姓只希望[總統/Cognizer]能[**了解/Knowing**][他們的心聲/Knowledge]。

laobaixing   zhi   xiwang   zongtong   neng   liaojie   tamen   de   xinsheng

commoner   only   hope   president   could   understand   they   DE   thought

'All the commoners hope is that the president could understand their thoughts'

c. [「第二軍」中的明星馬來西亞/Cognizer]，在近年高成長的喜悅中，開始[**了解**

/Knowing][「錢多」的煩惱/Knowledge]。

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dier-jun zhong de ming xing malaixiya zai jin-nian gao

chengzhang de xiyue zhong kaishi liaojie qian duo de fannao

second-army middle DE star Malaysia in recent-year high grow

DE joy middle start understande money much DE trouble

'Malaysia, the star of the 'second army'', started to understand the trouble of being

rich in the joy of growing highly these years.'

d. [我們溫州商人/Cognizer]就算是在伊拉克的砲火硝煙中也能[**發現**

/Becoming-aware][商機/Phenomenon]，

women wenzhou shangren jiusuan shi zai yilake de paohuo xiaoyan

zhong yeneng faxian shangji

we Wenzhou (Name of place) businessman even in Iraq DE gunfire

gunpowder also could discover business-chance

'We the businessmen of Wenzhou could discover the chance for business even in

Iraq during the war.'

e. 鬥到後來，對敵人的劍法已漸漸[**發現/Becoming-aware**]了[門路/Phenomenon]，

dou dao houlai dui diren de jian-fa yi jianjian faxian le men-lu

fight reach later toward enemy DE sword-way PERF gradually

discover PERF door-road

'Till the end, (I) have gradually discovered the way he fights with a sword.'

5.5 Correspondence between the Frames and the Morphological Make-ups

From the findings in Section 4.4 and the analysis in Section 5.3, an obvious

correspondence between the frames and the morphological make-ups is discovered, which is

shown in Table 19.

Table 19. Correspondence between Frame and Morphological Make-ups

Frame	Lemma	Characteristics of Morphological Make-ups
a. Perception_active	看 *kan* 'watch'、見 *jian* 'watch'、聽 *ting* 'listen'、聞 *wen* 'smell'、嗅 xiu 'smell'、嚐 *chang* 'taste'、摸 mo 'touch'、碰 peng 'touch'	**mono-syllabic V**
b. Perception_active_central	偷看 *toukan* 'peep'、偷窺 *toukui* 'peep'、窺視 *kuishi* 'peep'、監視 *jianshi* 'monitor'、掃視 *saoshi* 'glance'、凝視 *ningshi* 'gaze'、訪視 *fangshi* 'visit'、探視 *tanshi* 'visit'、注視 *zhushi* 'gaze'、俯視 *fushi* 'look down at'、仰視 *yangshi* 'look up at'、仰望 *yangwang* 'look up at', 怒視 *nushi*、眺望 *tiaowang* 'oversee'、瀏覽 *liulan* 'skim'、傾聽 *qingting* 'listen'、聆聽 *lingting* 'listen'、監聽 *jiangting* 'monitor'、偷聽 *touting*	**M-V** ● V₁ as a modifier of V₂ ● V₂ : perception verb

	'overhear'、竊聽 *quieting* 'overhear'、試聽 *shiting* 'try to listen'	
c. Perception_experience	聽到 *tingdao* 'hear'、聽見 *tingjian* 'hear'、看到 *kandao* 'see'、看見 *kanjian* 'see'、瞥見 *piejian* 'glance'、瞟見 *piaojian* 'glance'、聞到 *wendao* 'smell'、聞見 *wenjian* 'smell'、嗅到 *xiudao* 'smell'、嚐到 *changdao* 'taste'、摸到 *modao* 'touch'、碰到 *pengdao* 'touch'、觸到 *chudao* 'touch'、碰觸到 *pengchudao* 'touch'	**V-R** ● V_1: perception verb ● V_2: attainment resultative
d. Detect	看出 *kanchu* 'detect'、聽出 *tingchu* 'detect'、聞出 *wenchu* 'detect'、嗅出 *xiuchu* 'detect'、感覺出 *ganjuechu* 'detect'、察覺出 *chajuechu* 'detect'	**V-R** ● V_1: perception verb ● V_2: attainment resultative
	看起來 *kanqilai* 'look', 'appear', 'seem'、聽起來 *tingqilai* 'sound'、嘗起來	**V-R** ● V_1: perception verb

e. Perception_judgment	*changqilai* 'taste'、嚐起來 *changqilai* 'taste'、摸起來 *moqilai* 'feel'、感覺起來 *ganjueqilai* 'feel' 、看上去 *kanshangqu* 'look', 'appear', 'seem'、聽上去 *tingshangchu* 'sound'、摸上去 *moshangchu* 'feel'	● V$_2$: directional resultative

Table 19 reveals a systematic mapping between the frames and the characteristics of morphological make-ups among Mandarin perception verbs.

For Perception_active frame, the verbs which are composed of a mono-syllabic word as a root morpheme contribute to their meanings symbolic of volitional perceptual experiences. However, in terms of Perception_active_central frame, the basic frame which under the scope of Perception_active frame, the verbs display a noticeable property in morphology. That is, the words in Perception_active_central frame are morphologically composed of two verbs, V$_1$ and V$_2$. The association of V$_1$ and V$_2$ in Perception_active_central frame represents a modification relation (M-V compund), which indicates that V$_1$ serves to modify V$_2$. Particularly, Packard (2000:95) argued that the semantic head of the verb is V$_2$, which is on the right side of a M-V word. It provides an evidence for explaining that Perception_active frame contains larger semantic scope than Perception_active_central frame since V$_2$ in Perception_active_central frame, which is taken as a head semantically in the morphological structure, belongs to Perception_active frame. In other words, Perception_active_central frame shows more marked features than Perception_active frame in morphological make-ups.

For Perception_experience frame and Detect frame, the words are characterized by being made up of a perception verb as V$_1$ and an "attainment" resultative (Packard 2000:98) as V$_2$.

Distinguished from the morphological type of Perception_active_central frame, the words in Perception_experience frame and Detect frame represent 'V-R' type. In Tang's analysis (1992:104), the verbs are assumed to be one type of V-C transitive verbs. Moreover, he suggested that they are stative verbs for not occurring with BA-construction and in imperatives. These are indeed two main syntactic features for the two frames. But this study views the verbs of the two frames as achievement verbs, not stative verbs. In addition, Liu *et al* (1996:297) stated that 見 *jian* 'see' denotes 'results of action' when being a suffix of a perception verb, such as 看 *kan* 'watch', 聽 *ting* 'listen', and 聞 *wen* 'semll', etc., which are the verbs in Perception_active frame; they also stated that 到 *dao* 'reach' basically denotes four functions and the one which collocates with perception verbs signifies 'results of action'. Therefore, we see that why 見 *jian* 'see' and 到 *dao* 'reach' are the essential morphemes which are suffixes of the verbs in Perception_experience frame because it emphasizes the achievement of perceptual experiences. On the other hand, though 出 *chu* 'out' causes verbs to denote the event type of achievement just as 見 *jian* 'see' and 到 *dao* 'reach' do, the difference is that 出 *chu* 'out' promotes the complement to be an incremental theme. That is, the combination of V_1 and 出 *chu* 'out' as V_2 results in a V-R morphological type which implies a gradually-formed theme or event. It is transparent to link the function with Detect frame because two of the core frame elements, Detected entity and Detected fact, can be considered incremental themes through perceptual experiences. Thus, it shows that the V-R morphological types which contain attainment resultatives, are not varied in aspectual representations but different in the semantic nature of the complements.

As for the morphological make-up type of Perception_judgment frame, the resultative of the V-R type, 起來 *qilai* 'rise' is a directional resultative (Liu *et al* 1996:310; Packard 2000:98). V-*qilai* construction is specific in Mandarin for it denotes an evaluation especially when V_1 is a perception verb.

5.6 Summary

In this chapter, Mandarin perception verbs are classified into a hierarchical structure with a frame-based approach. Four-layered working taxonomy represents the semantic and grammatical features in an organized and systematic way. Each layer of the frames exhibits the semantic and syntactic property in a different scope. Moreover, based on the classification, the tendency of semantic shifts and the diversity of morphological make-ups among Mandarin perception verbs are explained correspondently to the identified frames.

Chapter 6

Conclusion

With the regard to capture the correlations between syntax and semantics, this study explores Mandarin perception verbs on the basis of the Frame Semantics (Fillmore & Atkins 1992) and the Construction of Mandarin VerbNet (Liu & Chiang). In the study, the classification of Mandarin perception verbs represents a multi-layered structure, which is composed of one archiframe, seven primary frames, five basic frames, and ten micro-frames. The distinction of verbs into frames provides a transparent way to show the specification of each group of verbs. In addition, the classification also reveals an interrelation with the other characteristics of Mandarin perception verbs, including the semantic shift from perception to cognition and the systematic exhibition of morphological make-ups. It implies that a frame-based analysis can clarify not only the differences between frames but also other features beyond semantic-syntactic representations. Ultimately, the study provides a frame-work for investigating verbal semantics.

In terms of the further research, it is suggested that the semantic shift among the verbs in Perception_attribute can be explored. The uses of these verbs are increasingly shifted to a communication domain, such as 公車司機居然嗆我 *gongche siji juran qiang wo* 'To my surprise, the bus driver scolded me.' or 千萬別酸人家 *qianwan bie suan renjia* 'Be sure not to satirize others.' The motivation for the semantic extension from perceptual experiences to particular ways of communication can be an issue to be investigated.

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Website Resources:

FrameNet   http://framenet.icsi.berkeley.edu/

Academia Sinica Balances Corpus of Modern Chinese

http://www.sinica.edu.tw/SinicaCorpus/

Chinese Word Sketch   http://wordsketch.ling.sinica.edu.tw/

WordNet   http://bow.sinica.edu.tw/wn/

Google   http://www.google.com/