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L2 Acquisition of English Psych Predicates by Native Speakers of Chinese and French

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of the degree of

DOCTOR OF PHILOSOPHY

To My Parents

ABSTRACT

This thesis investigates the second language acquisition of English psych predicates by Chinese-speaking and French-speaking adult learners of English within the Government and Binding Theory. Two major parts comprise the whole work: a study of psych predicates across Chinese, English and French, including verbs like *blame* and *annoy*, adjectives such as *annoying* and *annoyed*, and nominals like *annoyance*, and an experiment on Chinese and French learners' knowledge of English psych predicates.

An account of psych predicates is proposed, under which Experiencer Object (EO) verbs are the causatives of Experiencer Subject (ES) verbs, derived by zero affixation. Different D-structures are suggested for the two classes of verbs, solving the linking problem of psych predicates. The binding problem with EO verbs and corresponding *-ing* adjectives is resolved by the assumption of anaphoric pro, which enables the anaphor to be bound backwards by the antecedent through the extension of chain-binding theory. The Target/Subject Matter (T/SM) restriction is ruled out by a generalization established on the interaction of the zero CAUS and selectional restrictions.

Given the linguistic analysis that EO verbs are made up of a zero CAUS and a root, and the fact that psych adjectives and psych nominals are derived from these verbs, the central hypothesis for the L2 acquisition of English psych predicates hinges on this zero CAUS. It is predicted that if L2 learners of English have difficulty figuring out the causative nature of EO verbs and *-ing* adjectives, they should have difficulty recognizing the correct argument structure, the ungrammaticality of T/SM violations and the grammaticality of backwards binding with these predicates. A picture identification task, a multiple choice task and a grammaticality judgment and correction task are designed to test L2 learners' knowledge of these properties. The results obtained through the experiment are discussed with respect to the issues in second language acquisition.

RÉSUMÉ

Cette thèse examine l'acquisition des prédicats dit psychologiques en anglais langue seconde par des adultes de langues maternelles chinoise et française, et ce dans le cadre théorique du Gouvernement et du liage. Ce travail comprend deux parties principales: dans la première, nous étudions les prédicats psychologiques en anglais, chinois et français, y compris les verbes comme *blame* et *annoy*, les adjectifs tels que *annoying* et *annoyed* et les nominaux comme *annoyance*. Dans la deuxième partie, nous présentons une recherche expérimentale sur ce que savent les apprenants chinois et français des prédicats psychologiques en anglais langue seconde.

Dans notre étude théorique des prédicats psychologiques, nous proposons que les verbes à objet psy-chose (OP) sont les dérivés causatifs de verbes à sujet psy-chose (SP) par affixation nulle. Nous suggérons des structures profondes différentes pour ces deux classes de verbes, solutionnant ainsi le problème de projection argumentale posé par les prédicats psychologiques. Le problème de liage concernant les verbes OP et leurs correspondants adjectivaux en *-ing* est résolu en admettant la projection d'un pronom nul anaphorique *pro*, ce qui permet à l'anaphore d'être liée à l'envers par l'antécédant, et ce grâce à l'extension de la théorie de chaîne de liage. La restriction "Target/Subject Matter" (T/SM) est écartée en généralisant l'interaction entre l'affixe CAUS nul et les restrictions sélectionelles.

En admettant l'analyse linguistique selon laquelle les verbes OP sont constitués d'une racine et d'un affixe CAUS nul, et le fait que les adjectifs et nominaux psychologiques dérivent de ces verbes, l'hypothèse centrale en ce qui concerne l'acquisition des prédicats psychologiques en anglais langue seconde dépend de cet affixe CAUS nul. Si les apprenants de l'anglais langue seconde éprouvent des difficultés à établir la nature causative des verbes OP et des adjectifs en *-ing*, nous prédisons qu'ils auront du mal à reconnaître la bonne structure argumentale, l'aggramaticalité des violations T/SM ainsi que la grammaticalité du liage à l'envers avec ces prédicats. Un test d'identification d'image, un questionnaire à choix multiple ainsi qu'un test de jugements grammaticaux avec corrections ont été développés afin de cerner la connaissance qu'ont les apprenants de ces propriétés. Les résultats obtenus sont discutés.

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CHAPTER 1

LINGUISTIC THEORY AND LANGUAGE ACQUISITION

1.0 Introduction

What does it mean for a second language (L2) learner to acquire a predicate in a target language? What does the L2 learner really learn in terms of lexical properties such as meaning, syntactic form, morphological structure and phonological shape? How does the learning process actually proceed? What is involved? Is it the case that the learner has to acquire each individual predicate one by one or is it the case that predicates of one semantic type can be acquired as a group? What does the acquisition of a predicate contribute to the acquisition of syntax and the acquisition of a language? Regarding a set of morphologically related predicates, for instance, verbs, adjectives, and nominals, how does the learning process take place? Do learners first acquire the base word and then the derived words next or will the derivations fall out accordingly without learning when the original word is acquired? Will it be easier or more difficult to acquire morphologically derived predicates? In acquiring a new predicate in L2 which has a counterpart in L1, what role does the L1 play? Is there an occurrence of "positive transfer" facilitating the learning process? What would happen if such an equivalent does not exist in L1? Do we expect some form of "negative transfer" such that it will inhibit the learning process?

This work attempts to address some of these questions from the perspective of a Universal Grammar (UG)-based approach to second language acquisition (SLA). In particular, we examine the L2 acquisition of the argument structure of a special class of predicates known as psych(ological) predicates by Chinese-speaking and French-speaking adults learning English as a second language (ESL). These predicates, which involve the assignment of the theta role of Experiencer to one of their arguments, include psych verbs

such as *blame*, *annoy*, psych adjectives like *annoying*, *annoyed* and psych nominals like *annoyance*, as shown in (1).

(1) a. John blames the article
b. The article annoys John
c. John is annoyed with the article
d. The article is annoying to John
e. John's annoyance with the article is considerable

As observed by Grimshaw (1990) and Pesetsky (1995) among others, psych predicates in English (and also crosslinguistically) present some unusual properties, one of which is their seemingly arbitrary semantics-syntax correspondence. Sometimes the Experiencer takes the subject position, as in (1a), (1c) and (1e), sometimes the object position, as in (1b), or it occurs as a prepositional object (1d). The irregular mapping between thematic arguments and syntactic positions may constitute considerable learning problems for L2 learners of English, because unlike agentive verbs which typically associate the Agent with the subject and the Theme with the object, there seems to be no regularity to follow in linking semantics to syntax with these psych predicates. It is in here that the two immediate major purposes of this work lie: (i) to explain why psych predicates allow the apparently arbitrary mapping, and (ii) to find whether psych predicates are problematic for L2 learners of English.

In this chapter I will discuss the relationship between linguistic theory and language acquisition, with a particular focus on what and how a linguistic theory like the theory of UG (Chomsky 1981, and subsequently) contributes to language acquisition. To this end, I will first of all outline the general framework of UG and some of its modules that are relevant to this present work. I will then discuss the logical problem in language acquisition. I will next discuss the goals of this work and finally provide an organization of the thesis.

1.1 Linguistic Theory

It has been noted in the SLA literature (e.g., Rutherford (1995) among others) that one cannot arrive at a theory of how something is acquired without a theory of what that 'something' is. For reasons that will become clear as discussion proceeds, Chomskyian linguistic theory, also known as the theory of UG or generative linguistics, is adopted as a framework for the present research in L2 acquisition. In this section, I will first discuss the major goal of this theory and then introduce some important components and principles of this theory.

1.1.1 Linguistic Theory: UG and Its Goals

UG is defined as "a characterization of the genetically determined language faculty, ... an innate component of the human mind that yields a particular language through interaction with presented experience" (Chomsky 1986a: 3). Thus, the theory of UG is a theory primarily concerned with linguistic competence, the knowledge that native speakers have.

Ever since its inception in the mid 50's (Chomsky 1957), this approach has undergone many changes, from the Standard Theory in the 60's (e.g., Chomsky 1965) to the Extended Standard Theory in the 70's (e.g., Chomsky 1972, 1977), later to the Government and Binding (GB) Theory in the early 80's (e.g., Chomsky 1981, 1982, 1986a, 1986b) and finally to the current Minimalist Program (Chomsky 1993, 1995). Generative linguists have shifted their focus of attention from language-specific rules to universal principles, from the study of E(xternalized)-language, a collection of sentences "understood independent of the properties of mind" (Chomsky 1986a: 20), to the study of I(nternalized)-language, "a system represented in the mind/brain of an individual speaker" (Chomsky 1986a: 36). Despite the tremendous shifts, its fundamental goals have

remained the same throughout the history of the theory. That is, to "determine how it is possible for a child to acquire knowledge of a language" (Chomsky 1973: 12). Specifically, the following three questions have always been of particular concern for generative linguists (Chomsky 1986a: 3):

(2) a. What constitutes knowledge of language?
b. How is knowledge of language acquired?
c. How is knowledge of language put to use?

Knowledge of language refers to the unconscious knowledge that adult native speakers of a language have with respect to different components of the language, such as syntactic structures, sound structures, and meaning. This kind of knowledge which is usually abstract, subtle and complicated can often be reflected in the native speakers' ability to judge whether a structure is grammatical or not. For instance, native speakers of English know that (3a), (3b) and (3c) are grammatical sentences, whereas (3d) is not, because the latter violates the Empty Category Principle (ECP), a constraint which states that a trace (i.e., an empty category caused by a movement) must be properly governed.

(3) a. Who do you think that John loves?
b. Who do you think John loves?
c. Who do you think loves John?
d. *Who do you think that loves John?

In the case of object extraction, both (3a) and (3b) are fine with or without the complementizer *that*. However, with respect to the case of subject extraction in (3c) and (3d), only the sentence without the complementerizer *that* like (3c) is good. In other words, the complementizer *that* is optional where the object of an embedded question is extracted, but it must be deleted when the subject of an embedded question is extracted.

The reasons are as follows. For (3a) and (3b), the trace that is left in the embedded object position by the movement of wh-word is properly governed by the verb *love*, satisfying the ECP. For (3c), the original trace is properly governed by the intermediate trace left in COMP which, in turn, is properly governed by the antecedent. As for (3d), the original trace cannot be properly governed by the intermediate trace, because the complementizer *that* standing in between prevents the former from c-commanding the latter. Thus, the ECP is violated.

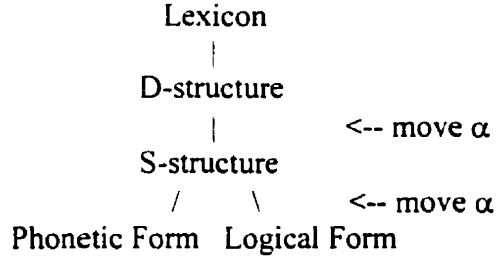
How can English native speakers arrive at such abstract knowledge which seems underivable from either formal teaching or overt evidence in the input? On this theory, native speakers' knowledge of language is represented in the form of UG which is innate and common to all human beings. Since all children are born with UG, a biological endowment for languages, they are bound to acquire a language and to show knowledge of principles such as the ECP. Given that there is a "built-in" linguistic system, containing principles and parameters, it is no longer a puzzle as to why native speakers possess basically similar judgments about certain linguistic phenomena and why children are able to acquire a language within a similar period of time.

Of the different models in the history of generative linguistics, the GB model, also known as the Principles and Parameters approach, represented in Chomsky (e.g., 1981, 1982, 1986a, 1986b) is adopted in the present study. This is because the GB model is much more clearly articulated and has been effectively used in the research on L1 and L2 acquisition over the past decade. While the Minimalist Program is not used as a whole, some of its ideas will be seen in the discussions of certain linguistic structures in the following chapters.

1.1.2 Linguistic Theory: UG and Its Components

To make use of the theory of UG in the investigation of L2 acquisition, it is first of all important to make it clear what this theory consists of and how the mechanisms work. In Chomsky (1981), the grammar takes the following forms.

(4)



The grammar starts with a lexicon which is the input to the other four separate levels. The level of D-structure which is generated from the lexicon according to the principles of X' theory (i.e., a constraint on the formation of structures) represents grammatical and thematic relationships. The level of S-structure, which is derived from D-structure by move α, represents the actual word order of the sentences. The level of Phonetic Form (PF) determines how a form is represented in terms of phonetic and phonological properties. The level of Logical Form (LF) determines how a form is interpreted semantically and logically. While each level of representation performs different function, they are related to each other indirectly by S-structure. [1]

Besides the above four levels of representation, UG contains modular subsystems including different theories, such as X' theory, Theta theory, Case Theory, Binding Theory, and different principles, such as the Projection Principle, the Empty Category Principle, etc. All these theories and principles serve as constraints ensuring that only

---

[1] According to the Minimalist Program (Chomsky 1993, 1995), there are only two levels of representations left: PF and LF. The levels of D-structure and S-structure are eliminated mostly for the conceptual reasons in the hope that things usually explained at these two levels can be accounted for by different theories.

well-formed representations are produced. In the following I will concentrate on the basic notions and functions of the Projection Principle, Theta Theory and Binding Theory, the theories that are relevant as a context for what follows in Chapter 3.[2]

1.1.2.1 Theta Theory

Theta theory looks at the semantic relationship between a verb and its arguments. The core of this theory is the Theta Criterion, according to which each argument must bear one and only one theta role, and each theta role must be assigned to one and only one argument. Roles like Agent and Theme are thematic relations that noun phrases have in regard to a given verb, as first proposed by Gruber (1965) and later developed by Jackendoff (1972) and others. According to the GB model, theta roles are assigned to NPs at D-structure and are carried along to S-structure.

Sentences observing the Theta Criterion are grammatical; sentences violating it are ungrammatical. Consider the examples in (5) for a detailed illustration.

(5) a. John kicks the ball
b. The ball is kicked by John
c. *John kicks
d. The earthquake killed many people
e. *Killed many people

In (5a), the verb *kick* assigns two theta roles. The role of Agent is assigned to the subject, *John*, who performs the action of kicking; the role of Theme is assigned to the object, *the ball*, which receives the effect of being kicked. For this sentence, the Theta Criterion is satisfied, thus it is good. In (5b), again the Agent is assigned to *John*, and the Theme to *the ball*. Although the Agent appears in the position of prepositional object and

[2] Note that the Projection Principle, Theta Criterion and Binding Theory to be introduced in this chapter are claimed to be crucial in the GB model, but they no longer exist in the Minimalist Program due to the removal of D-structure from the theory. However, similar ideas of these principles and theories still remain.

the Theme in the position of subject, this is a normal schema for passives, and the sentence is good. In (5c), *John* gets the Agent role from the verb *kick* but nothing else is there receiving the Theme role, therefore the sentence is bad due to the violation of the Theta Criterion. (5d) is grammatical for the reason that the Theta Criterion is observed by assigning the Instrument role to *the earthquake* and the Theme role to *many people*. (5e) is ungrammatical because of the lack of an argument bearing the Agent theta role.

Agent and Theme, as shown above, can either be animate or inanimate, because both animate and inanimate arguments are able to perform or receive an action. However, it is not always true that any theta role can be assigned to either animate or inanimate things. For example, the Experiencer, as reflected by *John* and *Mary* in (6a) and (6b), is a theta role that requires an animate NP rather than an inanimate NP. The reason is that Experiencer denotes an individual who feels or perceives an event. Obviously we cannot expect an inanimate object to feel or perceive, as shown by the ungrammatical sentences in (6c) and (6d).

(6) a. John likes football
b. Mary saw the movie
c. *Football likes John
d. *The movie saw Mary

A strict correspondence between the theta role assigner and the theta role assignee and a proper animacy requirement for certain theta roles ensure that only grammatical sentences are produced. But this is not enough, because it merely tells us one side of the story. The other side of the story concerns how a theta role is mapped onto a structural position. In other words, what makes the Agent role, *John*, map onto subject position in (5a) but the position of prepositional object in (5b)? What makes the Theme role, *the football*, associated with the object in (5a) but with the subject in (5b)? What decides that *John* and *Mary* receive the Experiencer role in the subject position in (6a) and (6b)? To

answer these questions, we need to know the lexical structure of each verb. Indeed, lexical structure is the important input to D-structure in (4). Thus, to the property of lexical structure, I will turn next.

1.1.2.1.1 Subcategorization and Argument Structure

The lexical entry for each predicate specifies how many NPs it takes and what theta role each NP carries. This information is known as a predicate's subcategorization frame or theta grid (e.g., Stowell 1981; Williams 1981). Take the verb *kick* for example. The subcategorization of *kick* is shown in (7) below.

(7) kick

[NP_1, NP_2]
(Agent, Theme)

(7) indicates that the verb *kick* requires two NPs. The first NP bears the Agent role and the second NP bears the Theme role. [3]

The notion of subcategorization is always related to argument structure, another aspect of the lexical entry. The notion of argument, as defined in Chomsky (1981), refers to an NP such as a name or a variable which may appear in a position where this NP is assigned a certain grammatical function. Argument structure refers to "the lexical representation of grammatical information about a predicate" (Grimshaw 1990: 1), or "knowledge about the syntactic expression of arguments" (Gropen 1996: 4). According to Williams (1981), a verb assigns a theta role directly to its internal argument (typically an

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[3] Noticed by Rappaport and Levin (1988), there are at least three ways to denote the subcategorial relations between theta roles and predicates. For example, in Stowell (1981), arguments are distinguished by the theta roles they bear without indication of internal structure. In Levin and Rappaport (1986), arguments are distinguished by θ-role labels and by annotations expressing information about grammatical functions such as the external argument by underlying and the direct or indirect internal argument. In Zubizarreta (1987), arguments are simply presented by means of annotated variables, containing information necessary to ensure the proper realization of the arguments of the verb in syntax.

argument within the verb, i.e., the object), and assigns a theta role indirectly to its external argument (typically an argument outside the verb phrase, i.e., the subject).[4] The subject position is the position that usually receives a higher argument (see below), while the object position receives a lower argument. Thus, Agent is generally associated with the subject, and Theme with the object if the theta role of Agent is considered as higher than the theta role of Theme. But is there any principle that ensures only correct linking between thematic roles and syntactic positions and at the same time rules out incorrect linking? Related to this question is another question of whether the relationship between thematic information and syntactic information is systematic or arbitrary. The next section will deal with these questions.

1.1.2.1.2 Thematic Hierarchy and UTAH

The subcategorization and argument structure of a predicate enable us to know a certain thematic relation between a predicate and its NPs. But how is a given theta role mapped to a syntactic position and why is one theta role considered to be higher than another? UG contains some principles which provide answers to the above questions. One of the principles is the Thematic Hierarchy which arranges thematic roles in accordance with their prominence: more prominent theta roles are placed higher in the hierarchy and less prominent theta roles are placed lower. In the literature there are different versions of the Thematic Hierarchy. The one given in (8) is proposed by Jackendoff (1990); Agent projects higher than Experiencer which in turn is higher than Theme.

(8) Thematic Hierarchy (Jackendoff 1990)

(Agent(Experiencer(Goal/Source/Location(Theme))))

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[4] According to Williams (1981), an external argument is syntactically realized outside the maximal projection that the verb heads, while an internal argument is syntactically realized internal to this maximal projection.

Some controversy exists concerning the position for Theme and for Location (e.g., Larson 1988: 382). But all the hierarchies assume that the highest position belongs to Agent and that when there is no Agent involved, lower theta roles can be projected to the highest position at D-structure (Larson 1988; Pesetsky 1995).

Since there is a degree of prominence among different theta roles, and the more prominent theta role is associated to the higher structural position in syntax, thematic roles are linked to syntactic positions systematically. The idea that thematic prominence parallels with syntactic prominence is best reflected in the Uniformity of Theta Assignment Hypothesis (UTAH):[5]

(9) Uniformity of Theta Assignment Hypothesis (UTAH) (Baker 1988a: 46)

Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure

What the UTAH emphasizes is that similar semantic elements must be realized by similar thematic relationships at D-structure. To illustrate the gist of the UTAH, let us look at two examples in (10).

(10) a. Mary fears the dog
b. The dog frightens Mary

Here, from the surface, the Experiencer *Mary* is associated with either subject in (10a) or object in (10b), though the two sentences express a similar meaning. In Belletti

[5] For the similar idea, see Perlmutter and Postal's (1984) Universal Alignment Hypothesis (UAH) which states that "There exist principles of UG which predict the initial relation borne by each (argument) in a given clause from the meaning of the clause". Pesetsky (1995) interprets UAH as the weaker form of UTAH, because the latter requires an identical mapping between semantically identical elements and syntactic structure, whereas the former only requires a predictable linking between a given clause and the meaning of the clause. Gruber (1995) proposes the principle of strict thematic configurationality, a strong version of UTAH. It states the following: "Every thematic relational distinction is distinctively represented configurationally in syntax."

and Rizzi's (1988) classical account of psych verbs, *Mary* is indeed base-generated at a similar structural position in D-structure for both *fear* and *frighten*, but the requirement for Case forces the Theme *the dog* to move to the subject position in the case of *frighten*, and that results in the different word order in the structure (10b).

The Thematic Hierarchy and the UTAH come into play at the level of D-structure, associating semantics with syntax. With these principles, a correct linking between thematic arguments and syntactic positions can be guaranteed.

1.1.2.2 The Projection Principle

The Projection Principle is a principle that constrains the syntactic representation of lexical information at each level, as shown in (11).

(11) The Projection Principle (Chomsky 1981: 29)

> Representations at each syntactic level are projected from lexicon, in that they observe the subcategorization properties of lexical item.

According to (11), lexical information determines syntactic information to a large extent. First, the lexical category of the head of a phrase determines the category of the phrase. Second, the thematic structure of a predicate encoded in the subcategorization and argument structure determines the template of a sentence. Third, the lexical information will remain the same throughout all the levels of representations (i.e., D-structure, S-structure, PF and LF) regardless of syntactic movement. When something moves in S-structure, it leaves a trace in situ so as to preserve information.

Take the verb *kick* for example. The verb *kick* is specified in the lexicon as containing two roles, the Agent and the Theme. It forms a VP constituent headed by *kick*. This VP requires the Agent to be assigned to subject and the Theme to object. According to (11), the lexical information encoded in the verb *kick* should be preserved at each level

of syntax. Thus, if a subject is extracted, as in (12a), or an object is extracted, as in (12b), a trace is left in both cases. The traces left in their original positions are in conformity with the Projection Principle.

(12) a. Who$_i$ t$_i$ kicked John?
b. Who$_i$ did John kick t$_i$?

1.1.2.3 Binding Theory

Binding theory constrains the coreferential relationships among various noun phrases, including pronouns, anaphors and proper nouns. Standard binding theory contains the following three principles (Chomsky 1981: 188):

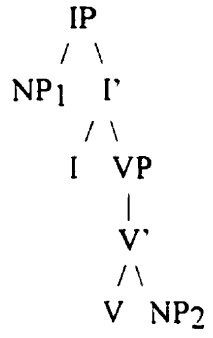
(13) A. An anaphor is bound in its governing category
B. A pronoun is free in its governing category
C. An R-expression is free

Here "to be bound" means to be c-commanded and coindexed. To be coindexed means that two NP are coreferential. An R-expression refers to a proper noun. As to c-command, one of the definitions is given in (14), from Chomsky (1986b: 8).

(14) A c-commands B iff A does not dominate B and every X dominates A also dominates B

A concrete example to illustrate (14) is given in (15), where NP$_1$ c-commands VP, V, and NP$_2$. V and NP$_2$ c-command each other. What is crucial here is that NP$_2$ does not c-command NP$_1$.

(15)



The notion of governing category has been quite controversial in the literature. But since the issues that are involved in this work are independent of the discussion on governing category, we will just regard a governing category as a local domain, e.g., the minimal NP or S that contains the governor and the anaphor. The governor is usually a verb or a preposition, and an anaphor includes the reflexives like *himself/herself* and the reciprocals like *each other*.

1.1.2.3.1 Forwards Binding

With the above definitions, let us look at the following examples in (16), which illustrate the three binding principles in (13).

(16) a. John$_i$ criticized himself$_i$
b. *Himself$_i$ criticized John$_i$
c. Mary$_i$ thought that Susan$_j$ praised her$_i$
d. *Mary thought that Susan$_j$ praised her$_j$
e. *She$_i$ thought that Mary$_j$ praised Susan$_i$

In (16a) *himself* refers back to *John*, observing Principle A. (16b) is ungrammatical because *himself* is not c-commanded by the antecedent *John*. (16c) is grammatical, because *her*, the pronoun, which should be free is not bound by *Susan* within its own governing category, observing Principle B. However, *her* can refer to

Mary outside its governing category. When the pronoun *her* is bound by *Susan* within its own governing category, then the sentence turns out to be bad, that is shown in (16d). (16e) is also bad because *Susan* is bound by the pronoun *she*, violating Principle C which requires the proper noun to be free.

The above examples show that binding is normally in a forwards direction to observe the c-command requirement. If the c-command condition is violated, sentences will become bad, such as the one as in (16b). What is interesting is that there are some structures allowing the anaphor before its antecedent, yet sentences of this kind which apparently violate the c-command condition on the binding of anaphor are still grammatical. In the following section I will give a brief discussion of a particular structure which allows the phenomenon of "backwards" binding.

1.1.2.3.2 Backwards Binding

Among various kinds of predicates that allow backwards binding are psych verbs such as *amuse*, *annoy*, shown in (17), from Pesetsky (1987: 127).

(17) a. Pictures of each other$_i$ annoy the politicians$_i$
b. Stories about herself$_i$ generally please Mary$_i$

In (17a) and (17b), the antecedents the *politicians* and *Mary* do not c-command the coindexed reciprocal *each other* or reflexive *herself* respectively, but both sentences are still perfectly acceptable in English. Similar backwards binding phenomena have been noticed in different languages such as Italian (Belletti and Rizzi 1988), Dutch (Mulder 1990), Chinese (Huang and Tang 1991), Japanese (Uesaka 1994). While people working on psych verbs have proposed different analyses to account for this unusual property, they have all agreed that the c-command condition or a similar condition must still be observed in this situation. For example, Belletti and Rizzi (1988) claim that the

Experiencer of the psych verbs like *annoy*, i.e., *the politicians* in (17a), is actually base-generated at a position higher than the Theme, *pictures of each other*, as shown in (18a).

(18) a. __ [VP [V' annoy pictures of each other] politicians]
b. [pictures of each other$_j$]$_i$ [VP [V' annoy t$_i$] politicians$_j$]

The politicians c-commands *pictures of each other* in the D-structure of (18a), therefore the anaphor *each other* in the latter is bound by the former based on the argumentation that Principle A can be applied at any level of representation, though the c-command condition is violated in S-structure of (18b) after the movement of *pictures of each other* to the subject position.

Binding Theory is an essential component of the Government and Binding framework. There are two kinds of binding: the one illustrated above is A-binding, where the antecedent for the anaphor is an argument. In addition, there is A'-binding, in which the anaphor is bound by a non-argument antecedent, such as the wh-word, etc. This dissertation is restricted to the issues relevant to A-binding and the binding of anaphors. Hence, only Principle A will be involved.

So far I have introduced some important theories and principles of UG that are related to the present work. In the following I will discuss the relationship between the theory of UG and language acquisition by examining the logical problem of language acquisition.

1.2 Logical Problem of Language Acquisition

Discussions about the theory of UG suggest that knowledge of language is very abstract and usually unconscious to native speakers. In L1 acquisition, small children are able to acquire their mother tongue within a short period of time and the end result is

almost the same for all children acquiring the same language. Given the subtlety and complexity of the language they speak, the relatively short length of time they spend on language acquisition, and the uniformity in the language they attain, a natural question that arises is how small children are able to acquire such complicated knowledge. There appears to be a logical problem of L1 acquisition, namely, a mismatch between the language input and the grammar that is acquired (Hamburger and Wexler 1975; Baker and McCarthy 1981; Hornstein and Lightfoot 1981). [6] The solution to this problem is to lay a heavy burden on a biological endowment for language, i.e., UG. The innate principles of UG allow a particular grammar to develop on the basis of positive evidence (i.e., the language utterances that children are exposed to). In other words, for small children, the language is acquired through the interaction of UG and primary linguistic data, because all the language elements are already "built in". What children need crucially in L1 acquisition is language input.

An example to illustrate the logical problem of language acquisition may be the psych predicates like (1), as repeated in (19), (20) and (21) with some additional versions.

(19) a. John blames the article
b. *The article blames John
c. John blames Mary
d. Mary blames John
e. The article annoys John
f. *John annoys the article
g. John annoys Mary
h. Mary annoys John

(20) a. The article is annoying to John
b. John is annoyed with the article

[6] This problem is also called projection problem (Baker 1979) or learnability problem.

c. Mary is annoying to John
d. John is annoyed with Mary
e. *The article is annoyed with John

(21) a. John's annoyance with the article is considerable
b. *The article's annoyance of John is considerable

For the verb *blame*, it is the Experiencer *John* or *Mary* that can take a subject position, as in (19a), (19c) and (19d). For the verb *annoy*, the Experiencer *John* or *Mary* can only be the object, as shown in (19e), (19g) and (19h). This suggests that there is a constraint on the theta roles of subjects and objects with regard to these two types of verbs. In addition, a "flip" phenomenon is observed with the pair of verbs *blame* and *annoy*. As illustrated in the pairs of (19a-19e) and (19c-19h), the same argument *John* can either be linked to subject or object, so can the argument *article*. The similar flip can be seen with the pair of adjectives *annoying* and *annoyed*, as demonstrated in (20). For instance, *the article* can be subject or prepositional object in (20a) and (20b) respectively, while *John* can also be prepositional object or subject in these two sentences. But no such exchange of arguments is allowed for the nominal *annoyance*, as shown in (21).

It seems that there is no regular pattern in the above sentences regarding selectional restrictions and the possible theta roles of subjects and objects. In fact, with these psych predicates, a number of subtle properties have to be acquired, including the properties of backwards binding, as given in (17), and the issue of when a certain argument can cooccur with another argument, and when such a cooccurrence is not allowed (this phenomenon will be discussed in Chapter 2 and Chapter 3). It is unlikely that small children are ever taught the details about these and the ungrammatical sentences like (19b), (19f), (20e) and (21b) do not occur in the input. Since native speakers possess similar judgments about these sentences, we assume that children are able to achieve the knowledge of these properties, with no help from the outside world but rather from the UG.

At this point, it is not too difficult to see why the theory of UG is chosen as the theoretical basis upon which an investigation of L2 acquisition is conducted. Among other things, this theory is the only theory that takes the question of how a language is acquired as its main concern and it has been used to try to explain how a language, L1 or L2, is acquired. We may end this section by quoting Rutherford (1995: 506), "Where the SLA goal is one of explanatory adequacy there is only one grammatical theory that has entered the picture, and that of course is Chomskyan UG".

1.3 Lexicon in L1 and L2 Acquisition

Sag and Szabolcsi (1992:vii) noted that the argument structure of a lexical item has generally been recognized as part of its entry, though there is no real consensus regarding the contents of lexical entries, the nature of lexical representations, the scope of the lexicon and lexical analysis in general. Research in generative linguistics over the past decade has clearly demonstrated that knowledge about argument structure of verbs plays an essential role in explaining a native speaker's knowledge of language (Grimshaw 1990; Jackendoff 1990; Levin and Hovav 1995; Wasow 1985). "The lexicon is more highly structured than heretofore thought; moreover, much of grammar turns on critical--and universal--links between syntactic and lexical-semantic phenomena" (Gleitman and Landau 1994:1); the study of the acquisition of argument structure of verbs holds much promise for a number of reasons.

First, when one is acquiring the argument structure of a predicate, the learner has to work out the answers to the following three questions: (i) how many arguments does this predicate bear? (ii) what theta role does each argument bear? (iii) how is each argument syntactically realized? This means that the acquisition of argument structure implies the acquisition of all the relevant properties of a predicate. Thus, when the argument structure of a certain predicate is acquired, the syntactic privileges of this

particular predicate are acquired. Second, the acquisition of argument structure can shed light onto the apparent learnability paradox. Taking psych predicates for example, the superficially arbitrary link between semantics and syntax shown in (1) constitutes a situation in which the logical problem of language can be investigated. On the one hand, the properties which are subtle and sophisticated seem to be underdetermined by the linguistic input, on the other hand, learners eventually come to know the syntax-semantics mapping of these predicates.

Much earlier work on the L1 acquisition of lexicon assumes that the lexicon is idiosyncratic and thus has to be acquired piecemeal. Current research on the acquisition of lexical items has shown that the learnability issue also arises with respect to the lexicon as elsewhere (Bloom 1994; Gleitman 1990; Gropen 1996; Pinker 1989; and papers in Gleitman and Landau (1994)).

Regarding the question of how children acquire the link between verb argument structure and the subcategorization frames of the verb, there has been a considerable debate. On the one hand, the view represented by Pinker (1984, 1987, 1989, 1994) claims that children first listen to verbs, then try to figure out their meanings by observing the situation. On this view which focuses on the mediating function of semantic concepts in the acquisition of verbs, children use the semantics to predict the syntax, known as semantic bootstrapping. On the other hand, there is a view opposing the above position, as represented in Gleitman (1990) and Fisher et al (1994). Basically, children deduce the meaning of verbs through the help of syntax. On this position, children use the syntax to predict the semantics, known as syntactic bootstrapping. In between the two different extremes lies a third position which is actually a reconciliation of the two approaches (Grimshaw 1994). Under this proposal, children acquire verbs through both semantic and syntactic information.

Compared to verb learning in L1 acquisition, verb or predicate learning is potentially quite different for adult L2 acquisition in several ways. One of the major

differences is that adults have already established a mental lexicon of verbs in L1. In the course of learning an L2, the L1 may be involved to some extent, either positively or negatively. Thus, unlike child L1 acquisition whereby either syntax alone or semantics alone or both are aiding the acquisition of a predicate, here in adult L2 acquisition, both semantic and syntactic knowledge instantiated in L1 may serve as a source in the learning process.

Over the past fifteen years, the question of whether or not UG is accessible to L2 learners has been very controversial (See White 1989a, 1995b, 1996 for an overview). There is a great deal of evidence for the availability of UG in L2 acquisition (e.g., Bennett 1994; du Plessis et al 1987; Eubank 1992, 1994; Flynn 1987; Juffs 1996; Hirakawa 1990; Liceras 1989; Mazurkewich 1984; Schwartz and Sprouse 1994, 1996; Thomas 1991, 1993, 1995; Vainikka and Young-Scholten 1994, 1996; White 1985b, 1989b, 1991a, 1991b, 1992a, 1992b, 1993, 1996; White et al 1992); there are also quite a number of works arguing against the role of UG in L2 acquisition (e.g., Bley-Vroman 1990; Clahsen and Muysken 1986, 1989; Schachter 1989). Such a debate seems likely to continue, as long as there is no other reasonable alternative which can break through the two major positions (cf. Carrol 1996).

Supposing that UG plays some role in L2 acquisition, now at issue is whether or not L2 learners are able to access to UG when L2 acquisition of predicates is concerned. If they do, then in what way does such access take place? Emphasis on the lexicon in L2 acquisition is growing and lexically oriented L2 research is developing (see papers in Harley (1996)). However, within the domain of UG-based approaches to L2 acquisition, White (1991c) assumes that, following Chomsky (1981, 1982) and White (1989a), much of the lexicon appears to be idiosyncratic and has to be learned from L2 input. In other words, the logical problem of language acquisition is not relevant to the acquisition of the

lexicon in SLA.[7] This idea has been recently challenged by Juffs (1996), who claims that, as long as L2 learners can be shown to have subtle knowledge of the L2 lexicon which is underdetermined by the L2 input a which cannot be derived from the L1, this knowledge is an indication that the acquisition of the L2 lexicon is actually constrained by certain UG principles.

Several recent studies, which differ in terms of the particular class of predicates investigated, assume that L2 acquisition of certain types of English predicates involves the issue of syntax-semantics mapping (e.g., Bley-Vroman and Yoshinaga 1991; Hirakawa 1995; Juffs 1996; Moore 1993; White 1995a, White et al 1996a, White et al 1996b; Yip 1995; Zobl 1989). As syntactic and semantic structures are subtlely entwined, the syntax-semantics linkage involves the issue of the learnability paradox, which requires an answer of how the mapping is acquired by L2 learners.

1.4 Goals of the Thesis

In this dissertation the L2 acquisition of psych predicates by Chinese and French ESL learners is examined.[8] We are interested in the interlanguage (IL) grammars of these L2 learners with respect to their acquisition and representation of English psych predicates, given the assumption that L2 learners' IL grammar is systematic, natural and rule-governed (e.g., Eubank et al 1995; Yip 1995).

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[7] For the discussion of the logical problem in L2 acquisition, see White (1985a, 1990).

[8] The term "second language acquisition" is traditionally distinguished from the term "foreign language acquisition" in the literature, with the former referring to the acquisition of a target language where learners can hear the language spoken by native speakers and the latter referring to the acquisition of an L2 in the environment where the language is not actually spoken. According to the work by White and Juffs (in press), learning environment does not really cause any differences in terms of the availability of UG in L2 acquisition, as long as learners in different learning settings start to acquire the L2 at a similar age after puberty. Thus, the term second language acquisition will be used throughout this dissertation, though the Chinese ESL subjects are "foreign language learners" and the French ESL subjects "second language learners" in the above sense.

The reason why psych predicates are chosen to be tested is as follows. First, given the assumption in Williams (1981) that morphologically related words share a similar argument structure with certain regular relations, then morphologically related psych predicates form an ideal situation to investigate how the argument structures of derived words are acquired.

Second, since these predicates, in particular the class of psych verbs like *annoy*, possess unique properties (details are discussed in Chapters 2 and 3), it is of interest to see whether the acquisition of these properties for verbs also extends to the acquisition of derived psych adjectives such as *annoying*, which also have these unusual properties. Research in this regard has direct implications for the issue of logical problem with respect to the L2 acquisition of predicates, given that the properties to be investigated are so subtle and abstract that it is unlikely that L2 learners of English will come to acquire them merely through the input.

Third, as will be shown in the following Chapters (Chapter 2 and 3), psych predicates possess some general properties crosslinguistically, but there are some peculiarities restricted to a particular language. How do L2 learners whose L1 is obviously different from English with respect to lexical and syntactic properties acquire English psych predicates as compared to another group of L2 learners whose L1 is similar to English? An experimental study exploring this question by looking at the L2 acquisition of English psych predicates by Chinese-speaking and French-speaking adults will shed light on the issue of the influence of L1 in L2 acquisition, an issue that has always been a big focus in the field of SLA (e.g., Gass 1979; Sharwood Smith 1979; Kellerman 1979, 1983; Schwartz 1992; Zobl 1980a, 1980b; papers in Gass and Selinker 1992; papers in Eubank and Schwartz 1996).

1.5 The Organization of the Thesis

In Chapter 2, a review of current accounts of psych predicates is provided, with a critical evaluation of each analysis. In Chapter 3, an alternative is proposed, which attempts to capture the data of psych predicates including verbs, adjectives and nominals in Chinese, English and French. In Chapter 4, studies on the L1 and L2 acquisition of psych predicates are reviewed, with a discussion of strengths and weaknesses in each of them. In Chapter 5, an experiment on the L2 acquisition of English psych predicates by Chinese and French ESL learners is reported. In Chapter 6, the results of the experiment are discussed with respect to the hypotheses proposed and general questions raised for this research.

1.6 Conclusion

In this Chapter, the relationship of linguistic theory and language acquisition has been outlined, with a brief demonstration of the relevant parts of theory assumed for this work and a general discussion of why such a theory is needed as the basis for the present work. It has been shown that the theory of UG provides some answers to the question of how language is acquired. This thesis tries to explore how Chinese-speaking and French-speaking adults acquire English psych predicates.

CHAPTER 2

PSYCH PREDICATES: CURRENT ACCOUNTS

2.0 Introduction

Ever since Lakoff (1971) and Postal (1970, 1971) first noticed the peculiar properties of psych predicates, there have been quite a number of studies examining psych predicates. The pioneering work by Lakoff (1971), Jackendoff (1972) and Postal (1970, 1971) looks at psych predicates in English in terms of transformational grammar. Belletti and Rizzi (1988), Bouchard (1995), Grimshaw (1990), Mulder (1992), Pesetsky (1995), Uesaka (1994) and Wu (1993) explore psych verbs crosslinguistically within the framework of GB theory. [9] In this chapter I will focus on influential accounts of psych verbs by Belletti and Rizzi (1988), Pesetsky (1995) and Grimshaw (1990). I will also review the current work on psych adjectives, one by Roberts (1989), one by Nakajima (1993), and the study of psych nominals by Georgopoulos (1987). I will discuss conceptual and empirical problems with these analyses. But before moving on to the current approaches, I need first discuss some major properties of psych predicates, the properties that each analysis of psych predicates cannot ignore.

2.1 Psych Predicates

To begin with, a definition and a classification of the scope of psych predicates are in order. Assuming the concept of a psych verb clarified in Chen (1995a), I will claim that a psych predicate is a predicate which requires one of its arguments, typically an animate individual, to internally undergo some emotional or cognitive process or state caused by

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[9] For the research on psych verbs outside the GB framework, see Legendre's (1990) study of French psych verbs using Relational Grammar, and Herschensohn's (1993) postfunctionalist approach towards French psych verbs.

another argument. As mentioned in Chapter 1, psych predicates in this dissertation refer to psych verbs [10] like *fear*, and *frighten*, *enjoy* and *amuse*, psych adjectives like *frightening* and *frightened*, which are derived from the verb by affixing *-ing* or *-ed*, and psych nouns like *amusement*, *annoyance*, which involve nominalization. Throughout this dissertation, I will use the term "psych predicates" when I refer to all the three kinds of predicates as a whole, i.e., verbs, adjectives and nouns, or to verbs and adjectives in some context. With respect to psych verbs, linguists have noticed quite a number of unusual properties, though some of them are not necessarily just specific to psych verbs (see Bouchard (1995) for a good overview). Here I will only concentrate on the two major peculiarities: the apparently arbitrary mapping of theta roles onto syntactic positions (a linking problem), and the seeming lack of c-command of anaphors (a binding problem). These two properties represent two serious problems for the theory of UG: the linking problem appears to be in violation of the UTAH and the binding problem appears to go against the c-command requirement on anaphors in Chomsky (1981, 1986a).

2.1.1 Unusual Property I: the Linking Problem

As first noticed by Lakoff (1971), psych verbs allow a special phenomenon of "flip". That is, subjects and objects of verbs can be exchanged with respect to their structural position, as shown in (1) below.

(1) a. John fears the dog
b. The dog frightens John

[10] Psych verbs are also called "mental verbs" by Croft (1993), "experiencer verbs" by Pesetsky (1987, 1995) and Talmy (1985), or "emotive verbs" by Rozwadowska (1988).

For the time being, let us assume that the theta roles involved in (1) are just the Experiencer and the Theme. It is clear that the Experiencer, *John*, is in subject position in (1a) but in object position in (1b). The same is true for the Theme, *the dog*, which is the object in (1a) but the subject in (1b). Postal (1970, 1971) suggests that "Psych-movement" takes place; in the case of verbs like *frighten*, this moves the Experiencer *John* to the object position and moves the Theme *the dog* to the subject position.

A similar flip can also be seen with the pair of psych adjectives such as *frightening* and *frightened*, as in (2), where the subject and the post-adjective prepositional object are inverted in the two sentences. Again, *John* is the subject in (2a) but the prepositional object in (2b), though the prepositional phrase can often be omitted. Likewise, *the dog* is the subject in (2b) but the prepositional object in (2a), where it is optional.

(2) a. John is frightened (of the dog)
b. The dog is frightening (to John)

Note that the property of flip shared by psych verbs and psych adjectives disappears when nominal forms are taken into consideration. In (3b) the flipped expression is ungrammatical with the noun *amusement*.

(3) a. John's amusement at the movie is considerable
b. *The movie's amusement of John is considerable

Linguists like Pesetsky (1995) call the *fear* class verbs Experiencer Subject verbs (henceforth ES verbs), and the *frighten* class verbs Experiencer Object verbs (henceforth EO verbs). I will use the same terminology. Regarding psych adjectives, I will use either *frightening* adjectives and *frightened* adjectives, or simply the *-ing* class and the *-ed* class adjectives.

Here a question naturally arises: why can a flip occur with psych verbs and psych adjectives but not with psych nouns? At this time I will not answer this question. Simply putting aside the question, I would like to look in more detail at what the flip really means and why it is problematic.

In Chapter 1 it was pointed out that thematic information is assumed to be systematically related to syntactic configurations. To be more precise, identical theta-roles should be assigned to identical structural positions. If the Thematic Hierarchy and the UTAH are assumed, then the flip seen in psych verbs and psych adjectives as in (1) and (2) challenges the general assumption of principled association between thematic roles and structural positions. Obviously, the pairs in (1) and (2) describe similar events. Nevertheless, the Experiencer and the Theme are mapped onto different syntactic positions: the Experiencer or the Theme can sometimes be projected to the subject, the object, or the prepositional object. As this behavior is related to the linking of arguments with positions, it is known as the linking problem.[11]

Interestingly, most verbs like *frighten* in (1b) have agentive counterparts which take animate subjects, sometimes modified by the adverbial *deliberately* or *purposefully*. Examples are given in (4).

(4) a. John deliberately/purposefully frightened Mary
b. John is deliberately/purposefully frightening Mary
c. John frightened Mary
d. *The exam deliberately/purposefully frightened Mary

---

[11] Psych verbs and psych adjectives are not the only predicates that have a linking problem. The inchoative/causative alternation and relational preposition doublets such as *before* and *behind*, etc., also seem to show a similar linking problem, as illustrated in the following examples.

(i) a. Ice-cream melted
b. Mary melted ice-cream
(ii) a. Mary is before John
b. John is behind Mary

With the inchoative/causative alternation, the linking problem is solved by an approach characteristic of an unaccusative analysis: *ice-cream* in (ia) is actually derived from the object position in (ib) in order to get nominative Case. I am not aware of how the phenomenon is explained with the lexical doublets.

Both (4a) and (4b) have the modifiers *deliberately/purposefully*, implying that John wants to frighten Mary. (4b) takes the present continuous tense, typically an indication of event reading. (4c) is ambiguous: it can have either an agentive reading, like (4a) and (4b), or a psych reading. When it has the psych reading, it means that John's appearance, his manner or his voice, etc. caused Mary to have some fear. In (4d), it is impossible for an inanimate subject such as an exam to do anything for the purpose of frightening Mary; therefore *deliberately/purposefully* cannot be used here.

Note that agentive psych verbs do not pose any linking problem, because the Agent is always realized as the subject and it is always higher than the Experiencer in object position.

2.1.2 Unusual Property II: the Binding Problem

Related to the arbitrary linking property are peculiarities in binding behavior. Psych verbs of the EO class can allow anaphors to precede their antecedents, violating the normal c-command condition, as shown in (5a). The same is true of the corresponding *-ing* adjectives, as given in (5b).

(5) a. The picture of himself frightens John
b. The picture of himself is frightening to John

In Chapter 1 we saw that the normal configuration to satisfy Principle A is for the anaphor to precede by its antecedent (forwards binding). However, as noted in the literature (e.g., Belletti and Rizzi 1988; Grimshaw 1990; Pesestsky 1995; Postal 1971; Ruwet 1976; among others), forwards binding is bad with EO verbs, as shown by the example in (6a) but good with ES verbs, as in (7a).[12] In the case of ES verbs,

[12] Note that judgments of sentences like (6a) are murky for native speakers of English, but a contrast in grammaticality between (5a) and (6a) seems to exist.

backwards binding cannot occur, as illustrated by the ungrammatical sentences in (8a). We find that the similar contrast in the binding property of the subject also holds for the *frightening* class adjectives and the *frightened* class adjectives, as given in (6b), (7b) and (8b).

(6) a. *John frightens himself
b. *John is frightening to himself

(7) a. John fears himself
b. John is frightened of himself

(8) a. *A friend of himself fears John
*A friend of himself is frightened of John

It seems that backwards binding can be generalized to any construction so long as the construction has an object that receives the interpretation of Experiencer.[13] [14] Again, note that agentive psych verbs do not show backwards binding.

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[13] Pesetsky (1995) claims that if some notion of causation is involved, then the phenomenon of backwards binding is allowed. Cambell and Martin (1989) and Giorgi (1984) claim that if the Experiencer is the object, there is a possibility of having backwards binding. The following are from Pesetsky (1995: 44).

(i) a. These stories about herself made Mary nervous
b. Pictures of himself give John the creeps

However, they all agree that the antecedent cannot itself be contained within the argument receiving the Experiencer, as shown in the following ungrammatical sentences from Cambell and Martin (1989: 44).

(ii) a. *Stories about herself generally please Mary's father
b. *Each other's parents worried the students' doctor
c. *Pictures of each other annoy the millionaire who funded the politicians

Also, animacy, or more precisely, agentive use of psych verb is related to this issue. As shown by the contrast in the following examples from Pesetsky (1995: 44), sentences with animate subjects are clearly worse than the sentences with inanimate subjects.

(iii) a. ?Each other's stupid remarks eventually killed John and Mary
b. ?Each other's criticisms harmed John and Mary
c. ?Those pictures of himself ultimately destroyed Bill

(iv) a. *Each other's stupid friends eventually killed John and Mary
b. *Each other's parents harmed John and Mary
c. *Each other's teachers insulted John and Mary

[14] Again the backwards binding phenomenon is not restricted to just psych verbs or psych adjectives. Some particular constructions with no psych verbs or adjectives also show the same property. Here are two examples from Barss (1986:123, 139).

(i) a. This picture of himself seems to be what John likes best
b. John wonders how proud of herself Mary is

Thus, psych verbs and psych adjectives are divided into two classes according to the binding phenomenon; on the one hand, ES verbs and *-ed* adjectives allow forwards binding; on the other hand, EO verbs and *-ing* adjectives allow backwards binding.

As psych nouns do not allow the flip phenomenon that psych verbs and psych adjectives share, nominal forms should not allow backwards binding. For the same reason, since agentive psych verbs do not present a linking problem, they do not have a binding problem. I will, in Chapter 3, discuss why the two unusual properties are not manifested in psych nouns.

2.2 Possible Solutions

So far I have demonstrated two intriguing problems with psych verbs and psych adjectives--the linking problem and the binding problem. It seems that either of the two problems can be seen in other verbs or in other constructions. However, it is only psych verbs and psych adjectives that have the two problems interwoven with each other.

Regarding solutions to the linking problem, Pesetsky (1995) provided three logical possibilities. First, the superficial difference reflected in the pairs of (1) and (2) is actually not present at a deeper level. In other words, the surface subject of the Theme with the verb *frighten* in (1b) is the result of NP movement from the original object position in (1a). Thus, in both (1a) and (1b), the Theme is always the internal argument and the Experiencer is projected to a position higher than the Theme. As for the pair of psych adjectives, shown in (2), the Theme moves up to the subject position from the original post-adjective position at D-structure. If this were the case, then identical theta roles are assigned to identical positions at D-structure. Hence, there is no problem for the UTAH with respect to psych verbs and psych adjectives. This is the solution known as the approach of fine-grained syntax.

The second possibility is that the apparent thematic similarities shared by the two classes of psych verbs and psych adjectives do not really hold. In other words, ES and EO verbs are not identical in terms of thematic representation, nor are *-ed* and *-ing* adjectives. In that case, different thematic properties of different predicates could have different structural representations. In consequence, the UTAH is still rescued. This is the approach of fine-grained semantics. In contrast to the previous two possibilities which preserve the spirit of UTAH, the third solution is that the UTAH itself is wrong and thus should be abandoned. [15] If so, there is no linking problem to start with.

Regarding the solution to the binding problem, there also seem to be three logical possibilities. First, the c-command requirement is satisfied in a way different from what is normally done or at a different level of grammar. Second, there might be something that is different from c-command, but that has its own mechanism on binding an anaphor. Third, there is no c-command condition on binding of anaphors.

As discussed in Chapter 1, the UTAH and the c-command condition are two of the most useful and robust mechanisms in the theory of UG, and they are also helpful to learners from the perspective of learnability. Therefore, I will assume the UTAH and the c-command condition in search for an account for psych predicates with respect to the two problems. Since the two problems apply only to psych verbs and psych adjectives and not to psych nouns, any analysis that attempts to account for these predicates should be able to answer the following basic questions: why are the linking problem and the binding problem found with psych verbs and psych adjectives but not other verbs or adjectives? Why are the two problems not observed with psych nominals though the latter also present a similar thematic relation between the arguments and the predicate?

In the sections that follow, I will discuss some current accounts of psych predicates. In 2.2.1, three influential analyses of psych verbs will be reviewed. In 2.2.2, studies of psych adjectives are discussed. In 2.3.3, research on psych nominals is given.

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[15] Rosen (1984) is the only person who argues against the need of UTAH, as far as I know.

Basic assumptions and analyses of each study will be presented, followed by a critical evaluation based on the following criterion (i) to what extent the analysis is capable of capturing the data crosslinguistically and (ii) to what extent the account is able to ease the burden of language acquisition for learners.

2.2.1 Psych Verbs

The unusual properties of psych verbs have attracted the attention of linguists for around two decades. Consequently, there is quite a lot of research in the literature. Here I will only discuss the important work by Belletti and Rizzi (1988) (henceforth B&R), by Grimshaw (1990) and by Pesetsky (1995), the three most influential GB-based studies on psych verbs. With respect to the linking problem, B&R's approach falls into the first possibility -- fine-grained syntax, arguing that EO verbs are unaccusatives; they treat the binding problem by arguing that Principle A can be satisfied at any level where the c-command requirement is met. The approach by Pesetsky (1995) falls into the second possibility -- fine-grained semantics. He handles the linking problem by assuming that ES and EO verbs have different configurations because of a thematic distinction between the two. In terms of the solution to the binding problem, this approach is similar to that by B&R. The account by Grimshaw (1990) lies in between regarding the linking problem. The essential idea is that ES and EO verbs have the same thematic prominence relation, but they have different D-structure realizations of their arguments because these two classes of verbs belong to two different aspectual subclasses. For the binding problem, Grimshaw proposes a different requirement, i.e., argument-command, to account for why psych verbs allow backwards binding.

2.2.1.1 Belletti and Rizzi (1988)

Belletti and Rizzi (1988) is a classical study of Italian psych verbs. In Italian, there are three classes of psych verbs. Verbs such as *temere* "fear" belong to Class I, which are like ES verbs in English, as in (9a). Verbs like *preoccupare* "worry" and *piacere* "please" belong to Class II and Class III respectively, as in (9b) and (9c). Both Class II and Class III are EO verbs, but they differ from each other in that the former takes an accusative Experiencer whereas the latter a dative Experiencer which can appear either in subject position, as in (9c), or in object position, as in (9c').

(9) the *temere* "fear" class:

a. Gianni teme questo
Gianni fear this

the *preoccupare* "worry" class:

b. Questo preoccupa Gianni
this worries Gianni

the *piacere* "please" class

c. A Gianni piace questo
to Gianni pleases this

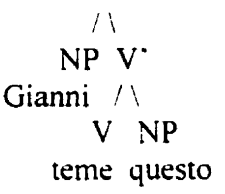
c'. Questo piace a Gianni
this pleases Gianni

The examples above show that Italian psych verbs also have the linking problem. To handle this linking problem, B&R make an important assumption. Namely, both ES and EO verbs share the same theta grid [Experiencer, Theme] with the Experiencer always projected to a higher syntactic position.[16] Since ES and EO verbs have the same

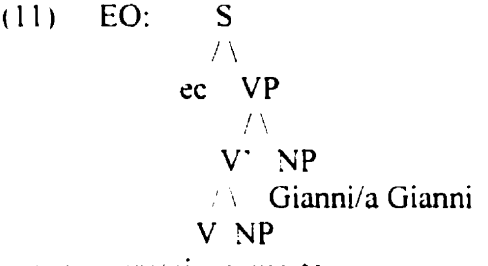
[16] Actually, B&R (1988) is not the only study that assumes the same theta grid for both types of psych verbs. Bouchard (1995), Grimshaw (1990), Jackendoff (1972), Rappaport (1983), and Ruwet (1976) also claim that ES and EO verbs possess the same thematic relationships, though some of them use a different label for what B&R call Theme.

thematic relations among arguments, they are represented by similar D-structure configurations. Illustrated in (10) and (11) respectively, the Theme is always in the underlying direct object position and the Experiencer always maps higher than the Theme. Thus, the requirement of the UTAH as well as any version of the thematic hierarchy are observed.

(10) ES:



(11) EO:



For B&R, no difference exists between ES and EO verbs at the level of D-structure. However, the two types of verbs differ from each other at the level of S-structure. For ES verbs, nothing happens at S-structure. Thus, ES verbs behave just like any other regular transitive verbs. As for EO verbs, if it is the *preoccupare* "worry" class, then the Theme has to move to subject position because verbs of this class cannot assign Case to the Theme NP: the Experiencer receives inherent accusative Case from the VP. Thus, the surface structure like (9b) is produced. If it is the *piacere* "please" class verbs, the Theme can move to subject position for Case and the Experiencer stays behind receiving inherent dative Case from the VP. That is the outcome shown in (9c'). But, the Theme can stay in situ. In that case, the Theme argument receives nominative Case from INFL and the Experiencer argument, which receives inherent dative Case from the

preposition *a*, moves to subject position. That results in (9c). Since the Theme NP and the Experiencer NP can get Case somewhere, both can optionally move up or stay where they are. Hence, the two orders are allowed.

Backwards binding is allowed in Italian psych verbs, as illustrated in (12) from B&R (1988: 10).

(12) Questi pettegolezzi su di sé preoccupano Gianni più di ogni altra cosa
These gossips about himself worry Gianni more than anything else

For the backwards binding problem, B&R claim that Principle A is an anywhere principle which can apply wherever it is satisfied. Based on this assumption, Principle A is applied at D-structure in which the Experiencer NP, the antecedent *Gianni*, c-commands the anaphor *sé* contained in the Theme NP *questi pettegolezzi su di sé* "these gossips about himself". As the c-command condition is satisfied at D-structure, the sentence remains good even though the anaphor eventually appears to go before the antecedent in the surface structure, due to NP movement at the level of S-structure.

2.2.1.2 Problems with B&R (1988)

B&R's account preserves the spirit of the UTAH and the c-command requirement when it approaches the problems of psych verbs. It seems that only a relativized UTAH is observed under this analysis. Recall that in (10) and (11) the Theme is always assigned to the internal argument. Though the Experiencer is uniformly projected to a position higher than the Theme in both structures, it is not uniformly assigned to one syntactic position. In (10) the Experiencer is in the traditional subject position with the *temere* class, but the Experiencer is in the adjoined VP internal position with the *preoccupare/piacere* class. Satisfaction of a relativized UTAH is not as good as satisfaction of an absolute UTAH, but it is still better than violation of the UTAH (See Larson (1990) for a discussion of observing a relativized UTAH in some constructions.

and Baker (1995) for reasons for an absolute UTAH). Here I will consider B&R's mapping of arguments onto syntactic positions as keeping in line with the UTAH.

However, B&R's approach suffers from some serious empirical problems. First, as pointed out by Pesetsky (1995) among others, with respect to the auxiliary selection, some EO verbs like *piacere* "please" take the auxiliary verb *essere* "be", normally associated with unaccusative verbs. Thus, an unaccusative analysis of these verbs is plausible. Nevertheless, many EO verbs like *preoccupare* "worry" take the auxiliary verb *avere* "have" which are normally associated with unergative verbs. In this case, an unaccusative analysis of these verbs is unlikely to be correct. In other words, B&R's approach can only partially account for EO verbs in Italian, because the unaccusative analysis is only compatible with a subset of EO verbs that choose BE auxiliary.[17]

Related to the unaccusative issue is a second problem. If EO verbs are unaccusatives, as argued by B&R, then no passive constructions should be observed with these EO verbs, because, as is well known, unaccusative verbs cannot be passivized due to the lack of an external argument. But in fact in Italian as well as in many other languages, EO verbs can be passivized freely, for instance, the English examples in (13), from Pesetsky (1995: 22)) and the Chinese examples in (14).

(13) a. Bill was angered by Mary's conduct
b. Bill was frightened by strange noises

(14) a. Fangfang bei Yuanyuan qisi le [18]
Fangfang BEI Yuanyuan anger-dead ASP
'Fangfang was angered to death by Yuanyuan'

---

[17] B&R discuss this problem in the latter part of the paper. They handle the problem by claiming that a verb can take *avere* if it assigns accusative Case, structural or inherent, otherwise *essere*. This seems to make the problem manageable, because *preoccupare* verbs are argued to be able to assign inherent accusative Case whereas *piacere* verbs assign inherent dative Case. But since there are many more *preoccupare* verbs than *piacere* verbs in Italian, such a solution does not reach explanatory adequacy.

[18] The Pingying system is used for Chinese examples throughout the dissertation. Some symbols used in the gloss are: ASP= aspect marker, BEI=passive marker, CL=nominal classifier , DE=nominal or verbal modifier.

b. Fangfang bei gou xiahuai le
Fangfang BEI dog frighten-bad ASP
'Fangfang was quite frightened by the dog'

Third, this approach has an unappealing Case-assignment system. Each verb has its own Case grid, responsible for assigning inherent Case. For the *preoccupare* class, it has an inherent accusative Case to assign; for the *piacere* class, it has an inherent dative Case to assign. Regarding the Case-assignment for the Theme NP with the *piacere* class, sometimes it receives nominative Case in subject position, sometimes it receives nominative Case in direct object position. All this looks like a stipulation, lacking an explanation in depth and width.

2.2.1.3 Grimshaw (1990)

Grimshaw (1990) handles the problems of psych verbs in a framework of argument-structure (a-structure). Argument structure is a structured representation which defines relations of prominence among arguments. Each predicate has an a-structure, the prominence of which must be jointly decided by two dimensions. The thematic tier deals with how a theta role is assigned to a certain argument; the aspectual tier deals with how an argument is assigned to a certain aspect. When an argument is maximally prominent on both tiers, this argument is an external argument. If an argument is more prominent on the thematic tier but less so on the aspectual tier, or vice versa, then a conflict of the two dimensions will render all the arguments internal to the predicate. In other words, there is no external argument.[19] It is crucial in this theory that the aspectual hierarchy like (15) determines which argument could be associated with the subject. [20]

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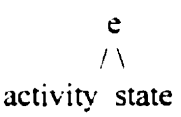
[19] This theory of argument structure is different from that proposed by Williams (1981) with respect to external argument. According to Williams, the external argument of a predicate is the argument that is realized outside the maximal projection of the predicates, typically the D-structure subject for a verb.

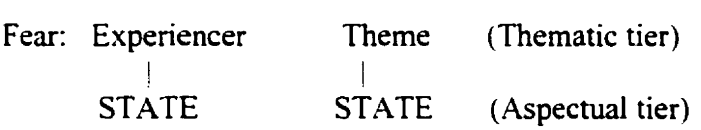
[20] Jackendoff (1990) proposes a similar analysis with a similar consequence. He claims that both thematic and action tiers are involved with the mapping between semantic and syntactic structures and the choice of a subject crucially depends on the hierarchy on the action tier.

(15) CAUSE (other (...))

What decides the aspectual hierarchy is the event structure. According to Grimshaw, each verb has an event structure that includes two sub-events: an activity and a state, as in (16). An argument that participates in the first sub-event is more prominent than the argument that participates in the second sub-event. A CAUSE is always associated with the first sub-event, therefore, it is always more prominent.

(16)


Under this thematic and aspectual approach, Grimshaw assumes that ES and EO psych verbs share the same thematic relationship, i.e., having the same theta grid [Experiencer, Theme]. Nevertheless, the two classes of verbs differ fundamentally with respect to their aspectual properties. *Frighten* verbs have causative meaning, causing a change of psychological state in the Experiencer, therefore, the Theme is actually CAUSE. In contrast, *fear* verbs are always stative, therefore, the Theme is not CAUSE. In consequence, the interaction of the thematic and aspectual properties distinguish the *fear* class from the *frighten* class. For the *fear* class, on the thematic dimension, the Experiencer is more prominent than the Theme, though they may be of the same prominence on the aspectual dimension, thus, the Experiencer is mapped onto subject position and it is an external argument. (17) shows the association of the arguments with the aspects on the two tiers.

(17)


In regard to the *frighten* class, the Experiencer is higher than the Theme on the thematic tier. But since the Theme is realized as CAUSE which participates in the sub-event of activity, CAUSE is the highest on the aspectual hierarchy. As a result, this gives rise to a crossed association like (18) regarding the two elements on the two tiers. The first element on the thematic tier has to be linked to the second position on the aspectual tier and the second element on the thematic tier to the first position on the aspectual tier. Since the Theme is aspectually most prominent, it is projected to the most prominent position in syntax, i.e., the subject of the verb. This argument is only prominent on one tier, i.e., the aspectual tier, but not on both tiers, therefore, it is not an external argument.

(18) Frighten: Experiencer Theme (Thematic tier)

CAUSE STATE (Aspectual tier)

Through the interaction of the thematic and aspectual properties of verbs, Grimshaw explains why ES verbs differ from EO verbs in terms of linking behavior.

For the binding problem, Grimshaw assumes with Giorgi (1984) and Jackendoff (1972, 1990) that the thematic hierarchy can govern anaphoric relations. To use her words, "a more prominent argument asymmetrically a-commands (i.e., argument-command) a less prominent argument" (Grimshaw 1990: 159). Regarding the backwards binding sentence with EO verbs in (5a), i.e., *The picture of himself frightens John*, *John* is the Experiencer which is more prominent than the Theme *the picture of himself*, therefore, the former a-commands the latter. In consequence, the sentence is fine since *John* binds *himself*. For the same reason, *John* binds *himself* in the backwards binding sentence with the *frightening* adjective in (5b), i.e., *The picture of himself is frightening to John*. Under this theory, the c-command relation is replaced by the a-command relation which determines antecedenthood for the anaphor.

2.2.1.4 *Problems with Grimshaw (1990)*

A good point of Grimshaw's account is that it also assumes the UTAH for the linking problem. But it violates the c-command requirement. While Grimshaw proposes to use the a-command condition which could be considered as a sort of substitute for the c-command requirement, the former is still quite different from the latter in nature. The c-command is syntactically/configurationally motivated and it, therefore, is more strict, whereas the a-command is thematically motivated and is less strict. In addition, the proposal for a-command seems to be an ad hoc solution to the binding problem introduced merely because of psych verbs. Yet the c-command condition is still necessary for other purposes in the framework of GB, for example, for the control theory. Thus, the existence of both c-command and a-command makes the theory of UG less constrained. Hence a heavier burden for children acquiring a language.

Second, this account relies heavily on the event template, as in (16). One good point of this is that it explains the mismatch of the thematic tier with the aspectual tier for EO verbs by linking the Theme with CAUSE. However, at the same time, this account leads to one unwelcome consequence.[21] If all the verbs have two sub-events, how about the *fear* class which is argued to be only state? I assume, since the verb *fear* is a state, it can only be associated with the second sub-event, the state, in (16). If this is so, then the Experiencer is not more prominent on the aspectual tier. In that case, how can the Experiencer be realized as the external subject with the lower aspectual prominence? In her Endnote 27, Grimshaw says that she will not include verbs like *fear* in this class. Related to this point is the fact that the Theme subject in (19) need not be associated with an activity in order to put the Experiencer object into a state of fear.

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[21] Y. Li (1993) proposes to replace Grimshaw's event structure in (16) with an aspectually headed structure, as shown in (i), to capture some semantic differences between Chinese and Japanese resultative compounds. As noted by Y. Li, the first part of the sub-event of Chinese resultative compounds may not always be Activity, just as the second part of the sub-event may not necessarily always be State.

(i) Event

A-head A-complement

(19) a John's appearance frightened Mary
b. The rat frightened the child

John's appearance and *the rat* are not involved in any action, therefore, they cannot be related to activity. If this is the case, then they cannot be considered as more prominent than *Mary* or *the child*. Accordingly, they cannot be realized as subjects. All this suggests that the theory of aspectual prominence fails to capture the data in terms of event structure.

Third, Grimshaw arrives at the conclusion that EO verbs do not have external arguments. This suggests that EO verbs cannot be passivized. Obviously, this constitutes the same problem that B&R have.

Fourth, the aspectual hierarchy is not well developed and thus not clear what it really means. As shown in (15), there is only one item CAUSE. What are the other items on the hierarchy?

Finally, this analysis cannot capture the data of binding in Chinese which allows both forwards and backwards binding with EO verbs, as observed by Wu (1993) and Chen (1995a). Two examples are given in (20).

(20) a. Ziji$_i$ de chenggong zhenfen le Fangfang$_i$
self DE success excite ASP Fangfang
'Her (own) success excites Fangfang'

b. Fangfang$_i$ de chenggong zhenfen le ziji$_i$
Fangfang DE success excite ASP ziji
'Fangfang's success excites herself'

In (20a), the Experiencer *Fangfang* is more prominent than the Theme *ziji*, therefore, it can bind the anaphor *ziji*, satisfying the a-command requirement. In (20b), the Experiencer *ziji* is more prominent than the Theme *Fangfang* on the Thematic

Hierarchy, then we should predict that *ziji* a-commands *Fangfang*. As a result, (20b) should be ruled out, since nothing a-commands the anaphor. But this is not true, because a sentence like (20b) is perfect in Chinese.

2.2.1.5 Pesetsky (1995)

Unlike B&R (1988) and Grimshaw (1990) who assume the same theta-grid for both ES and EO verbs, Pesetsky (1995) handles the arbitrary linking problem from the angle of finer-grained semantics. Under this approach, there is a crucial distinction in semantics between the object of ES verbs and the subject of EO verbs. That is, the object argument with ES verbs should be a Target or Subject Matter (known as the Object of Emotion), i.e., the thing that an animate being has some feelings or emotions about; while the subject argument with EO verbs should be a Causer, i.e., the thing that arouses some feelings or emotions in a certain animate being.

If different theta-grids are claimed for the two different classes of verbs, then the mapping of thematic information onto syntactic configuration can still observe the UTAH, since the object theta role of the verb *fear* is no longer Theme and neither is the subject theta role of the verb *frighten*. Hence, the arbitrary linking problem disappears with no violation of the UTAH.

However, such a solution to the linking problem leads to a brand-new problem. That is, if Target/Subject Matter is considered to be totally different from Causer, then Causer should be able to cooccur with Target/Subject Matter with the same predicate. But this is not possible, as shown by the ungrammatical sentences in (21). Indeed, this phenomenon is not a semantic problem, because a periphrastic causative construction with both Target/Subject Matter and Causer is perfect in English, as shown in (22).

(21) a. *The article annoyed John at the government
b. *The food pleased John with his trip to Beijing

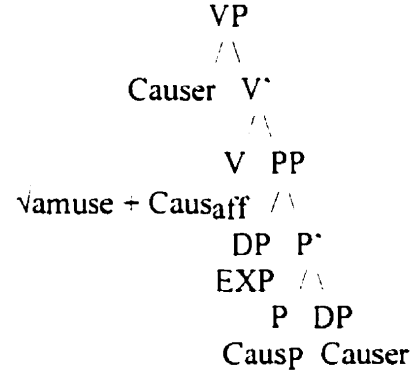
(22) a. The article made John annoyed at the government
b. The food made John pleased with his trip to Beijing

To solve the above problem, which Pesetsky calls the Target/Subject Matter (T/SM) restriction, Pesetsky (1995) proposes a bimorphemic analysis of EO verbs. That is, verbs like *amuse* contain a verb root *√amuse* (which is actually an ES verb) and a zero causative morpheme CAUS, as illustrated in (23).

(23) [[√amuse] ∅Caus]

With the assumption of a bimorphemic composition of the EO verbs, Pesetsky proposes the following D-structure for the sentences with the EO verb like *amuse*.

(24)

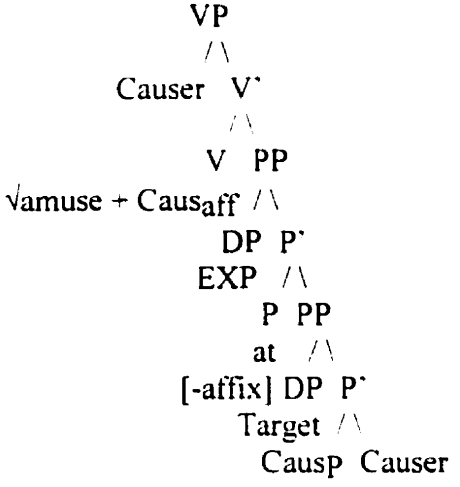


In (24) Caus which is hypothesized as a clause-internal preposition selects Causer. Adopting Chomsky's (1993) checking theory concerning the link between affixation and movement, Pesetsky assumes that Caus is affixed to the V *√amuse* in the lexicon, which makes it possible that Causer is selected by $Caus_{aff}$ in the Spec of VP. Causp moves up to the V *√amuse* in order to check the feature of $Caus_{aff}$. Unlike the overt preposition which can Case-mark an NP, the phonologically-null Causep cannot license Case on its object, therefore, this lower Causer has to move to the Spec of VP which is filled with an

identical Causer. According to Pesetsky, this movement is possible only if it is a movement from one theta position to another identical theta position.

Under this account, the ungrammatical sentences with the T/SM restriction like (21) are explained by the Head Movement Constraint (Baker 1988a; Travis 1984).

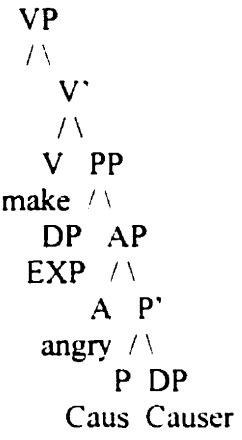
(25)



In (25), Caus is attached to the V *√amuse* in the lexicon as before, but CausP in this structure cannot raise to *√amuse* without first adjoining to *at* due to the HMC. According to the HMC, CausP first moves to the intervening preposition *at*. The resulting category [CausP + at] is headed by *at* which is nonaffixal, so it cannot raise further to the V *√amuse*, otherwise HMC is violated. Hence, sentences like (21) are ruled out.

For the grammatical periphrastic counterparts like (22), the verb *make* does not involve any zero Caus, as the verb itself semantically encodes causative. Consequently, there is no need for the affixation of Caus to the verb, thus, no movement of the Causer to the Spec of VP. In this way, there is no blocking of movement by intervening heads. Hence, the Causer and the T/SM can cooccur together. The D-structure for such causative construction is as follows.

(26)



On Pesetsky's analysis, the backwards binding problem is resolved in the same way as B&R do. Namely, the anaphor contained in the Causer is c-commanded by the antecedent (which is the Experiencer) in D-structure, thus Principle A is observed. Like B&R, Pesetsky assumes that as long as the condition of c-command is satisfactorily met somewhere, there is no violation of Principle A despite the fact that the subject NP that contains the anaphor turns out to c-command the antecedent in S-structure.

2.2.1.6 Problems with Pesetsky (1995)

This approach is interesting in two respects. First, it makes an important assumption that ES verbs and EO verbs have different thematic representations. Second, it proposes a zero causative analysis of EO verbs. These two proposals have resulted in a new way of looking into the problems of psych verbs.

However, this account suffers from the following four problems. First, the fact that Causer is base-generated at a position lower than Experiencer is in contradiction with the Thematic Hierarchy that Pesetsky proposes. In (27), the hierarchy ranks Causer higher than Experiencer, but in the D-structures shown above, the Causer is lower than the Experiencer. Besides there are two Causers there, one higher than the Experiencer, and one lower than the Experiencer. How could there be two Causers in the same structure?

(27) Causer > Experiencer > Target/Subject Matter (Pesetsky 1995: 59)

Related to this question are two other questions that need answers: (i) where would be the position for Agent on this thematic hierarchy: does Agent occupy a different place or is Agent a special case of Causer? [22] (ii) how could the structure in (24) account for a sentence which involves the agentive use of psych verbs such as (4a) *John deliberately frightens Mary*? Is *John* Causer or Agent? Let me try to use Pesetsky's analysis to explain this. Being a causative psych verb, *Frighten* must have Caus which would select a Causer. If this Causer is placed at the bottom part of the tree, then what would occupy the position of Spec of VP, Agent or a Causer? According to (24), it should be Causer and the movement of the lower Causer to the higher Causer takes place. Then *John* is the Causer, not Agent. This is actually not a big problem. The problem is that this analysis will predict that backwards binding with agentive psych verbs are fine. However, backwards binding in English with the agentive use of the psych verb is bad as shown in Footnote 13 (iv), as repeated in (28), which is also recognized by Pesetsky himself.

(28) a. *Each other's stupid friends eventually killed John and Mary
b. *Each other's parents harmed John and Mary
c. *Each other's teachers insulted John and Mary

If we want to rule out the constructions of agentive psych verbs with backwards binding, then we would like to assume no movement of Causer. Now we are in a dilemma: we need a movement of Causer to account for agentive psych verbs, but need no movement to rule out the bad cases of backwards binding. It seems that to get out of this dilemma, two different D-structures need to be postulated.

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[22] Regarding this question, Pesetsky puts a footnote which says that Causer and Agent may take the same position, but he leaves this open for further research.

Second, the hypothesis that Caus is a prepositional affix rather than a verbal affix is not universal cross-linguistically. Actually, Pesetsky builds this hypothesis on the observation of the following English sentences, some of which do not involve any psych verbs.

(29) a. Sue yells out of frustration
b. Mary objected to the show because of Bill's remarks
c. Mary jumped for joy
d. John died of consumption

It seems that there is not enough evidence to argue that the causative morpheme is prepositional. Nash (1994) noticed that there are two types of causative morphemes in terms of category: the verbal causative morpheme and the nominal causative morpheme. The verbal causative morphemes are like the ones observed in Chinese (e.g., Lü 1984; L.-H. Wang 1991), Japanese (Uesaka 1994). The verbal causative morphemes in these languages are dependent. The independent verbal causative morphemes are observed in Romance languages, such as *faire* in French, *fare* in Italian and *hacer* in Spanish (Zubizarreta 1985). The nominal causative morphemes are observed in Georgian (Nash 1994). Suppose Pesetsky's observation is correct that English has a prepositional causative morpheme which can be characterized by his analysis. This shows that his analysis is only language-specific to English, because it cannot capture the relevant data in the Chinese type of languages or the Romance type of languages. Irrespective of the fact that Pesetsky has made great efforts in arguing that the analysis proposed is powerful enough to account for data in English not related to psych verbs, it still suffers from too many deficiencies.

Third, the movement of an NP (i.e., the lower Causer in (24)) from one theta position to another identical theta position is just a stipulation. What is the empirical evidence for that? Is there any theoretical implication of such movement? If the

movement is proposed just for the sake of solving problems caused by this account, then such a solution is quite ad hoc.

Fourth, what is the semantic difference between the periphrastic structure such as *make+angry* and the synthetic structure such as *anger*? If there is no real semantic difference, then an identical syntactic D-structure should be expected for both of them, otherwise, the UTAH should be violated. If Pesetsky's finer-grained semantic approach were adopted for the linking problem with ES and EO verbs, why should not the T/SM problem with the periphrastic and syntactic structures be treated in the finer-grained semantic approach? In other words, Pesetsky argued that there are semantic differences between ES and EO verbs, and thus they should be dealt with by different D-structures, resolving the linking problem. That is fine. But regarding the T/SM phenomenon with the periphrastic and synthetic structures, as the two constructions are not semantically different, why should two different D-structures be proposed to account for the T/SM restriction? Given that two different approaches are adopted in dealing with the two problems which are interrelated to each other, this theory may not be so appealing.

2.2.2 *Psych Adjectives*

Postal (1971) and Lakoff (1971) discuss the pairs of *-ed* and *-ing* adjectives. They treat *-ed* adjectives on a par with ES verbs and *-ing* adjectives with EO verbs. In their accounts, they merely describe and try to explain why psych predicates including verbs and adjectives show those unusual properties without addressing the issue of how adjectives are derived from verbs. There has been quite a lot of research on adjectival passives in general, i.e., nonpsych *-ed* adjectives (Borer 1984; Grimshaw 1990; Levin and Rappaport 1986; Pesetsky 1995; Siegel 1973; Wasow 1977; Williams 1981). Regarding the issue of how *-ed* adjectives are derived, there are different views. Briefly, Borer (1984) and Wasow (1977) argue that *-ed* adjectives are formed by some rules at the level

of lexicon. Levin and Rappaport (1986) argue that *-ed* adjectives are derived from verbal passives by relabelling under conversion. Grimshaw (1990) suggests that *-ed* adjectives are derived from verbs in their perfect participle forms. Pesetsky (1995) assumes that *-ed* adjectives are derived from verbal passives by adding a null adjectivizer. Up to now not many studies have been done examining both *-ed* and *-ing* adjectives in particular (except Borer 1984; Cowper 1995). Regarding research on the psych *-ed* and *-ing* adjectives, surprisingly, Roberts (1989), Nakajima (1993) and Chen (1995b) are the only three studies, as far as I know. It is interesting to note that both Roberts and Nakajima look at psych adjectives together with psych verbs and both arrive at a similar conclusion. That is, EO verbs and *-ing* adjectives belong to the ergative (i.e., unaccusative) class, taking non-thematic subjects, whereas ES verbs and *-ed* adjectives belong to the unergative class, taking thematic subjects. In the following I will discuss the basic ideas of these two studies respectively. [23] Terms such as *-ing* and *-ed* adjectives will refer to psych adjectives in particular.

2.2.2.1 Roberts (1989)

Roberts (1989) suggests that both *-ed* and *-ing* adjectives are derived from EO verbs. Following B&R (1988), Roberts assumes that EO verbs have an ergative structure

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[23] Chen (1995b) argues that both-*ing* and *-ed* adjectives are derived from causative EO verbs which bear the zero CAUS, but only *-ing* adjectives still preserve the CAUS in final outcomes, whereas *-ed* adjectives lose the CAUS in the course of derivation. For the special case of *-ed* adjectives, Chen's argumentation is based on Pesetsky's (1995) assumptions that *-ed* adjectives are derived from verbal passives by the addition of a phonologically-null adjectivizer and that the zero CAUS suppresses the external argument when it affixes to the root. Given the idea by Chomsky (1981) and Marantz (1981) that passive morphology will block the syntactic realization of the external argument, then the CAUS and *-ed* which have the same function of dethematizing the external theta role cannot be incorporated, otherwise the Principle of Morphological Nonredundancy by Zubizarreta(1985) will be violated, which prohibits the attachment of redundant morphology. This account has some problems. Theoretically, the loss of the zero CAUS poses a problem for the Projection Principle, if the zero CAUS is a part of the verb in terms of morphology. Empirically, there are counterexamples which show that causative and passive can cooccur in the same construction, as shown in the following examples.

(i) a. The article made John annoyed at the government
b. The kids are made to go to bed earlier

such as the one shown in (30), which serves as the basis for the derivation of the two types of adjectives.

(30) [[v Cause] Exp]

For the *-ing* class, Cause (i.e., the Cause argument) moves to subject position in order to get nominative Case. As a result, *-ing* adjectives behave the same as EO verbs in terms of argument structure: both lack an external argument. But they are different from each other in two aspects. First, *-ing* adjectives Case-license the Experiencer dative while verbs Case-license the Experiencer accusative. Second, *-ing* adjectives optionally require the Experiencer argument while verbs obligatorily require it. For the *-ed* class, the derivation involves a process of externalization of the Experiencer and a deletion of the Cause.

As this account takes B&R's structure for EO verbs as its starting point, it is not surprising that it has reached a similar conclusion.

2.2.2.2 Problems with Roberts (1989)

As mentioned above, Roberts (1989) bases his account on B&R by assuming the same D-structure for *-ing* adjectives and EO verbs. Thus, all the deficiencies that B&R suffer from, as discussed in 2.2.1.2, can carry over to Roberts (1989).

Second, this account fails to address why and how a deletion of the Cause argument happens during the course of derivation of *-ed* adjectives. It is not clear why it is the affixation of the *-ed* morpheme but not the *-ing* morpheme that causes a process of an externalization of the Experiencer argument and a deletion of the Cause argument.

Third, Roberts demonstrates a minimal contrast, as in (31), between *-ing* adjectives and *-ed* adjectives by using predicate contexts as a diagnostic for whether an adjective can assign an external theta role or not.

(31) a. John arrived home depressed/*depressing
b. John left the theatre amused/*amusing

What Roberts hopes to show by (31) is that *-ed* adjectives can assign an external theta role while *-ing* adjectives cannot. Hence, there is a contrast in grammaticality. However, as pointed out to me by Mark Baker (personal communication), the fact that (31a) and (31b) are good with *-ed* adjectives but turn bad with *-ing* adjectives may be related to the differences between individual-level predicates and stage-level predicates in the sense of Carlson (1977), Kratzer (1989) and Diesing (1990). To be more specific, *-ing* adjectives are individual-level predicates, which usually describe permanent properties, whereas *-ed* adjectives are stage-level predicates, which describe events or transient properties. As the action of arriving or leaving can be compatible with the events of being depressed or amused which last for a period of time, the sentences are grammatical. In contrast, John's arriving home or leaving the theatre is incompatible with his personal depressing or amusing properties, so the sentences are ungrammatical. This indicates that Roberts' argument is incorrect. While individual-level and stage-level predicates may involve a different theta-assignment, this does not imply that *-ing* adjectives cannot have an external theta role to assign. It seems that adjectives, either in *-ing* or *-ed* forms, can assign an external theta role when they are used predicatively or attributively.

2.2.2.3 Nakajima (1993)

Nakajima (1993) is a study that seeks a uniform account for both psych verbs and psych adjectives on the assumption that the two classes of predicates suffer from a similar linking problem. The basic idea of his analysis is as follows. For psych verbs and psych adjectives, the thematically most prominent argument is chosen as the subject; then a construction-independent lexical rule called Suppress-α applies that causes the differences between *-ed* adjectives and *-ing* adjectives on the one hand, and the

differences between ES verbs and EO verbs on the other.[24] Nakajima builds this rule on his observations of certain common characteristics for both passives and *-ing* adjectives: (a) both take a pleonastic *it* at the subject position, (b) both have an optional use of *by*-phrase in passives and *to*-phrase in adjectives, (c) both disallow extraction of NPs embedded within the *by*- phrase or *to*- phrase. With this as the starting point, Nakajima claims that passives and *-ing* adjectives should be treated the same way. That is, the lexical rule Suppress-α, as in (32), applies in both constructions, and the suppressed argument which he calls a(rgument)-adjunct occurs in a VP-adjunction structure.

(32) Suppress-α : Suppress an external argument (Nakajima 1993: 109)

According to Nakajima, the operation of Suppress-α is Case-theoretically motivated. In the case of passives, the lexical passivization makes, among other morphological changes, the preposition *by* precede the suppressed external argument. As the external argument gets inherent Oblique Case from the preposition *by*, it cannot stay in subject position. Otherwise, this argument will receive structural nominative Case, resulting in a Case conflict. Therefore, the external argument must be suppressed.

For Nakajima, both *-ing* and *-ed* adjectives have the same stems (i.e., EO verbs), accordingly they share the argument structure [Experiencer, Theme]. Take the pair *annoying* and *annoyed* for example. When the stem *annoy* is suffixed with *-ing*, the preposition *to* is usually added to the Experiencer; when the stem is suffixed with *-ed*, the idiosyncratic prepositions *at/with* are required to introduce the Theme, as shown in (33).

(33) a. The news is annoying to John
b. John is annoyed at/with the news

[24] In Nakajima's theory, subject of a predicate is an external argument.

Suppress-α can apply freely in both cases, but the outcomes of the application are only legitimate with *-ing* forms but not with *-ed* forms. In the former case, the operation of Suppress-α turns the *to*-Experiencer into an a-adjunct which receives no structural Case at the VP-adjunct position. Since the Experiencer is inherently Case-marked by *to* already, no Case is needed. In the case of *-ed* adjectives, the Experiencer becomes an a-adjunct through Suppress-α as before, but it receives no Case. As this argument has not been Case-marked by any means, the Case Filter would be violated. In other words, no operation of Suppress-α is allowed with *-ed* adjectives, because otherwise it results in ill-formed outcomes. According to Nakajima, the differences in question can be seen from the contrast in (34), where it is *-ing* adjectives but not *-ed* adjectives that can take pleonastic *it*. This suggests that only *-ing* adjectives undergo the operation of Suppress-α.

(34) a. It is surprising to us that he passed the exam
b. *It is surprised at us that he passed the exam

In terms of psych verbs, similarly, the application of Suppress-α is allowed only when its outcomes are grammatical. For EO verbs, since they have inherent accusative Case as suggested by B&R, Suppress-α has to apply, because otherwise the Experiencer NP which has been assigned inherent accusative Case will get structural nominative Case, if it stays in subject position. Thus, a Case conflict follows. But if the Experiencer NP is suppressed, it occurs in the VP-adjunct position where no further Case is assigned. Consequently the output is grammatical. For ES verbs, they have no inherent Case to assign according to B&R, so the application of Suppress-α will result in an outcome of violating Case Filter. In other words, the Experiencer NP gets no Case, if it occurs in VP adjunct position as a result of Suppress-α. Therefore, Suppress-α cannot occur with ES verbs.

Thus, by using Suppress-α, Nakajima classifies passives, *-ing* adjectives and EO verbs into one group and *-ed* adjectives and ES verb into another group. The first group take non-thematic subjects, while the second group take thematic subjects.

2.2.2.4 Problems with Nakajima (1993)

Nakajima is correct in claiming that it is only *-ing* adjectives but not *-ed* adjectives that can take the pleonastic *it*, but this is not sufficient to conclude that *-ing* adjectives are ergative, while *-ed* adjectives are unergatives. The contrast illustrated in (34) follows from different selectional restrictions.[25] Crucially, the theta role of Experiencer can only be carried by an animate thing. This suggests that the impersonal pleonastic *it* cannot be used to bear the Experiencer in (34b). Hence, the sentence is ruled out.

Apart from that, there are some questions left open under this analysis. Is Suppress-α a universal lexical rule that can freely apply to all the external arguments of predicates? What is the general assumption that adjectives should be treated the same as verbs? Why are the differences between verbal passive and *-ed* adjectives (which are also called adjectival passives) so big that the operation of Suppress-α can apply in the former but not in the latter? What are the D-structures for two types of adjectives?

2.2.3 Psych Nouns

Compared with psych verbs and psych adjectives, psych nominals have not attracted so much attention from linguists, though researchers like Grimshaw (1990) and Pesetsky (1995) touch on nominalizations in their studies.[26] Grimshaw (1990) claims

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[25] Thanks to Mark Baker (personal communication) who brought my attention to this direction.

[26] Psych nouns are distinguished from psych nominals. Psych nouns refer to those which are listed as independent words in the dictionary, for instance, *love, fright, worry*; while psych nominals are the ones that are derived from psych verbs by adding some suffixes, such as *loving, worrying, amusement, fascination*. This work only focuses on psych derived nominals, ignoring psych nouns and gerundive nominals (the nominals ending in *-ing*).

that there is no nominalization for psych EO verbs, because this class of verbs do not have external arguments based on her theory of a-structure. Pesetsky (1995) claims that the nominalizations of EO verbs consist of the verb stems and nominal affixes and that psych nominals are argument-taking nouns. Georgopoulos (1987) is the study that looks at the detailed properties of psych nominals in Palauan.[27] In the following I will discuss the basic ideas of this work in a bit more detail.

2.2.3.1 Georgopoulos (1987)

Following the framework of B&R (1988) and of Stowell (1986), Georgopoulos makes the two claims: (i) the properties of psych predicates in Palauan, a Western Austronesian language, are nominal rather than verbal; (ii) two of its lexically selected arguments, i.e., the Experiencer and theme, are internal to the NP at D-structure with an empty subject position.

Palauan is a VOS and uniformly head-initial language in which the predicate carries a prefix having an agreement in person and number with the surface subject. Nominal predicates are a special class of predicates in this language: they have the form of possessed nouns which are quite productive. According to Georgopoulos, the type of

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[27] Rozwadowska (1988) is another study, in which English and Polish psych nominals are examined. The central claim is that the object of the ES class and the subject of the EO class bear a Neutral role, and that the Neutral cannot appear in specifier position of a nominal, called the N-rule. The notion of Neutral is defined as follows (Rozwadowska 1988: 151):

(i)Neutral: An entity X holds a thematic relation NEUTRAL (N-role) with respect to a predicate Y if

a. X is in no way affected by the action, process, or state described by Y,

b. X does not have any control over the action, process, or state described by Y.

According to Rozwadowska, the N-rule accounts for the contrast of (ii) and (iii) in the following English examples, because *John* and *the children* are the Experiencers in (ii), whereas *the miracle* and *the movie* are the Neutrals in (iii).

(ii) a. John's amusement at the film

b. The children's surprise at the presents

(iii) a. *The miracle's amazement of the people

b. *The movie's shock of the audience

One of the problems with this analysis is that if EO verbs are considered as causatives, then the subject of these verbs cannot be a Neutral. In that case, the N-role is not relevant. This suggests that the ungrammaticality of (iii) cannot be explained by the N-rule. Theoretically, the N-rule is descriptive, which cannot make clear predictions for L2 acquisition of psych nominals.

"possession" associated with these predicates has the traditional notion of "obligatory" possession.

Take the root *sau-* "like" for example. Two examples containing *sau-* are given in (35) from Georgopoulos (1987:219).

(35) a. te-soal a Willy a rbuik
3p-like-3s boys
'Willy likes the boys'

b. te-soarir a Willy a rbuik
3p-like-3p boys
'The boys like Willy'

Georgopoulos assumes that this root does not have a syntactic category, but it takes a nominal paradigm like (36) which is different from the verbal agreement paradigm like (37) (both (36) and (37) are taken from Georgopoulos (1987: 215). Since the inflection is [+N], the affixed word should be [+N].

(36) Nominal paradigm: Possessed forms of *sau* - "like"

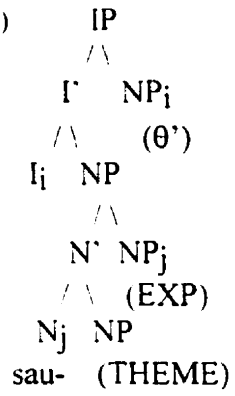
Sing.	Pl.	
	incl.	excl.
1 so-ak	so-ad	so-(a)mam
2 so-am	so-miu	
3 so-al	so-(a)rir	

(37) Verbal paradigm: Direct Object agreement

Sing.	Pl.	
	incl.	excl.
1 -ak	id	-emam
2 -au	-emiu	
3 -ii	-(t)erir	

Georgopoulos argues that *sau-* is a predicate which is not derived from the verb. Her major arguments for this claim are that (i) these predicates are always in the predicate position which is initial, bearing the subject agreement prefix or tense marker, and that (ii) no other corresponding verbs or verb-like constituents exist in the language. The D-structure for the psych predicate *sau-* proposed by Georgopoulos is given as follows.

(38)



In this structure, both IP and NP contain a specifier. The specifier of IP, i.e., NP_i, is required by the Extended Projection Principle. The specifier of NP, i.e., NPj, is base-generated as a possessor argument, lexically selected by the predicate *sau-*. Since there is an agreement between the head and its specifier, thus there is a coindexation between *sau-* and Spec of NP. Georgopoulos argues that the base structure in (38) fits into the proposal of B&R(1988). First, the *sau-* class predicates are the modal predicates which involve NP movement to athematic subject position. Second, both thematic NPs fill in D-structure slots in the predicate *sau-*. Although *sau-* is nominal, it possesses the ability to assign theta role and Case. The Theme argument gets structural Case from *sau-*, while the Experiencer argument gets inherent genitive Case assigned at D-structure. So no movement is needed. However, Georgopoulos assumes that both arguments are also free to move to Spec of IP. If it is the Theme that moves, then sentences like (35a) is produced; if it is the Experiencer that moves, then sentences like (35b) is produced.

2.2.3.2 Problems with Georgopoulos (1987)

The conclusion that Georgopoulos makes in this paper is that Case-assignment and NP movement are independent. This entails that the movement of the Theme or the Experiencer is not obligatorily driven by Case. In that case, what motivates NP movement? This seems to be a conceptual problem.

In addition, only nominal predicates that seem to be like ES verbs are discussed in the paper. It is not clear whether it is the language per se that lacks the class of EO-like nominal predicates or whether it is Georgopoulos who just concentrates on the class of ES-like nominal predicates. But it is clear that the proposal cannot be used for the data in other languages. As languages like English have psych nouns derived from corresponding EO verbs, the differences between the two categories cannot be captured by Georgopoulos' analysis.

2.3 Conclusion

In this chapter, I have reviewed three current accounts of psych verbs which are quite influential in the literature. B&R and Grimshaw share two common points. First, both assume the same theta grid for ES and EO verbs. Second, both arrive at the same conclusion that EO verbs have no external arguments, though they differ from each other in that for B&R the surface subject is a derived subject, whereas for Grimshaw the surface subject is a D-structure subject. B&R and Pesetsky have two points in common. First, both argue for a configurational distinction between ES and EO verbs: ES verbs are like other regular transitive verbs, while EO verbs are different. Second, both assume that Principle A can be applied anywhere for binding anaphors. Grimshaw is the only one who assumes no configurational distinction between the two classes of verbs and who argues that binding can be sensitive to something other than pure syntactic configurationality. Grimshaw and Pesetsky both assume "cause" as an inherent factor.

Two studies on psych adjectives are reviewed. Two things are common to these studies. First, a uniform account has been provided to solve the linking problem with both psych adjectives and psych verbs. Second, *-ing* adjectives and EO verbs are argued to be ergative, taking no external arguments, while *-ed* adjectives and ES verbs are argued to be unergative, taking external arguments. The work by Georgopoulos examines nominal psych predicates in Palauan with the conclusion that these predicates behave like verbs in the language.

It has been shown that all the above analyses have their own problems, conceptual or empirical. This means that an alternative account of psych predicates needs to be worked out. Such a new analysis should be powerful enough to capture the data of psych predicates in as many languages as possible on the one hand, and simultaneously it should be constrained so that it will provide testable predictions for acquisition, including the L2 acquisition of English psych predicates. It is to satisfy these needs that I turn to the next chapter.

CHAPTER 3

PSYCH PREDICATES: ALTERNATIVE ACCOUNT

3.0 Introduction

In this chapter I will propose an alternative account for psych verbs. This account is based on data from psych verbs in Chinese which also present the arbitrary linking problem and the backwards binding problem. The basic idea of this proposal is that ES and EO psych verbs do not share the same theta grid and thus they have different D-structures, along the lines of Pesetsky (1995). EO verbs are the causatives of ES verbs, derived by zero affixation. Under this approach, there is no longer an arbitrary linking between thematic arguments and structural positions. An anaphoric pro in the sense of Travis (To appear) is assumed, which forms a chain so as to allow the anaphor to be bound backwards. This solution of the binding problem is within the extension of the chain-binding theory (Barss 1986).

This account is then extended to psych verbs in English. The essential difference between Chinese on the one hand and English on the other hand is that English has a productive pattern of synthetic EO verbs whereby there is a zero causative morpheme encoded lexically with an EO verb root, as observed by Pesetsky (1995), while Chinese has a productive pattern of periphrastic EO verbs which are composed of an overt causative morpheme *shi* "make" and an adjective. English also has periphrastic EO verbs which use overt causative verbs such as *make* selecting an AP. Both synthetic and periphrastic EO verbs are accommodated by the analysis proposed for Chinese psych verbs. As French resembles English in terms of psych verbs, the proposed account is able to explain the French data as well.

Psych adjectives in all the three languages are discussed in Section 3.2. There is no morphological distinction between psych verbs, in particular the EO type of verbs,

and psych adjectives in Chinese; therefore, the analysis proposed for EO verbs applies easily to adjectives. With respect to English, psych adjectives differ from psych verbs morphologically, in that the former seem to be derived from the latter by affixing either *-ing* or *-ed*, in the lexicon. I will argue that the crucial difference between the two classes of psych adjectives lies in the fact that they undergo two separate word formation processes. The *-ing* adjectives like *annoying* are formed by attaching the *-ing* morpheme to the EO verbs which are made up of a verb root and a zero causative morpheme CAUS, i.e., *√annoy* + CAUS; in contrast, the *-ed* adjectives like *annoyed* are formed by attaching the *-ed* morpheme directly to the verb root without the zero causative morpheme CAUS, i.e., *√annoy*. Thus, it is the *-ing* class but not the *-ed* class that presents syntactic properties related to the presence of a zero causative morpheme, namely, the existence of the T/SM restriction and the possibility of backwards binding.

I will demonstrate that the difference between the two classes of psych adjectives is similarly reflected in French for the same reason. That is, the *-ant* adjectives, corresponding to the *-ing* class in English, are derived from the EO verbs that contain a zero causative morpheme, whereas the *-é* adjectives, corresponding to the *-ed* class in English, are derived from the EO verbs that contain no zero causative morpheme.

Regarding psych nouns, which are discussed in Section 3.3, since nominalizations do not share the properties of flip, nor do they present the phenomenon of backwards binding as observed with EO verbs and *-ing* adjectives, they will not be treated the same way as psych verbs of the EO class and psych adjectives of the *-ing* class. Chinese lacks psych nouns. While there are a very small number of nominal psych predicates, an adjectival or verbal expression is used instead in most situations. In English, there is a way of forming psych nouns from psych verbs. Following Pesetsky (1995), I assume that psych nouns such as *annoyance* are formed by adding the nominal affix *-ance* directly to the bound morpheme *√annoy* in the lexicon. As there is no causative morpheme CAUS involved, the derived word does not show any of the syntactic properties that the verb

annoy and the adjective *annoying* have. The lack of CAUS in psych nouns leads to the lack of flip or backwards binding with this class of predicates. French is almost the same as English with respect to the nominal formation and the syntactic functions that these derived nouns present.

3.1 Psych Verbs

The solution that I propose in this section for the linking problem and the binding problem of psych verbs takes Pesetsky's (1995) assumption as the starting point. That is, there are two different theta grids for the two types of psych verbs. Also following Pesetsky (1995), I take a decompositional analysis for both EO and ES verbs along the lines of Lexical Relational Structure in Hale and Keyser (1991, 1993). I will first discuss Chinese psych verbs, and propose an analysis for them. Next I will discuss how the proposed analysis is able to account for English and French psych verbs respectively.

3.1.1 Psych Verbs in Chinese

3.1.1.1 Data

Examples of Chinese psych verbs are given in (1).

(1) a. Wo pa gou
I fear dog
'I fear the dog'

b. Gou xia wo
dog frighten I
'The dog frightens me'

This pair of Chinese sentences is not unlike its English counterparts given in (1) in Chapter 2, regarding word order and the theta grid. But note that psych verbs of the structure in (1b) are very unproductive in Chinese.[28] Thus an overgeneralization of the structure (1b) would lead to bad sentences like (2a). The correct way to express (2a) is (2b), whereby the verb of cause, typically *shi*, or *ling* or *lang*, all meaning "make", has to be used preceding the Experiencer NP. [29]

(2) a. *Zhe chang yinyuehui shiwang wo
this CL concert disappoint I
'This concert disappoints me'

b. Zhe chang yinyuehui shi wo hen shiwang
this CL concert make I very disappointed
'This concert disappoints me a lot'

For ease of exposition, I will call (1b) a synthetic EO psych verb (i.e., monomorphemic) and (2b) a periphrastic EO psych verb (i.e., bimorphemic) borrowing the terminology from Mulder (1992).

Before moving on, let us examine in detail the categorical properties of Chinese psych verbs. First, consider the periphrastic EO type. As mentioned above, *shi* is a verb of Cause. While *shi* can be used independently, it is more often used in a structure like (2b), in which *shi* must select a predicate as its complement. Now what is this predicate? To be more precise, what is the word *shiwang* in (2b), a verb or an adjective?

It is generally observed in Chinese that no copula is needed when adjectives are used as the predicate of a sentence and that they can be negated directly by the negative particles *bu* or *mei (you)* "not" just like verbs (e.g., Chao 1968; Li and Thompson 1981;

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[28]Other verbs of this type that I am aware of in Chinese are *zhenfen* "excite", *guli* "encourage", *weixie* "threaten".

[29] Here I assume with Lü (1984), L.-H. Wang (1991) and Wu (1993) that *shi* is a verb in Chinese which has an obvious causative meaning and its own argument structure (See Zhang (1979) for a view that *shi* is a preposition).

among others). Because of these syntactic properties, some Chinese grammarians, e.g., Li and Thompson (1981) and Y. Li (1990), treat adjectives as verbs. However, the fact that adjectives can (but not necessarily must) function directly as the predicate of a sentence without using a copular or with the use of negative particles should not obscure the real differences between adjectives and verbs. Actually, in the traditional literature of Chinese syntax, there are some tests which can distinguish an adjective from a verb. One crucial test is using the degree adverbial *hen* "very" as a modifier.[30] Usually, an adjective can be modified by *hen*, as shown in (3a-3b), but a verb cannot, as shown in (3c-3d). [31]

(3) a. Fangfang hen yonggong
Fangfang very diligent
'Fangfang is very diligent'

b. Zhe zuo fangzi hen da
this CL house very big
'This house is very big'

c. *Yuanyuan hen ku
Yuanyuan very cry
*'Yuanyuan cried very much'

d. *Fangfang hen kan dianying
Fangfang very watch movie
*'Fangfang watched the movie very much'

Second, an adjective can be used as a predicate of a comparison sentence using the adverbial *geng ... yiyang* "as ... same" or *bi ... geng* "compare ... more", while a verb cannot. The contrast is illustrated in (4) and (5).

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[30] According to T.-C.C. Tang (1979), there are other degree adverbials which can only modify adjectives but not verbs, such as *geng* "even more", *bijiao* "relatively", *feichang* "very much".

[31] Li and Thompson (1981) point out that there are two interpretations involving *hen*: one is its intensified meaning of "very" when it is heavily stressed, the other is a semantically bleached "very" which adds no intensive meaning when unstressed, but makes the sentence sound more natural. The examples in (3a), (3b), (6a) and (7a) take the first presentation.

(4) a. Fangfang geng Yuanyuan yiyang yonggong
Fangfang as Yuanyuan same diligent
'Fangfang is as diligent as Yuanyuan'

b. Fangfang bi Yuanyuan geng yonggong
Fangfang compare Yuanyuan more diligent
'Fangfang is more diligent than Yuanyuan'

(5) a. *Fangfang geng Yuanyuan yiyang ku.
Fangfang as Yuanyuan same ku
*'Fangfang cries as same as Yuanyuan'

b. *Fangfang bi Yuanyuan geng ku
Fangfang compare Yuanyuan more cry
*'Fangfang cries more than Yuanyuan'

Using the above two tests, we can see that *shiwang* behaves like an adjective, because it can be modified by *hen* as shown in (6a), and can be used in a comparison sentence using *geng ... yiyang* and *bi ... geng*, as shown in (6b) and (6c).[32]

(6) a. Zhe chang yinyuehui shi wo hen shiwang
this CL concert make I very disappointed
'The concert made me disappointed very much'

b. Zhe chang yinyuehui shi wo geng Fangfang yiyang hen shiwang
this CL concert make I as Fagnfang same very disappointed
'This concert made me disappointed as same as Fangfang'

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[32] Some native speakers of the Wu dialect accept the following sentences which allow the adverbial *hen* to modify the verb *shi*, and which may also be used with *geng ... yiyang* or *bi ... geng*.

(i) a. Zhe chang yinyuehui hen shi wo shiwang
this CL concert very make I disappointed
'The concert made me disappointed very much'

b. Zhe chang yinyuehui geng nei chang yingyuehui yiyang shi wo shiwang
this CL concert as that CL concert same make I disappointed
'This concert made me as disappointed as that one'

c. Zhe chang yinyuehui bi nei chang yingyuehui geng shi wo shiwang
this CL concert compare that CL concert more make I disappointed
'This concert made me more disappointed than that one'

As pointed out in Footnote 2, *shi* has only been argued to be a verb or a preposition in the literature. Further research on the properties of *shi* should help us understand the real nature of *shi*.

c. Zhe chang yinyuehui shi wo bi Fangfang geng shiwang
this CL concert make me compare Fangfang more disappointed
'This concert made me disappointed than that one'

Note that ES verbs can also be modified by *hen* and used with *geng ...yiyang* or *bi ... geng* in a comparison sentence, as illustrated in (7a), (7b) and (7c) respectively.

(7) a. Yuanyuan hen pa gou
Yuanyuan very fear dog
'Yuanyuan fears the dog very much'

b. Yuanyuan geng Fangfang yiyang pa gou
Yuanyuan as Fangfang same fear dog
'Yuanyuan fears the dog just like Fangfang'

c. Yuanyuan bi Fangfang geng pa gou
Yuanyuan compare Fangfang more fear dog
'Yuanyuan fears the dog more than Fangfang does'

As far as synthetic EO verbs are concerned, they can neither be modified by the adverbial *hen*, nor be used as a predicate in a comparison sentence, as shown in (8).

(8) a. *Gou hen xia wo
dog very frighten I
*'The dog very frightened me'

b. *Gou be gui geng xia wo
dog compare ghost more frighten I
'The dog frightened me more than the ghost'

We may conclude that both ES predicates and the roots of periphrastic EO predicates in Chinese are adjectival in nature, while synthetic EO predicates are verbal in nature. Chao (1968) and T.-C.C. Tang (1979) notice that Chinese has a distinction

between transitive adjectives and intransitive adjectives. On T.-C.C. Tang's (1979) view, the type of ES predicates like *pa* in (7) is transitive adjective which can assign accusative Case, while predicates like *shiwang* in (6) are intransitive adjectives which cannot assign Case. In this work, I will assume that the adjective *shiwang* "disappointed" and the verb *shi* form a complex EO verb, with the Experiencer in between, and that the adjective *pa* "fearful" incorporates with the zero copula BE to form a simplex ES verb. In the latter case, since the adjective is transitive, the derived verb is transitive, too. More details will be discussed below regarding the formation of the periphrastic EO predicate *shi ... shiwang* and the ES predicate *pa*.

Next let me consider the binding facts with Chinese psych verbs, as given in (9)-(11), which are taken from Wu (1993) with some modifications.[33]

(9) a. Fangfang$_i$ danxin ziji$_i$ de shengti
Fangfang worry about self DE health
'Fangfang worries about her (own) health'

b. *Ziji$_i$ de fumu danxin Fangfang$_i$ de shengti
self DE parents worry about Fangfang DE health
'Her (own) parents worry about Fangfang's health'

(10) a. Fangfang$_i$ de chenggong zhenfen le ziji$_i$
Fangfang DE success excite ASP self
'Fangfang's success excited herself'

b. Ziji$_i$ de chenggong zhenfen le Fangfang$_i$
self DE success excite ASP Fangfang
'Her (own) success excited Fangfang'

[33] I checked the data with 12 Chinese native speakers. It was found that some informants speaking the Beijing dialect do not like sentences having backwards binding, but all of them have the feeling that backwards binding with the EO type is better than backwards binding with the ES type. The backwards binding phenomenon in Chinese is also reported in Huang and C.-C. J. Tang (1991) and Xu (1994).

(11) a. Fangfang$_i$ de chenggong shi ziji$_i$ hen xingfen
Fangfang DE success make self very excite
'Fangfang's success made herself very excited'

b. Ziji$_i$ de chenggong shi Fangfang$_i$ hen xingfen
self DE success make Fangfang very excite
'Her (own) success made Fangfang very excited'

The examples in (9) involve the ES verb *danxin* "worry about". With this class of verbs, only forwards binding but not backwards binding is grammatical, as illustrated by the contrast in (9a) and (9b). However, for the EO verbs like *zhenfen* "excite" and *shi xingfen* "excite", both forwards and backwards binding are grammatical irrespective of being synthetic (10) or periphrastic (11). For capturing Chinese data, the GB theory of anaphor binding is modified into (12) and (13) by C.-C.J. Tang (1990: 101) to include a sub-command relation between a reflexive and its antecedent (See also Huang and C.-C. J. Tang (1991)).

(12) A reflexive α can be bound by β iff

a. β is coindexed with α
b. β sub-commands α and
c. β is not contained in a potential binder of α

(13) β sub-commands α iff

a. β c-commands α or
b. β is an NP contained in an NP that c-commands α or that sub-commands α, and any argument containing β is in subject position

Simplified somewhat, a potential binder of α is any animate subject that c-commands or sub-commands α. Thus, the relaxed c-command requirement explains why (10a) and (11a) are still grammatical, though in both cases the Spec of subject NP, *Fangfang*, only sub-commands but does not c-command its antecedent *ziji* "self".

An important fact about Chinese psych verbs needs to be pointed out. That is, like English, Chinese synthetic EO verbs cannot allow the T/SM to occur in the same construction, the so-called T/SM restriction discussed in Chapter 2, as shown in (14a) and (14b). However, the periphrastic EO verbs like (2b) allow the T/SM to cooccur with the Causer. When the T/SM theta role is phonologically realized, a preposition *dui* "to" must be used to introduce the T/SM and this PP has to occur in front of the root, as in (15a). In this regard, it is like English analytical causative construction with the verb *make* where a T/SM is allowed, as in (15b).

(14) a. *Gou dui ta de jiaosheng xia wo
dog to it DE barking frighten I
*'The dog frightened me of his barking'

b. *The article annoyed me at the government

(15) a. Zhe chang yinyuehui shi wo (dui nei ge ming zhihui) hen shiwang
this CL concert make I to that CL famous conductor very disappointed
'This concert made me disappointed (at that famous conductor)'

b. The article made me annoyed (at/with the government).

The above examples indicate that both Chinese and English observe the T/SM restriction when EO verbs are synthetic in form, as in (14), but both do not observe the T/SM restriction when EO verbs are periphrastic, as in (15). However, there is an obvious difference between Chinese and English in terms of the distribution of the T/SM argument: unlike English which keeps the T/SM at the end of the sentence, as shown in (15b), the T/SM argument in Chinese has to appear in front of the AP, as shown in (15a), a normal case in Chinese whenever a PP is used.[34]

[34] The fact that Chinese does not allow postverbal prepositional phrase involves the controversial issue of word order in this language, which the present work cannot go into in any detail. For the discussion of this topic, see Huang (1995), Mulder and Sybesman (1992), Y-H. A. Li (1990) and Travis (1984, 1989).

To summarize, Chinese has both ES and EO psych verbs. For the EO class, the productive pattern is periphrastic in form which contains a causative verb and an adjective; there are only a couple of synthetic EO verbs. Both ES verbs and the roots of periphrastic EO verbs are adjectival in Chinese. Irrespective of synthetic or periphrastic, Chinese psych verbs show the linking problem and the binding problem. The T/SM restriction is observed with synthetic EO verbs but not with periphrastic EO verbs.

3.1.1.2 Analysis

In Chapter 2 it was mentioned that Pesetsky (1995) makes a significant observation about the thematic properties of psych verbs. That is, the object argument with ES verbs is the Target of Emotion or the Subject Matter of Emotion (i.e., Object of Emotion), the thing that an animate being has some feelings or emotions about; while the subject argument with EO verbs is the Causer, i.e., the thing that arouses some feelings or emotions in a certain animate being. The different thematic denotation can be seen in the following examples (Pesetsky 1995: 56).

(16) a. Bill was very angry at the article in the *Times* (Target)
b. The article in the *Times* angered Bill (Causer)
c. John worried about the television set (Subject Matter)
d. The television set worried John (Causer)

According to Pesetsky, *the article in the Times* in (16a) is Target of Emotion, something that Bill was angry about, but *the article in the Times* in (16b) is Causer, something that makes Bill angry. The truth conditions of these two sentences are noticeably distinct. For (16a) to be true, Bill must have formed a bad opinion of the article by evaluating it. (16b) is different. Bill might not have a bad opinion of the article, but something described in the article provokes anger in Bill. The truth conditions of

(16c) and (16d) are also different for the similar reasons. For (16c), John was always thinking about the television set whenever he was experiencing the worry. In other words, *the television set* is Subject Matter of Emotion. For (16d), *the television set* is the Causer, that causes John to experience certain worry, which may not relate to the television set itself. Note that the Causer can sometimes act simultaneously as if it were an Object of Emotion. I will discuss this issue later.

The evidence for distinct theta roles can also be observed in Chinese psych verbs. As discussed above, the periphrastic EO type has to rely on the causative verb *shi* "make". This makes the "Theme" NP in the ES type (17a) different from the "Theme" NP in the EO type (17b).

(17) a. Wo xihuan zhe bu dianying
I like this CL movie
'I like this movie'

b. Zhe bu dianying shi wo xingfen
this CL dianying make I excite
'This movie made me excited'

zhe bu dianying "this movie" in (17a) is the thing that *wo* "I" like, so it is a T/SM according to Pesetsky (1995). In (17b) *zhe bu dianying* "this movie" is what makes me excited, therefore, it is a Causer, though it also acts like an Object of Emotion, the thing that I am excited about.

In addition to the distinction in thematic relation with the two types of verbs, ES verbs also differ from EO verbs in semantics. Still taking the sentences in (17) for an example, (17b) is causative but (17a) is noncausative. Actually such a semantic difference has been observed crosslinguistically, e.g., for Chinese by Wu (1993), for Dutch by Mulder (1992), for English by Chomsky (1965, 1970), Grimshaw (1990) and Pesetsky

(1995), for French by Ruwet (1976) and Bouchard (1995), for Japanese by Uesaka (1994), and for Malagasy by Phillips (1996).

Given that the two types of psych verbs actually do not involve the same role of Theme, though they do have the same theta role of Experiencer, they should not share the same θ-grid, contrary to the claims of B&R (1988) and others. Recall that Pesetsky (1995) proposes a bimorphemic analysis of English EO verbs. Namely, EO verb are complex in morphology with a zero causative morpheme added to an ES predicate. If this position is correct, logically speaking, the θ-grid for the EO verbs should be complex in the sense that it must manifest the thematic properties of the causative verb and the thematic properties of the ES predicate. Thus, for EO verbs, I suggest a complex θ-grid which contains a theta role of Causer for the causative verb and the Experiencer and the T/SM for the ES predicate, as in (18a).[35] [36] For Chinese ES verbs, while I assume that they also have a complex morphology composed of a zero copula and an ES predicate, they still have a simple θ-grid, , as in (18b), because the copula verb BE cannot assign a theta role.

(18) a. EO type: [Causer, [Experiencer, Target/Subject Matter]]
b. ES type: [Experiencer, Target/Subject Matter]

This predicts that the Causer and the T/SM should occur together at some level, and I will handle this issue in detail in the next section.

If different psych verbs have different thematic structures, they should project different D-structures. In that case, the linking problem for psych verbs is reduced to a predictable mapping between a given theta-role and a grammatical function. Based on the

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[35] Pesetsky (1995) claims a complex morphology for EO verbs, but this complexity in morphology is not observed in the θ-grid [Causer, Experiencer] that he suggested. If an EO verb contains a zero CAUS and an ES predicate morphologically, then a T/SM argument should be assumed.

[36] I assume that the theta grid for periphrastic EO verbs should be the same as the one for synthetic EO verbs, as both contain a causative verb, though it is overt phonologically in the former but covert in the latter.

Thematic Hierarchy shown in Chapter 2, as repeated in (19), which has the Causer as higher than the Experiencer which is further higher than the Target/Subject Matter, the UTAH can be rescued for psych verbs.

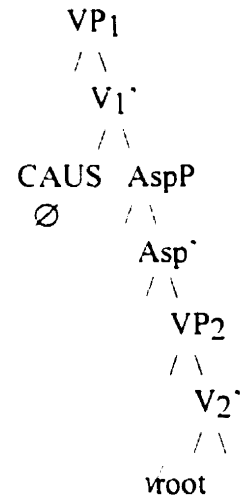
(19) Causer > Experiencer > Target/Subject Matter

With the two different θ-grids proposed for the two types of Chinese psych verbs, the next question is how the two different θ-grids get projected in syntactic configurations. Before answering this question, I would like to discuss two basic theoretical assumptions. As far as synthetic EO verbs are concerned, I will follow Pesetsky (1995) in assuming that a verb such as *xia* "frighten" contains a zero causative morpheme and the verbal root *√xia*. Consequently, there must be two separate VPs projected in D-structure. For periphrastic EO verbs such as *shi* ... *shiwang* "make disappointed", since they contain an overt causative morpheme and an adjective, the D-structure should include a VP and an AP. Basically, the two types of EO verbs can be projected in a Larson (1988) VP-shell structure linked by an AspP (Aspect Phrase) in the sense of Travis (1991) with the higher VP headed by a causative verb CAUS, non-overt for the synthetic EO type as in (20a), but overt for the periphrastic EO type as in (20b).[37] These two templates differ from each other only in the category of the root at the bottom part of the tree: the root in the Chinese synthetic EO type is verbal, while the root in the Chinese periphrastic EO type is adjectival. As for ES verbs, since they are not causative, there is no projection headed by a causative verb. However, as argued before, ES verbs are adjectival and become verbal by incorporating with a zero BE, so there is a similar

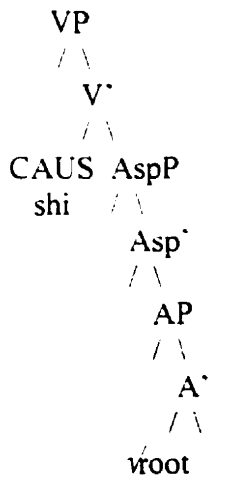
[37] According to Travis (1994, 1995), the Aspect Phrase is a (theta-) binding category (i.e., neither a pure functional category nor a pure lexical category) and it indicates whether or not an action is completed.

structure, with a higher VP headed by a zero copula BE and a lower AP headed by an adjective, as shown in (20c). [38] [39]

(20) a. Synthetic EO verbs



b. Periphrastic EO verbs



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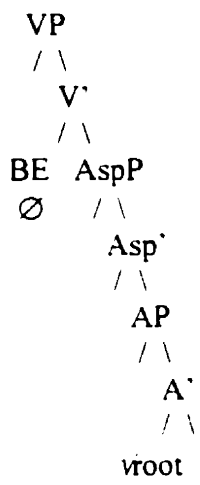
[38] The idea of treating Chinese psych predicates from the decompositional perspective is along the lines of the work by Hale and Keyser (1991, 1993). Huang (1991, 1992) analyzes several kinds of Chinese constructions in similar terms. His claim is that all verbs can be represented as the lexical heads of the complements to some abstract verb. For instance, statives such as *xihuan* "like" in Chinese has the head BE or HOLD; causatives have CAUSE and DO. Wu (1993) also proposed a decompositional analysis of Chinese ES and EO verbs.

[39] As verbs are different from adjectives in category, there should be some differences between the two in terms of D-structures. But for the purpose of being consistent in this work, I will leave the details of differences open at this time.

c. ES verbs



Second, I assume that while morphologically related verbs and adjectives share a similar θ-grid, the realization of arguments, in particular the internal argument, is different due to selectional restrictions. In English, for a verbal predicate, if it is transitive, the realization of argument is straightforward: two NPs are selected. As for an adjectival predicate, there can be two scenarios. When an adjective takes an implicit internal argument, this argument is realized by a null NP. However, when an adjective requires an explicit internal argument, this argument is overtly realized by a PP. For example, both the root of the verb *anger* and the adjective *angry* assign an Experiencer and a T/SM. *√anger* has the T/SM realized by an empty category, whereas *angry* may either select a null NP for the T/SM, or select a PP to realize the T/SM. The differences between the two categories in realization of arguments are illustrated in (21) and (22).

(21) a. The article angered John
b. anger: (verb) [Causer, [Experiencer, T/SM]]
(VP V (NP, NP, e.c.))

(22) a. John is angry (at the government)
b. angry: (adjective) [Experiencer, T/SM]
(i) (AP A (NP, e.c.))
(ii) (AP A (NP, PP (P, NP))

As far as Chinese is concerned, since there is a distinction between transitive adjectives and intransitive adjectives, there are two different patterns for the realization of arguments. For a transitive adjective, the internal T/SM argument is realized by an overt NP, as shown in (23bi). But, some transitive adjectives can also alternatively select a null NP, as in (23bii). This is, more or less, like the verb *eat* in English, which has the option of taking an overt object, or taking a covert object. For an intransitive adjective, there are also two ways to realize the internal argument. One is by means of a null NP, like (24b(i)), the other is by an overt PP, as in (24b(ii)).

(23) a. Wo pa gou
I fear dog

b. pa: (transitive adjective) [Experiencer, T/SM]
(i) (AP A (NP, NP))
(ii) (AP A (NP, e.c.))

(24) a. Zhe chang yinyuehui shi wo hen shiwang
this CL concert make I very disappointed

b. shiwang: (intransitive adjective) [Experiencer, T/SM]
(i) (AP A (NP, e.c.))
(ii) (AP A (NP, PP (P, NP))

(23b) shows that the adjective *pa* can either have a realization of the T/SM argument by an overt NP, producing a transitive *pa* or a realization of the T/SM by a covert NP, resulting in a seemingly intransitive *pa*. (24b) shows that the adjective *shiwang* may also either take a null NP or an overt PP. Under the current assumption, both psych verbs and morphologically derived psych adjectives (transitive or intransitive) have the same theta-grid, therefore there is no need to stipulate that the projection of an object θ-role is optional and the relevant data can be captured at an explanatory level.

The assumption that both ES and EO verbs have an adjectival root and that adjectives are different from verbs in terms of realization of arguments leads to some important generalizations. That is, with periphrastic EO verbs, the lack of the T/SM restriction follows naturally from the fact that an adjectival root subcategorizes a PP, which makes the cooccurrence of the T/SM and the Causer possible since the T/SM argument can be realized in the PP. With synthetic EO verbs, as the root is a verb, it can only select an NP. The T/SM argument cannot be realized, because there is no such a PP that is allowed to occur in this context. These generalizations capture the data of Chinese EO verbs.

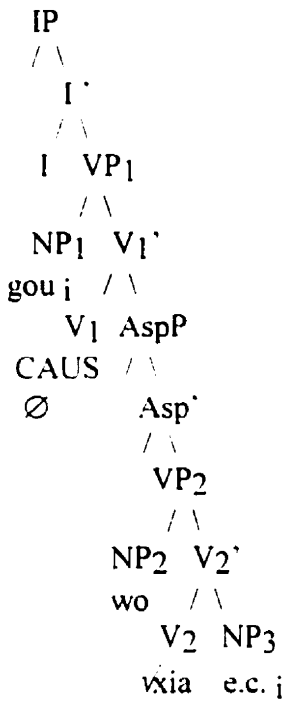
3.1.1.2.1 EO verbs

With the previous discussions of different θ-grids, different semantic structures and different templates for psych verbs, I now turn to the details of D-structures of the two classes of EO verbs. I start with synthetic EO verbs in the sentence (1b), repeated in (25a), for which I suggest D-structure (25b). [40]

(25) a. Gou xia wo (=1b)
dog frighten I
'The dog frightens me'

[40] As pointed out in Footnote 28, there are only a very small number of synthetic EO verbs in Chinese, therefore we may simply concentrate on the productive pattern of periphrastic EO verbs and treat synthetic EO verbs as exceptions. However, since a uniform analysis is to be proposed, aiming at capturing not only the data in Chinese but also the data in English and French which do show a productive pattern of synthetic EO verbs, I take synthetic EO verbs as a starting point.

b.



As discussed in Chapter 1, θ-assignment must observe the Projection Principle which states that lexical information should be syntactically projected at all levels and the Theta Criterion which requires each theta-role of a predicate to be assigned to only one argument. Following Grimshaw (1990), Y.Li (1990) proposes the Theta-Role Prominency which claims that the less prominent theta-role should be assigned prior to the more prominent theta-role. With the above assumptions in mind, let us first look at θ-assignment at the D-structure in (25b).

Here, the zero causative morpheme CAUS takes the head position of the higher VP and *vxia* "frightened" the head position of the lower VP. Following Pesetsky (1995), I assume that the root *vxia* is an ES predicate, which has the θ-grid [Experiencer, Target/Subject Matter], as formulated in (18b). Based on the Projection Principle, the Theta Criterion and the Theta-Role Prominency, these two theta roles must be assigned to two separate arguments, with the T/SM assigned to NP_3 first and the Experiencer to NP_2 second, since the T/SM is less prominent than the Experiencer in accordance with the thematic hierarchy such as (19). While the morpheme CAUS is phonologically null, it

assigns a Causer role to NP_1. Thus, the θ-grid of the EO verb *xia* is [Causer, [Experiencer, Target/Subject Matter]], with the T/SM being covert in surface.

With respect to Case-assignment, since CAUS is phonologically null, it cannot assign structural Case to NP_2 as argued in Chen (1993). Thus, *xia* has to move, via the head of AspP, to the position of V_1 to incorporate with CAUS. As a result, the incorporated V_1+V_2 becomes a causative psych verb which can assign accusative Case. At the same time, NP_2 *wo* "I" moves to the Spec of AspP, a landing site for a derived object according to Travis (1991). *Wo* receives accusative Case from the incorporated causative EO verb *xia* . NP_1 *gou* "dog" gets nominative Case from INFL in the Spec of VP_1.[41] NP_3 cannot be Case marked by any means, as *xia* has moved up and only left a trace in situ, which cannot assign Case. As will be argued below, NP_3 is a special empty category, which can be exempt from the Case requirement at this position.

One might wonder why such an e.c. is needed in the D-structure of (25b); what kind of null element this e.c. is; and what has allowed this e.c. to be coindexed with NP_1. First, the need of having the argument of NP_3 follows directly from the interaction of some interrelated principles, such as the Projection Principle, the Theta-Role Prominency and the Theta Criterion. If NP_3 is not in syntax at (25b), how can the projection of *xia*, particularly the T/SM role be satisfied? If the projection of *xia* is not met, or only partially met by the assignment of the theta-role of Experiencer to NP_2 directly, how can the Theta-Role Prominency be observed? If the Projection Principle is not well observed, how can the Theta Criterion be respected?

Second, a piece of evidence for having [e.c.] in NP_3 comes from the interpretation of sentences with periphrastic EO verbs like (2b), repeated in (26).

(26) Zhe chang yinyuehui shi wo hen shiwang
this CL concert make I very disappoint
'This concert disappointed me a lot'

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[41] As suggested by Koopman and Sportiche (1991), Chinese is a Class II language which can receive governed Case from INFL at Spec of VP, while in English, as a Class I language, the specifier of NP has to move up to Spec of IP to get agreement Case from INFL.

(26) has only one reading, "I am disappointed at the concert". The sentence cannot mean that I am disappointed at something that is not related to the concert. A similar observation can be seen in Baker (1988b: 27, 1995:32), who provides the representation (27) for the English EO verbs like *frighten* in a sentence like *The ghost frightens Mary* along the lines of Jackendoff's (1990) decomposition of verbs, in which the identification of X means that "the ghost is both the cause and the object of emotion". Thus, the reading of the sentence is "the ghost caused Mary to have fear of the ghost". This suggests that there must be some sort of argument that bear this kind of thematic information. As this argument is not overtly realized in the surface, the only possibility is that this argument is a null element.

(27) Frighten: CAUSE (x, GO_{psych} (y,TO (FEAR <OF (x)>)))

Third, the presence of this [e.c.] can be further supported by Tagalog causative sentences with **pagpa-**, as argued by del Pilar (1993: 18).[42]

(28) Nagpahikayat si A_i kay B [e_i] na bumili PRO ng bahay
At-pagpa-perf-persuade nom A obl B COMP AT-buy acc house
'A caused B to persuade A to buy a house'

Assuming that object control is a universal property of the verb *persuade*, del Pilar provides her crucial argument from Control Theory (Chomsky 1981). If there is an overt NP in the object position of the verb *persuade*, this NP serves as the object controller of PRO: if nothing were present here, PRO would not be controlled and the sentence should be bad. Since this is not the case, then some element must be there to make the sentence good. The only conclusion is that a phonetically unrealized element exists here. As for to what type of null element this [e] belongs, del Pilar claims that it is a kind of pro.

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[42]AT=Agent topic marker; perf=perfective aspect marker; nom=nominative Case marker; obl=oblique Case marker; acc=accusative Case marker.

Next I will discuss what this e.c. is with respect to the current typology of null elements which includes (i) NP-trace; (ii) PRO; (iii) pro and (iv) variable (Chomsky 1981, 1982). First, this e.c. cannot be an NP-trace, because it is base-generated, and is not the result of movement. Second, this e.c. cannot be a PRO, because it stays in a governed position, receiving the theta role of T/SM there. Third, this e.c. cannot be a variable, because the subject of the verb is its antecedent which would be a violation of Principle C which requires R-expressions (including variables) to be free anywhere. Now the only possibility left is pro. Is this e.c. a pro?

In syntax if this e.c. is pro, it should be free in its governing category (i.e., the root sentence) due to Principle B which requires pronouns, overt or nonovert, to be free in their governing category. But this is not true as seen in (25b) where NP_3 is coindexed with NP_1. Meanwhile, Chinese and English psych verbs require this e.c. to have an "anaphoric interpretation" (del Pilar 1993), viz, to be bound by the subject NP. This conflict between syntax and semantics forces us to conclude that this e.c. cannot be a pro either. Indeed, the existence of pro in this context is ruled out if Rizzi's (1986) Case module is assumed. According to Rizzi, while pro is an empty category, it must be Case marked, i.e., formally licensed through Case assignment by a designated head. Baker (1991) also assumes that pro in Mohawk must be assigned Case, and this Case-assignment is done at the level of LF, though in D-structure and S-structure the Case features of the pro are absorbed by the agreement morpheme in this language. As the trace of *wia* cannot assign Case to NP_3, this e.c. is in a Caseless position, in which pro cannot stay. Hence, the e.c. is not an ordinary pro.

Travis (To appear) proposes that there is an anaphoric pro which is an empty reflexive or empty anaphor (named ana) in contrast with the empty pronoun (pro). The main evidence for this type of null element comes from the causative construction in Tagalog. According to Travis, this empty reflexive is bound by a subject antecedent and is licensed by the causative morpheme **-pag-** in INFL through the movement of anaphoric

pro at LF. Here, following Travis, I claim that the e.c. in (25b) is an anaphoric pro. [43] Along with Travis, I assume that the anaphoric pro here is licensed by CAUS and gets "long distance" bound by the subject, i.e., NP_1. [44]

Now it is clear why there should be an e.c. at the position of NP_3 in (25b). As that position is Caseless, an ordinary pro cannot occur. Obviously, no lexical NP can appear in that position because there is no Case. However, an anaphoric pro which needs no Case can take that position. As an anaphoric pro, NP_3 is bound by NP_1. This explains why the Causer also has the interpretation of Object of Emotion and why the T/SM can only be identical to the Causer in such cases.

The anaphoric pro, which only presents the feature [+ anaphor], does not fall under the current typology of empty categories within the GB framework, but the addition of this extra element into the paradigm of null elements is appealing. Theoretically it directly eliminates an otherwise unusual asymmetry between lexical and empty reflexives if the symmetry of lexical and empty pronoun is taken into consideration. Empirically the proposal of anaphoric pro is reinforced by the data of causatives and resultatives in Chinese. [45]

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[43] As suggested by José Bonneau (personal communication) there is an alternative way to look at this [e.c.]. That is, the [e.c.] is a null operator in reconstruction proposed by Browning (1987). According to Browning, a null operator presents the nature of a zero reflexive (i.e., anaphoric pro) in the sense that it gets licensed by the subject of the sentence. Since this proposal of null operator is based on the biclausal structure, for which there is little evidence for the Chinese data in question, I will not explore this possibility in the present study.

[44] Since the anaphoric pro is "long-distance bound", it follows naturally that NP_1 but not NP_2 serves as the antecedent. Pan (1994, 1996) noted that Chinese allows both animate and inanimate NP to be the long-distance antecedent. Thus, there is not any problem for NP_3 to be bound by the inanimate NP_1.

[45] In Chen's (1995a) analysis of the Chinese causatives and resultatives shown in (i), an anaphoric pro is assumed, which receives the theta role of Theme.

(i) a. zhe bei jiu he le Fangfang yi zheng ye
this CL wine drink ASP Fangfang one entire night
'This glass of wine made Fangfang drink (it) the whole night'

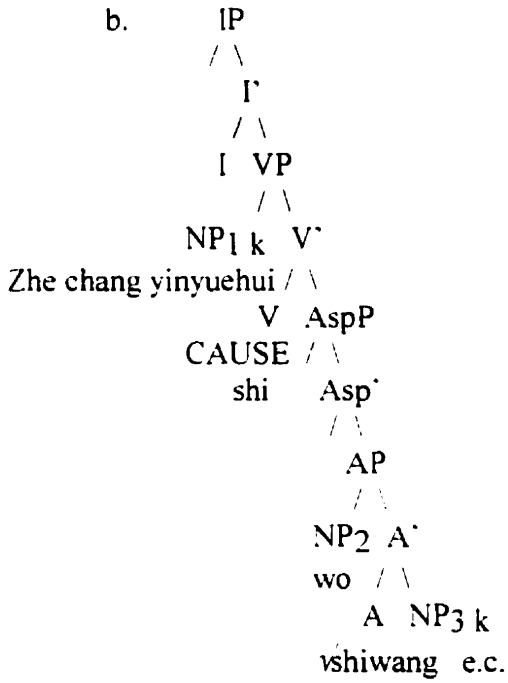
b. zhe bei jiu he-zui le Fangfang
this CL wine drink-drunk ASP Fangfang
'This glass of wine made Fangfang drink (it) and she got drunk'

The assumption of an anaphoric pro in these two cases enables the sentences to be correctly interpreted in the following way. *Jiu* "wine" is both something that caused *Fangfang* to drink and something that *Fangfang* drank in (ia) and (ib), but *Fangfang* is always the person who drank the wine.

Now let us go on to look at the periphrastic EO verb like (2b), repeated in (29a). I suggest a D-structure like (29b) where the upper VP is headed by a phonologically overt verb *shi* and there is an AP projected instead of a VP.

(29) a. Zhe chang yinyuehui shi wo hen shiwang (=2b)
this CL concert make I very disappoint
'This concert disappoints me a lot'

b.



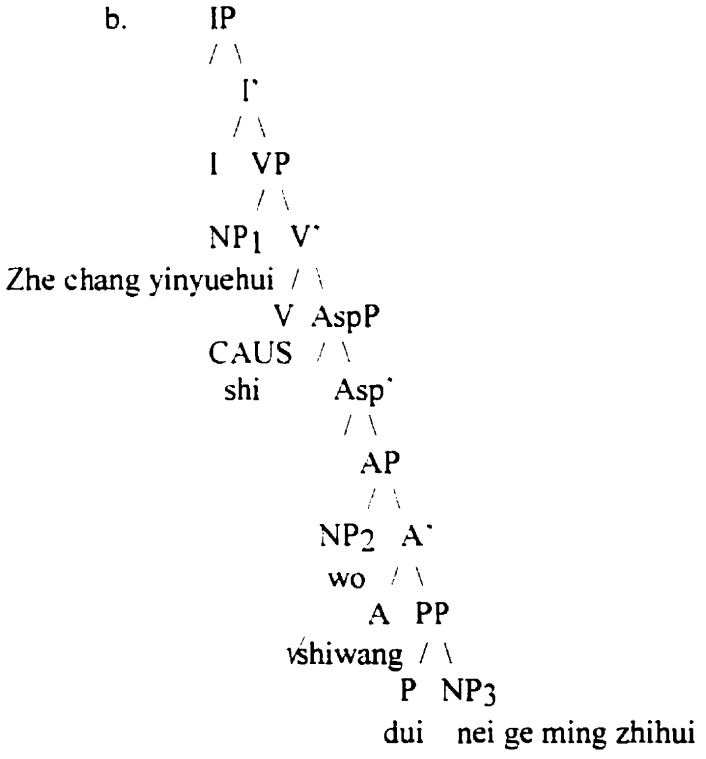
Here, the causative morpheme CAUS is phonologically realized by *shi* which selects an AP. According to (24b), the adjective *√shiwang* has two theta-roles to assign. The T/SM is assigned to NP_3 first and the Experiencer to NP_2 second. CAUS *shi* assigns the Causer role to NP_1. Since periphrastic EO verbs do not require the root to incorporate with CAUS, the root *√shiwang* just moves to the head of AspP. For Case-assignment, since the causative morpheme is filled by the verb *shi* "make", this overt CAUS is qualified to assign accusative Case to NP_2 *wo* "I" which moves up to the Spec

of AspP. NP_1 *zhe chang yinyue hui* "this concert" receives nominative Case from INFL, while NP_3, being an anaphoric pro, needs no Case. As a result, (29a) is produced.

For the sentence with an overt T/SM like (15a), repeated in (30a), I suggest D-structure (30b) which is expanded from D-structure (29b) by having the head of the AP selecting a PP as its complement. This is in accordance with the template of the subcategorization and selection of arguments for adjectives illustrated in (24).

(30) a.Zhe chang yinyuehui shi wo dui nei ge ming zhihui hen shiwang
this CL concert make I to that CL famous conductor very disappointed
'This concert made me disappointed at that famous conductor'

b.



In (30b), everything else is the same as D-structure (29b) except the fact that the root *√shiwang* selects a PP rather than an NP. Again, *√shiwang* has two theta-roles to assign (i.e., the T/SM and the Experiencer). Concerning the θ-role that NP_3 *nei ge ming zhihui* "that famous conductor" receives, it has the role of T/SM. But the T/SM is not

assigned by the preposition *dui* itself. It is somehow transmitted from the adjective *shiwang* to the preposition *dui*. As a preposition, *dui* is able to Case-mark NP_3. *Wo* "I" receives the role of Experiencer and it moves to the Spec of AspP to get accusative Case from the verb *shi*. [46] Under this approach, the cooccurrence of an overt T/SM with the Causer for Chinese periphrastic EO verbs is a direct consequence of realization of arguments subcategorized by adjectives. This predicts that only when the root is an EO adjective, can a PP be selected and the T/SM occurs together with the Causer.

Regarding the ungrammatical sentences like (14a) which involve the T/SM violation with synthetic EO verbs, our explanation is as follows. In the case of synthetic EO verbs, the zero CAUS must take a VP as its complement in accordance with (20a). For this kind of VP, only an NP is subcategorized as the internal argument. Since PP is not selected, it cannot occur. Hence, an overt T/SM is not allowed. The only T/SM that could occur is the anaphoric pro. If this analysis were correct, the T/SM violation with synthetic EO verbs follows from the selectional restriction of these particular verbs, which, in turn, is crucially decided by the existence of the zero CAUS.

Now let us turn to look at how this analysis accounts for the binding facts with EO verbs given in (10-11), repeated in (31) and (32) respectively.

(31) a. Fangfang$_i$ de chenggong zhenfen le ziji$_i$ (=10a)
Fangfang DE success excite ASP self
'Fangfang's success excited herself'

b. Ziji$_i$ de chenggong zhenfen le Fangfang$_i$ (=10b)
self DE success excite ASP Fangfang
'Her (own) success excited Fangfang'

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[46] To get the surface word order like (30a), the PP has to prepose before the root through a reanalysis in the sense of Y-H. A. Li (1990). According to Y-H. A. Li (1990: 11), postverbal PPs are not acceptable in Chinese due to the Chinese Word Order Constraint which states that Chinese is head-final except under the requirements of Case assignment. Thus, a PP which is a nonhead constituent should precede its head (See W. Wang (1996) for a different analysis of the *dui* construction).

(32) a. Fangfang$_i$ de chenggong shi ziji$_i$ hen xingfen (=11a)
Fangfang DE success make self very excite
'Fangfang's success made herself very excited'

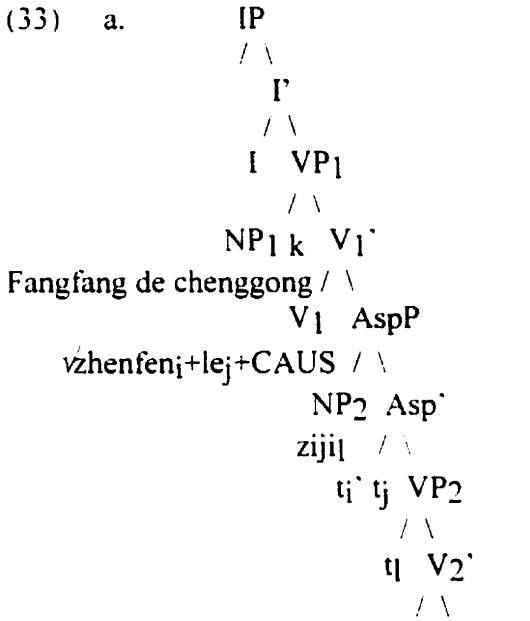
b. ziji$_i$ de chenggong shi Fangfang$_i$ hen xingfen (=11b)
self DE success make Fangfang very excite
'Her (own) success made Fangfang very excited'

Here, I will explain the binding facts based on the two assumptions. First, as proposed by Belletti and Rizzi (1988) and also adopted by Pesetsky (1995), Principle A is an anywhere principle. This means that Principle A can apply wherever it is satisfied and the application outcome remains well-formed even though the c-commanding relation between the antecedent and the anaphor is violated in the surface structure as a result of movement. Second, as claimed by Barss (1986) in his chain-binding theory, Simplified and extended somewhat, if an antecedent contained in an object position c-commands an NP trace left by the NP that contains the anaphor and that moves to the subject position in a surface structure, the antecedent can bind the anaphor backwards through the chain.

(31) shows the examples with the synthetic EO verb *zhenfen* "excite".[47] The property of forwards binding in (31a) is accounted for by the structure in (33a). In (33a), *Fangfang* sub-commands *ziji* (because *Fangfang* is contained in the NP *Fangfang de chenggong* which c-commands *ziji* based on (13b)), satisfying the binding condition stated in (12). With the property of backwards binding in (31b), in S-structure (33b), since NP_2 *Fangfang* c-commands NP_3 which is in turn coindexed with NP_1, NP_2 can bind the anaphor in NP_1 backwards through the coindexation chain. In other words, *Fangfang* can bind *ziji* by means of NP_3 which is both sub-commanded by *Fangfang* and coindexed with *ziji de chenggong*. Thus, backwards binding is accounted for.

[47] Following Travis (1991) that the AspP indicates whether or not an action is completed, I assume that the aspect marker *le* is base-generated in the head of Asp and it moves to the higher VP in S-structure.

(33) a.



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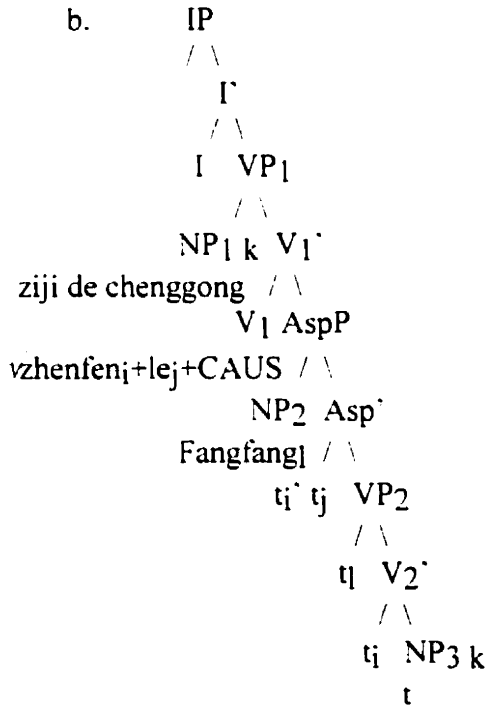

Note that unlike NP_3 at the previous D-structures (i.e., 25b and 29b) which is argued to be an anaphoric pro, here NP_3 in the S-structures of (33) is a trace left by the anaphoric pro. As argued before, following Travis (To appear), I assume that this anaphoric pro must move to V CAUS at S-structure where it gets licensed by CAUS. The

motivation for this anaphoric pro to move to V CAUS at S-structure is two-fold: (i) as a pure anaphor, the anaphoric pro needs to be licensed along the lines of Pica (1987), namely anaphors must move to get interpretation since they are defective categories; (ii) the anaphoric pro requires an antecedent for correct interpretation. [48] In this way, NP_3 is interpreted as sort of an NP-trace of the subject at S-structures in (31). The anaphor *ziji* gets bound backwards by the antecedent *Fangfang* through the extension of Barss' (1986) chain-binding, since the trace here is left by an anaphoric pro, while, on Barss' account, the trace is left by an NP that contains the anaphor. [49]

The examples in (32) are periphrastic EO verbs. They are different from synthetic EO verbs only in that the causative morpheme CAUS is phonologically full. But the realization of the causative morpheme by *shi* does not affect the binding relation between antecedent and anaphor. Therefore, the account of binding facts with synthetic EO verbs can apply to periphrastic EO verbs as well. The corresponding S-structures for (32) are

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[48] There might be another motivation for the anaphoric pro to move. If we follow Raposo (1987), we may also consider that this anaphoric pro gets long-distance Case assignment. According to Raposo, the inflected infinitive in European Portuguese requires Agr to be specified for Case. Raposo proposed several means to Case mark Agr in the infinitival clause depending on where the infinitival appears. The central idea is that Case is transmitted to Agr in the infinitival clause via chain formation. For instance, in an extraposed subject clause like (ia), the extraposed clause and a null expletive pronoun in subject position form a chain at S-structure (ib). Thus, nominative Case is assigned to the null expletive pronoun by $Infl_2$ and is transmitted via chain formation to the coindexed extraposed clause. This Case percolates down to $Infl_1$, the head of the clause.

(i) a. Será difícil [$_{IP}$ eles aprovar*em* a proposta]
'It will be difficult that to-approve-Agr the proposal'

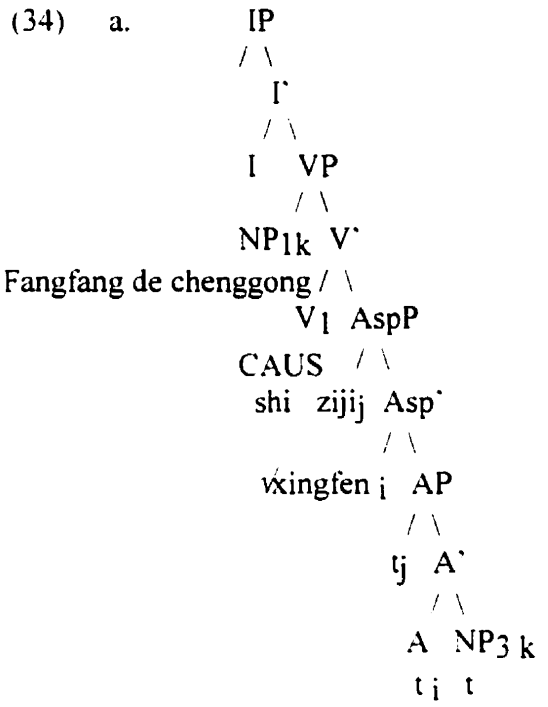
b. pro$_i$ [$_{I'}$ $Infl_2$ será difícil [$_{N^{max}}$=$_{IP}$ eles [$_{I'}$[$_{I}$ Agr]$_1$ aprovar a proposta]]$_i$]

The idea of Case chain is further developed in Raposo and Uriagereka (1990), who proposed a mechanism of a long-distance Case assignment, through which nominative Case is available to the nonraised subject of prepositional small clauses. For the technical details of how the anaphoric pro moves to get long-distance Case in our case, I will leave open for further research.

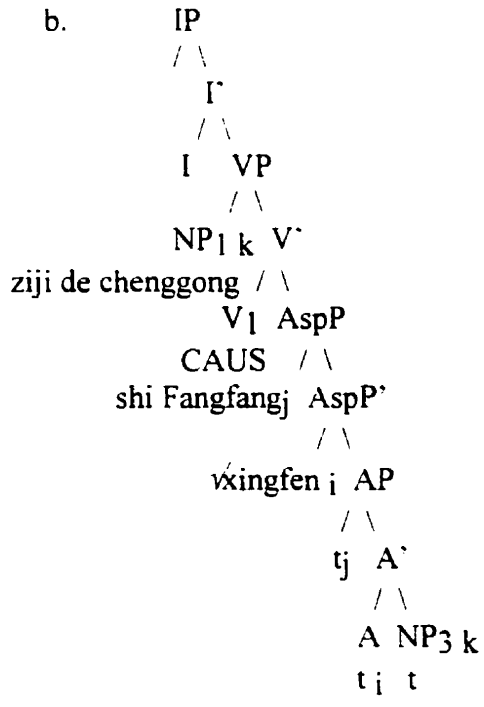
[49] One might raise a question that poses a problem for the chain theory in Chomsky (1986a, 1986b). According to Chomsky, a chain is defined as having one θ-role. If this is followed strictly, then the same coindexing of NP_1 and NP_3 in our case is not a real chain, because NP_1 and NP_3 each receive its own θ-role. Regarding this problem, I do not have any ideas to suggest except a stipulation. That is, since NP_3 is argued to be an anaphoric pro, which is in a Caseless position and which moves to get licensed by CAUS, the trace left by this anaphoric pro presents some nature of NP-trace at S-structure. Thus, this kind of chain can be exempt from a strict observation of the chain criterion. Further research on the anaphoric pro will contribute to our knowledge in this regard. Baker (1995) has noticed this problem as well as the question of determining what kind of empty category NP_3 is, but he also has to rely on the notion of an empty category and Barss' (1986) mechanism of chain-binding to capture the backward binding phenomenon with psych EO verbs. While an analysis of this kind is problematic in some aspects, Baker (1995:32) remarks that "it seems to have more or less the right cluster of properties to explain the behavior of *frighten*-class psych verbs, as well as being consistent with an absolute UTAH".

given in (34). In (34a), *Fangfang* sub-commands *ziji*, thus, forwards binding is accounted for; in (34b), NP_2 c-commands NP_3 which is in turn coindexed with NP_1, NP_2 can bind an anaphor in NP_1 backwards through the coindexation chain. In other words, *Fangfang* can bind *ziji* by means of NP_3 which is both sub-commanded by *Fangfang* and coindexed with *ziji de chenggon*. Thus, backwards binding is accounted for.

(34) a.



b.



To summarize what has been discussed so far, I have shown how the D-structures proposed in (25b), (29b) and (30b) are able to handle the sentences with synthetic EO verbs, with periphrastic EO verbs, and with periphrastic EO verbs taking the T/SM argument. When EO verbs are synthetic, an anaphoric pro is proposed to receive the T/SM argument in D-structure. As this argument is a special empty category which needs no Case, it is not overt in S-structure. With synthetic EO verbs which can only select an NP as the internal argument, a PP is not allowed to bear the T/SM role, accounting for the T/SM restriction observed with this structure. When EO verbs are in the periphrastic structure, the T/SM can be realized by a PP subcategorized by the adjectival predicate. This explains why there is a possible cooccurrence of an independent T/SM and the Causer in the periphrastic construction. I have also demonstrated how the proposed analysis allows S-structures in (33) and (34) to account for the forwards and backwards binding facts with Chinese EO verbs, both synthetic and periphrastic. Crucially, Barss' (1986) chain-binding is extended to explain why the anaphor in the subject position can be bound backwards by the antecedent in the object position, when the antecedent c-commands the trace of the anaphoric pro which is coindexed by the subject NP.

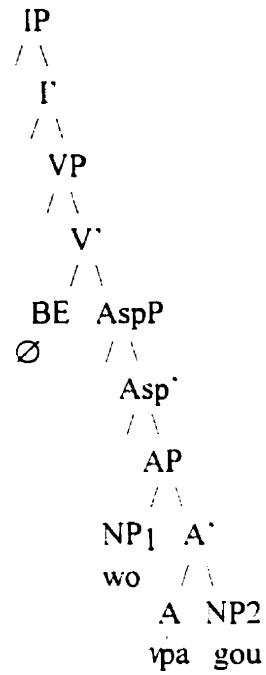
3.1.1.2.2 ES Verbs

For ES verbs such as in (1a), repeated in (35a), I suggest (35b) as the D-structure. As argued above, *√pa* "fearful" is an adjective, therefore, it requires a zero copula BE to form a verb according to the pattern in (20c).[50] The empty copular BE does not assign any theta role. But *√pa* has two theta roles to assign (the Experiencer and the T/SM). The T/SM is assigned to NP_2, and the Experiencer to NP_1. To become an ES verb, *√pa* raises up to incorporate with BE. Accordingly, NP_1 *wo* "I" moves to the Spec of VP, receiving nominative Case from INFL, while NP_2 *gou* "dog" moves to the Spec of AspP to receive

[50] Pesetsky (1995) uses "√" to denote a bound root. Here "√" is also used, which means that the morpheme is a root, but not a bound morpheme.

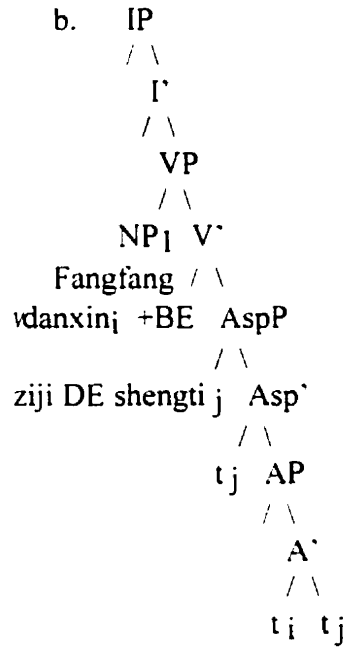
accusative Case from the incorporated verb *pa* "fear", where the root *√pa* is a Case-assigner.

(35) a. Wo pa gou (=1a)
I fearful dog
'I fear the dog'

b.


With ES verbs, only forwards binding is observed, as in (9a), repeated in (36a). This kind of binding fact can be simply explained at S-structure (36b) where *Fangfang* c-commands *ziji de shengti*. Since there is no backwards binding involved in this type of psych verbs, no more discussion is needed.

(36) a. Fangfang$_i$ danxin ziji$_i$ de shengti (=9a)
Fangfang worry about self DE health
'Fangfang worries about her (own) health'



In summary, I have proposed different D-structures for EO and ES verbs. Both types of verbs are adjectival in Chinese (with the EO type being intransitive and the ES type transitive) and become verbal by incorporating into a certain verbal morpheme. The essential difference between the two classes is as follows. EO verbs are causatives, therefore, there is a projection of a causative verb CAUS which selects a Causer. For the synthetic EO type (very few in number), the CAUS which is phonologically null selects a VP as its complement; thus, there is a structure of double VP. As the lower VP can only subcategorize an NP but not a PP as its internal argument, the occurrence of an independent T/SM with this type of EO verbs is excluded. For the periphrastic EO type, the CAUS which is phonologically realized by *shi* selects an AP; thus, a structure of a VP and an AP is projected. Since the root for the periphrastic EO verbs is adjectival, it can require a PP to realize its T/SM argument. Hence, the cooccurrence of the T/SM argument with the Causer in Chinese follows. No matter whether they are synthetic or periphrastic in form, an anaphoric pro is assumed at D-structure, which crucially captures the facts of unusual backwards binding at S-structure through the extension of chain-

binding mechanism. In contrast, ES verbs are noncausative. There is no projection of CAUS, but a projection of abstract copula BE which selects an AP. How is this account able to accommodate the data in English? I turn to this question in the next section.

3.1.2 Psych Verbs in English

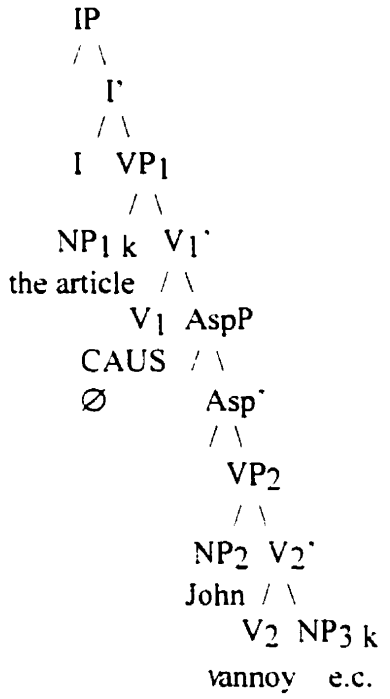
In this section I will extend the analysis for Chinese psych verbs to English psych verbs. First, let us look at EO verbs. As pointed out before, English and Chinese are basically the same except that English uses synthetic EO verbs productively, while Chinese uses periphrastic EO verbs productively. To capture the English data, the crucial thing is to show that the current analysis is able to explain why sentences like (37a), (37c) and (37d) are grammatical and why sentences like (37b) are ungrammatical.

(37) a. The article annoyed John
b. *The article annoyed John at the government
c. The article made John angry (at the government)
d. The article about himself annoyed John

The sentence (37a) is accounted for by D-structure (38) which is the same as (25b). Here, the higher VP is headed by a zero CAUS and the lower VP is headed by an ES predicate *vannoy*. *vannoy* assigns the T/SM to NP_3 and the Experiencer to NP_2. The head of the upper VP (i.e., VP_1) selects NP_1 as the Causer. To form a causative EO verb *annoy*, *vannoy* has to move to V_1 via the head of AspP and assigns accusative Case to NP_2 which moves to the Spec of AspP. NP_1 gets nominative Case from INFL after it moves to the Spec of IP. As argued before, NP_3 is an anaphoric pro, which needs no Case. Hence, it is not overt in surface.

(38) a. The article annoyed John (=38a)

b.

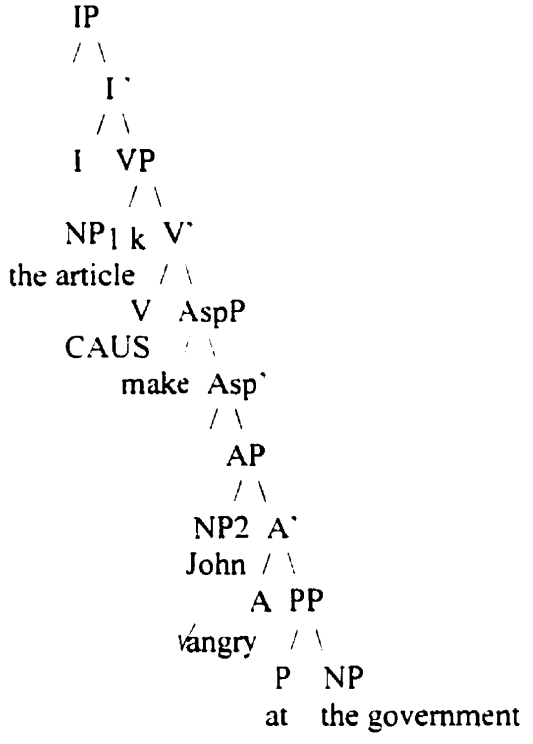


The ungrammaticality of (37b) can be simply accounted for as follows: Since the root *√annoy* is verbal in category, it can only take a null NP as its internal argument according to (21b). Therefore, the prepositional phrase *at the government* is not allowed to occur in the argument structure of *annoy*. Hence the ungrammatical sentence is ruled out. Only an NP that is an anaphoric pro is subcategorized and it takes the T/SM argument. No lexical NP can occur here, because it would violate the Case Filter. No PP is allowed either, because the null CAUS can only select a VP which cannot subcategorize a PP.

As for the grammatical periphrastic counterpart like (37c), the causative verb is phonologically realized by *make* which takes an AP headed by the adjective *angry*. An adjective can select a PP as one of its arguments according to (22b). In this way, the prepositional phrase *at the government* is allowed to occur in the structure as the complement of the AP, as shown in (39).

(39) a. The article made John angry at the government (=37c)

b.

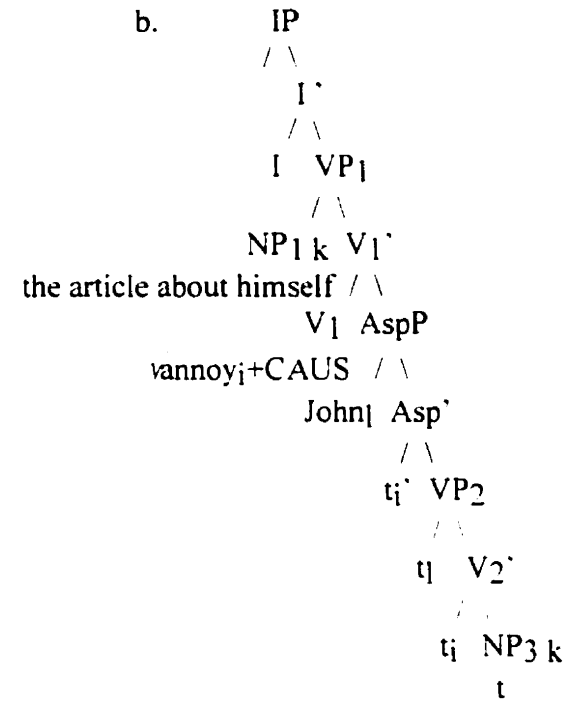


One might argue that some verbs in English do take PP arguments, for instance, *appeal to, care for, occur to*. While these verbs take an Experiencer as their dative objects, they are not causative Experiencer verbs like the ones that are of concern in the present work. Some other psych verbs such as *delight in, grieve over/at, puzzle over, worry about* also take a PP as one of their arguments such as in *delight in one's company, grieve over the great loss, puzzle over the math problems, worry about one's health*. But note that, again, these psych verbs are not causative EO verbs either (and there are just four in number). On the contrary, they belong to the ES class which does not contain a zero CAUS (as demonstrated before and will be discussed below). Indeed, the causative counterparts of these ES verbs are the ones that cannot take the prepositional particles such as in the following sentences taken from Pesetsky (1995: 73). *His new-found wealth delighted Bill, The court decision grieved Sue, Sue's remarks puzzled us, The television set worried John.*

The backwards binding facts in (37d) are explained in the same way that the Chinese counterparts are accounted for using (34b), which I will repeat here in (40b).

(40) a. The article about himself annoyed John (=38d)

b.



In (40b), *John* c-commands NP_3, which is coindexed with NP_1 that contains the anaphor *himself*; therefore, *John* can bind *himself* backwards through the coindexation chain between NP_3 and NP_1.

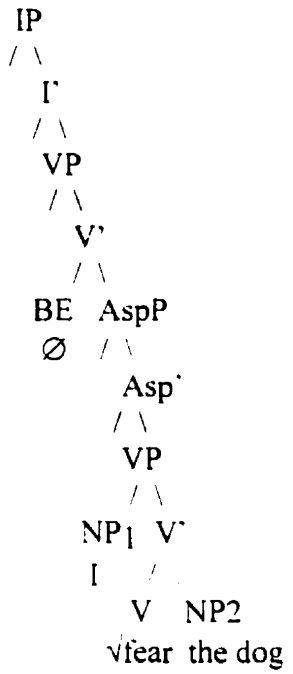
Now let us look at English ES verbs. Regarding sentences with ES verbs such as (41a), the D-structure is (41c), just the same as the one for the Chinese counterpart in (35b). While *fear* is a verb in English, which is unlike Chinese *pa*, it can still be lexically decomposed into the root *√fear* and the head BE in accordance with Hale and Keyser's (1991, 1993) theory of Lexical Relational Structure. *√fear* assigns the T/SM to NP_2 and the Experiencer to NP_1. *√fear* moves to incorporate with BE, forming the verb *fear*. NP_2 *the dog* gets accusative Case from the incorporated ES verb *fear* when it moves to the Spec of AspP, while NP_1 *I* gets nominative Case from INFL when it moves to Spec of IP.

The phenomenon of forwards binding in (41b) can be explained in the corresponding S-structure (41c), whereby the c-command condition is observed.

(41) a. I fear the dog

b. John likes himself

c.



Up to now we have shown how the properties of English psych verbs can be captured by the analysis proposed for Chinese psych verbs. Just like the way in which Chinese EO verbs were handled, in particular, with respect to the property of the T/SM, the account of the T/SM with English EO verbs is also very straightforward. In the case of synthetic EO verbs, since the zero CAUS in these verbs selects a VP, and since this VP can only subcategorize an NP, the bad sentence involving the T/SM is ruled out. As for periphrastic EO verbs, since the overt causative verb only selects an AP, and since this AP may subcategorize a PP, there is no T/SM violation, because the T/SM argument can be realized in the PP.

Under this account, the analysis of the T/SM violation with synthetic EO verbs and the nonviolation of the T/SM with periphrastic EO verbs simply follows from the subcategorization and selectional restrictions of EO verbs. The current treatment of the

T/SM violation is simpler and more adequate than Pesetsky (1995). Recall that Pesetsky tried to exclude the cooccurrence of the T/SM argument with the Causer in synthetic EO verbs, but include it in periphrastic EO verbs by the Head Movement Constraint (Travis 1984). However, this analysis fails to capture the backwards binding phenomenon observed with the periphrastic construction. My analysis, using anaphoric pro, captures both the T/SM and the backwards binding properties. To summarize this uniform analysis of the T/SM problem, the following generalization is formulated.

(42) a. When V CAUS selects a VP, there is a T/SM restriction
b. When V CAUS selects an AP, there is no T/SM restriction

Since when to select a VP and when to select an AP relies heavily on the phonological content of this CAUS, (42) can be furthermore generalized as (43).

(43) a. When V CAUS is phonologically null, a VP must be selected, hence a T/SM restriction

b. When V CAUS is phonologically realized, an AP must be selected, hence no T/SM restriction

One might challenge the generalization by arguing that when the V CAUS is phonologically full, such as the causative verb *make*, it may also select a VP, as shown by the following examples. Furthermore, in this kind of structure, the overt causative verb *make* allows an NP to bear the T/SM argument, as illustrated in the same examples.

(44) a. The news made John fear the government
b. The news made John dislike the government
c. The news made John hate the government

It is crucial to note that the VPs selected by *made* in (44) are all ES verbs. Recall that the so-called T/SM restriction refers to the fact that the theta role of T/SM and the

theta role of Causer cannot overtly cooccur in one single predicate. Therefore, this restriction is only relevant with synthetic EO verbs, where CAUS and Causer are involved. With ES verbs, the T/SM violation does not arise, because there is no CAUS, and thus no Causer argument is concerned. Although there is a Causer and also a T/SM in the structures like (44), these two arguments are selected by two separate overt predicates respectively, thus the cooccurrence of the Causer and the T/SM in the periphrastic construction does not constitute a T/SM restriction. This suggests that the generalization proposed in (43) only applies to the class of EO verbs, which, in turn, implies that examples in (44) do not pose any problem for (43).

Moreover, in the case of (44) where an ES VP is selected by the causative verb *make*, it is noteworthy that ES verbs are similar to adjectives in terms of theta-role assignment. Namely, both assign an Experiencer and a T/SM. Thus, it is natural that the periphrastic structure taking an EO adjective and the periphrastic structure taking an ES verb may allow the T/SM to cooccur with the Causer. This also suggests that with the periphrastic psych construction, the root is always noncausative.[51]

In fact, each ES verb in (44) can be considered as sort of an adjectival predicate. For instance, (44a) can be paraphrased as "The news made John fearful of/afraid of the government", (44b) can be interpreted as "The news made John antagonistic toward the government", and (44c) can be rephrased as "The news made John hateful of the government". The fact that only adjectives or adjective-like ES verbs are allowed in the

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[51] This prediction is borne out by the English examples in (i), which are bad due to the fact that causative EO verbs are selected. This may be related to another big issue, which cannot be explored in this work. That is, periphrastic EO verbs cannot be agentive, as seen in (ii), where the adverbial *deliberately* which describes the intention of the subject makes the sentences ungrammatical.

(i) a. *The article made the government frighten John
b. *The article made John frighten the author
c. *The author made the article frighten John

(ii) a. *The article deliberately made John frightened (at the government)
b. *The clown deliberately made the child amused

As noted in the literature, synthetic EO verbs, crosslinguistically, also present an agentive reading and when they bear this reading, they do not exhibit the property of backwards binding.

periphrastic structure in English is consistent with the data of Chinese, which show the adjectival nature of ES and EO verbs.

It seems that the generalization formulated in (43) holds true not only for Chinese and English EO verbs, but also for French EO verbs (that are to be discussed in the next section), and appears to be true for Japanese, Polish, and Spanish EO verbs. However, if this generalization were correct, then an answer is definitely required to explain why there is such a generalization. A crosslinguistic examination of EO verbs would provide further insights into this issue. For the rest of the thesis, wherever the generalization is referred, I will not include the seemingly problematic cases like (44).

In this section, it has also been shown that the analysis arrived at for Chinese EO verbs is able to explain backwards binding with English EO verbs. In the next section, we will examine whether this same analysis can be extended to French psych verbs.

3.1.3 Psych Verbs in French

Some data on French psych verbs are given in (45).

(45) a. Jean blâme l'article
Jean blame the article
'John blames the article'

b. L'article énerve Jean
the article annoy Jean
'The article annoys Jean'

c. Marie manque à Jean
Mary misses Dat Jean
'Jean misses Mary'

d. *L'article énerve Jean contre le gouvernement
the article annoy Jean at the government
*'The article annoys Jean at the government'

e. *L'article fait énerver Jean contre le gouvernement
the article made annoy Jean at the government
'The article made Jean annoyed at the government'

f. L'article a rendu Jean énervé contre le gouvernement
the article has made Jean annoyed at the government
'The article made Jean annoyed at the government'

g. L'article écrit sur lui-même énerve Jean
the article about himself annoy Jean
'The article about himself annoys Jean'

(45) shows that French is quite similar to English in that both ES and EO verbs are encoded lexically with no morphological markers to distinguish between the two classes.[52] There are two types of EO verbs in French. A zero causative morpheme CAUS seems to exist with one type of EO verbs, as in (45b), taking an accusative Experiencer. The other type which takes a dative Experiencer is noncausative, as in (45c). Like English, the T/SM restriction is observed with the causative EO verbs, as illustrated in (45d). The periphrastic *faire* structure, i.e., (45e), does not allow the T/SM to cooccur with the Causer, whereas the periphrastic *rendre* structure does, as shown in (45f). As it is (45f) but not (45e) that observes the generalization in (43), I assume that the French counterpart of the English causative verb *make* is *rendre* rather than *faire*. Like English, backwards binding is observed with the class of causative EO verbs, as in (45g). [53]

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[52] One point is worth noting with regard to French psych verbs. Pesetsky (1995) claims that in French and Russian, EO verbs are zero-derived from ES verbs which have a clitic reflexive, for example, the French pair *s'étonner/étonner*. In other words, the causative EO verb *étonner* is derived from the reflexive form *s'étonner* by dropping the reflexive *se*. According to Pesetsky, the requirement that the reflexive disappears grew out of a requirement that this reflexive be controlled by the Experiencer, and an assumption that this relation requires the reflexive to be c-commanded by the Experiencer. If the clitic is not removed when the zero CAUS is added, the control requirement cannot be met.

[53] Zubizarreta (1985) noted that unlike English *make*, the French causative verb *faire* in the periphrastic structure has to select a bare infinitive based on the Principle of Morphological Nonredundancy (See Footnote 23 in Chapter 2 for the Principle). However, as pointed out to me by Philippe Prévost and José Bonneau (personal communication), with respect to psych verbs, even the bare infinitive cannot occur in the periphrastic *faire* structure, as shown in (45e).

Putting aside the question of why French has some noncausative EO verbs which take a dative Experiencer, and the question of why it is only *rendre* but not *faire* that may take an EO adjective, French psych verbs are just similar to English psych verbs with respect to morphological and syntactic properties. In other words, like English, French has a class of EO verbs which contain a zero CAUS, and thus, observes the T/SM restriction and backwards binding. Therefore, the analysis that accounts for the data of English psych verbs should also be able to accommodate the data of French. I will not repeat the details of the analysis here.

To sum up what has been discussed so far, I first proposed an analysis to explain the facts of psych verbs in Chinese. This account does not rely on any major NP-movement, but needs an anaphoric pro which crucially takes the responsibility of allowing the anaphor to be bound backwards by its antecedent alone the lines of chain-binding theory. I then demonstrated how the analysis is capable of capturing the data of psych verbs in English and French respectively. Through the discussion I have illustrated that the proposed analysis groups English and French psych verbs in one class and Chinese psych verbs in another. The two groups differ in that English and French have both synthetic and periphrastic EO verbs, whereas Chinese has just one type of periphrastic EO verbs with a few residual synthetic EO verbs. Periphrastic EO verbs in all the three languages take an overt causative verb and an adjectival root. Regarding synthetic EO verbs, Chinese, English and French all take a zero causative morpheme and a verbal root. The differences as well as the similarities among these three languages are shown to be captured in one uniform account.

3.2 Psych Adjectives

In this section, I will deal with psych adjectives across the three languages. As noted above in Chapter 2, psych adjectives also have the properties of flip and backwards

binding. That is, one type of adjective takes the Experiencer as subject and another type takes the Causer as subject. The class of adjectives that has a Causer subject also allows the T/SM restriction and backwards binding. To account for these properties, I will look at the facts in Chinese, English and French, starting with the Chinese data.

3.2.1 Psych Adjectives in Chinese

Chinese psych adjectives are illustrated in (46) and (47).

(46) a. Fangfang (dui zhe jian shi) hen shiwang
Fangfang to this CL matter very disappointed
'Fangfang is disappointed (at this matter)'

b. Zhe jian shi shi Fangfang hen shiwang
this CL matter make Fangfang very disappointed
'This matter is very disappointing to Fangfang'

(47) a. Fangfang (dui zhe jian shi) hen qifeng
Fangfang to this CL matter very annoyed
'Fangfang is very annoyed (at this matter)'

b. Zhe jian shi shi Fangfang hen qifeng
this CL matter make Fangfang very annoyed
'This matter is very annoying to Fangfang'

The above examples show that Chinese has just one class of adjectives, which can occur either in the ES construction, as in (46a) and (47a), or in the EO construction, as in (46b) and (47b). The adjectives occurring in the ES construction optionally take the T/SM argument preceded by the preposition *dui*, while the adjectives in the EO construction take a causative verb *shi*. Since the adjectives in (46a) and (47a) exhibit the same pattern as ES verbs, mapping the Experiencer to subject position, they are referred to as ES-like adjectives. The ones in (46b) and (47b) will be referred to as EO-like adjectives, as they

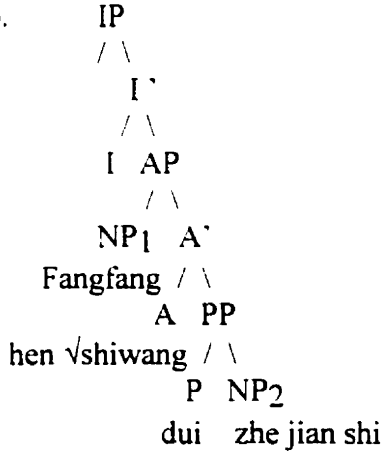
behave just like EO verbs, taking the causative *shi*. One thing is worth noting. The ES adjectives are exactly as they appear in the root of EO verbs.

Given that EO verbs are in fact EO-like adjectives in Chinese, there is no need to propose an additional account for this type of construction. The T/SM and backwards binding properties are as described in Section 2. However, some questions are worth thinking about. Namely, how do we look at adjectives versus verbs in Chinese? Is there any derivational relation between the two? If the answer to this question is yes, which is the original form and which is the derived form?

For the adjectives in the ES structure, since they are pure adjectives by the tests for adjectivehood shown at the beginning of Section 1, they can be accounted for by the following D-structure, which is actually a part of D-structure for the corresponding EO verbs in (25b). (48b) is the D-structure for (48a) with the overt T/SM argument, and (48c) is the D-structure for (48a) with a null T/SM argument.

(48) a. Fangfang dui zhe jian shi hen shiwang (=46a)

b.



c. IP
/ \
I'
/ \
I AP
/ \
NP_1 A'
Fangfang / \
A NP_2
hen √shiwang e.c.

As the predicate *shiwang* is an intransitive adjective, it optionally selects a PP or an e.c. to realize the T/SM argument in accordance with the selectional restriction in (24b). When a PP is selected, (48b) is generated; when an e.c. is selected, (48c) is produced. As there is no CAUS involved, the e.c. in (48c) cannot be an anaphoric pro. Following Huang's (1984) assumption that Chinese is a pro-drop language, I assume with him that this object e.c. is a variable bound by an empty operator.

3.2.2 Psych Adjectives in English

In English, there are two types of psych adjectives distinctively marked in morphology, with one type taking *-ed*, and the other type having *-ing*. [54] One thing is worth noticing: both types are derived from the same EO verbs. [55] In the subsequent discussion, they will be referred to as *-ed* adjectives and *-ing* adjectives.

Illustrated in (49) are the basic properties of English psych adjectives.

(49) a. John is disappointed (with the movie)
b. The movie is disappointing (to John)

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[54] In this work, the psych adjectives which have no morphological markers or morphological markers other than *-ing* and *-ed*, for instance, *angry, sad, satisfactory*, etc., are not discussed.

[55] It is interesting that most of the *-ing* adjectives are derived from EO verbs but not ES verbs or other nonpsych verbs, this is related to Brekke's (1988) Experiencer Constraint that *-ing* may only attach to EO verbs to form true adjectives.

c. *The movie is disappointing to John about his performance
d. The movie about himself is disappointing to John

Two points are clear from (49). First, like psych verbs, psych adjectives also participate in an alternation with the Experiencer as the subject of *-ed* adjectives and as the prepositional object of *-ing* adjectives. Second, as with the case in EO verbs, the T/SM restriction is observed with *-ing* adjectives, as in (49c), and backwards binding is also allowed, as in (49d). Like ES verbs which involve no T/SM restriction or backwards binding, the T/SM restriction does not hold of *-ed* adjectives, as in (49a) where a T/SM argument is allowed, but no Causer is involved.

Here the questions arise: Why does the flip occur between the two types of psych adjectives which seem to be derived from the same verb? Why can the *-ed* type of adjective take a T/SM (49a), whereas the *-ing* type of adjective cannot (49c)? Why is backwards binding allowed with *-ing* adjectives?

The familiar flip observed in the pair of psych adjectives illustrated in (49) indicates that *-ed* adjectives are like ES verbs, taking [Experiencer, T/SM] as their theta grid, while *-ing* adjectives are like EO verbs, involving the theta grid of [Causer, [Experiencer, T/SM]]. This, furthermore, suggests that *-ing* adjectives are causative, but *-ed* adjectives are not. As shown in (49b), the movie causes John to have disappointment, whereas John became disappointed with the movie without any obvious cause from the example in (49a), which simply emphasizes the fact that John is now in a state of being disappointed. In contrast, (49b) emphasizes the cause.

Supposing that *-ing* adjectives but not *-ed* adjectives are causative, then the answer to the question of why *-ing* adjectives cannot take a T/SM argument while *-ed* adjectives can follows naturally from our generalization formulated in (43a), which says that the existence of the zero CAUS is responsible for the T/SM restriction. In other words, I suggest that *-ing* adjectives contain a zero CAUS, and therefore they disallow the T/SM argument to cooccur overtly with the Causer. Hence, the T/SM restriction is

observed in (49c). As for *-ed* adjectives, I suggest that they do not contain CAUS, so a T/SM argument can occur.

One might feel uncomfortable about the application of the generalization (43) to psych adjectives, as that generalization was established based on the data from psych EO verbs. But as can be seen clearly from the surface, the psych adjectives in question are morphologically derived from psych EO verbs. The internal relationship between these adjectives and the verbs from which they originate suggests that the properties of the derived adjectives are subject to the same generalization.

If a zero CAUS in *-ing* adjectives is the explanation for the non-occurrence of the T/SM with this type of adjectives in accordance with (43a), then the occurrence of backwards binding with this type of adjectives, as illustrated in (49d), should also follow accordingly. As demonstrated in the section on psych verbs, backwards binding is accounted for along the lines of Barss' (1986) chain-binding. Here, it can also be assumed that the same analysis captures the characteristics of *-ing* adjectives.

Regarding the formation of *-ed* and *-ing* adjectives, I suggest the following. The base for *-ed* adjectives is a root alone without CAUS, whereas the base for *-ing* adjectives is a root plus the zero CAUS. The affixation of *-ing* and *-ed* to the different bases naturally leads to two different derivatives.

In the case of *-ed* adjectives like *annoyed*, I assume *-ed* is affixed directly to *√annoy*, as illustrated in (50). As a result, there is no CAUS inside the *-ed* adjective *annoyed*. Consequently, this class of adjectives can only denote a state which the Experiencer experiences.

(50) *√annoy + ed*

The fact that *-ed* cannot attach to the root *√annoy* with the zero CAUS is constrained by Myers's Generalization, as given in (51).

(51) Myers's Generalization (1984)

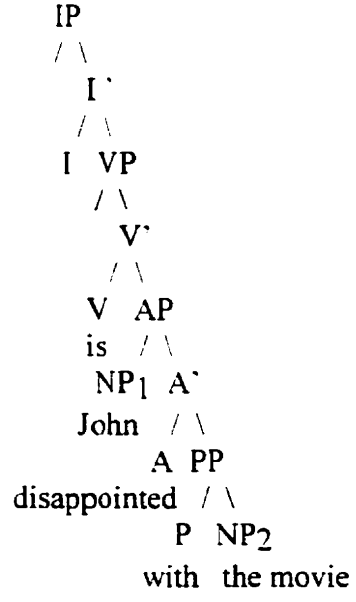
Zero-derived words do not permit the affixation of further derivational morphemes.

This means that when a word is derived from another word by the affixation of a zero morpheme, the derivative cannot be further attached by any other derivational morpheme. Examples in (52) are ungrammatical, because of the violation of the Generalization.

(52) a. *[[[accent] + ∅] + *ive*]
b. *[[[abuse] + ∅] + *ous*]

As *-ed* is attached to the root without CAUS, this class of adjective does not contain a zero CAUS inside. Since *-ed* adjectives do not have a CAUS, they do not select a Causer. Therefore, the theta grid for this type of adjectives is [Experiencer, T/SM]. Consequently, the T/SM restriction is not relevant. A D-structure like (53b) is suggested for the class of *-ed* adjectives in sentences like (49a). Here, the theta role of T/SM is assigned to the PP *with the movie*, while the Experiencer is assigned to *John*. *John* receives its nominative Case when it moves to the Spec of IP.

(53) a. John is disappointed with the movie (=49a)
b.



As far as *-ing* adjectives like *annoying* are concerned, I assume that they are formed by affixing *-ing* to the root *√annoy* and the zero CAUS, as shown in (54). This derivation violates Myers's Generalization.

(54) *√annoy* + ∅ CAUS + *ing*

It is puzzling why Myers's Generalization does not apply to *-ing*. According to Bouchard (1995), the answer to this question is that *-ing* is simply an exception to the Generalization. Through a search of entries in a dictionary, Pesetsky (1995) found that there are three morphemes which consistently violate Myers's Generalization, two of them being *-able* and *-er*. [56] Bouchard extended Pesetsky's findings about *-able* and *-er* to *-ing* and assumes that *-ing* can be attached to zero-derived words. He also suggested that as derivatives ending in *-ing* are usually not listed in dictionaries because of being fairly productive, *-ing* did not turn up in Pesetsky's search. Put another way, the fact that *-ing* was not found as an exception in Pesetsky's search is due to dictionary writing choices rather than linguistic factors. The following are some well-formed examples, taken from Bouchard (1995: 349) and Pesetsky (1995: 76), showing that zero-derived words can be grammatically further suffixed by *-ing* as well as by *-able* and *-er*.

(55)	a.	accenting (colors), limiting (rules)	(denominal + *ing*)
	b.	accentable, documentable, enviable	(denominal + *able*)
	c.	accenter, documenter, envier	(denominal + *er*)

Since *-ing* is affixed to the root and the zero CAUS, *-ing* adjectives bear a zero CAUS. Thus, the attachment of the zero CAUS adds a theta role of Causer to the argument structure of the root, producing a theta grid like [Causer, [Experiencer, T/SM]]

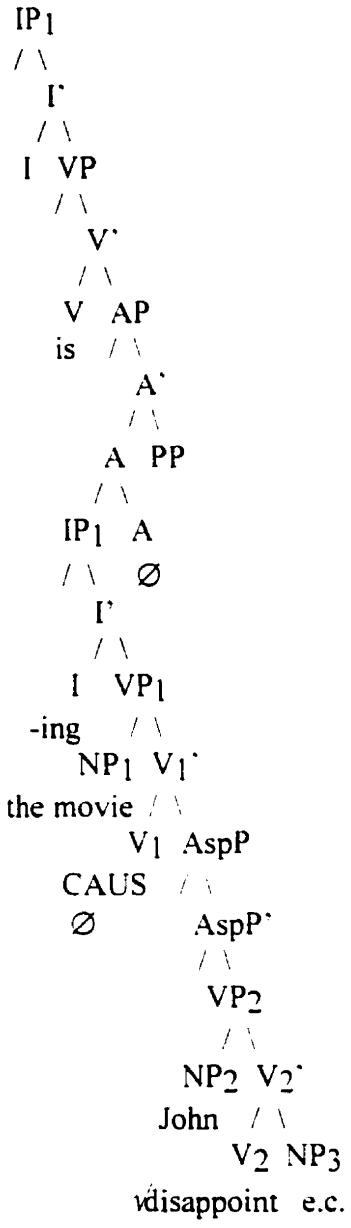
[56] The other exceptional morpheme is the stress-shifting deverbal noun such as found in *contract*.

for *-ing* adjectives. Unlike the *-ed* adjectives which remove the Causer from the original argument structure after the affixation of *-ed*, the *-ing* adjectives keep the argument structure intact when *-ing* is affixed. A D-structure like (56b) is tentatively suggested for the sentences involving *-ing* adjectives like (49b) regarding how the *-ing* adjective *disappointing* projects its arguments.

Along the lines of Pesetsky (1995) that *-ed* adjectives are the result of the affixation of a null adjectivizer to verbal passives, I assume that *-ing* adjectives are formed by the attachment of a null adjectivizer to present participles. I also assume that *-ing* is base-generated under the head of INFL and it affixes to the stem (i.e., the root and the zero CAUS) through the movement of the latter to the former within the extention of Baker et al's (1989) assumption on the formation of passives. Some details are as follows. The root *√disappoint* first moves to incorporate with the zero CAUS, then moves to *-ing*, resulting in a causative participle *disappointing*. Next, the null adjectivizer affixes to *disappointing*, producing a causative adjective *disappointing*. For the theta-role assignment, *√disappoint* theta-marks NP_3 as the T/SM, and NP_2 as the Experiencer; the null CAUS assigns the Causer to NP_1. NP_1 gets nominative Case when it moves to the Spec of IP in the higher IP. Again, NP_3 is considered as an anaphoric pro. As a result, it is covert in surface. At this moment, I will leave it open as to how and why NP_2 which is preceded by the preposition *to* eventually appears at the end of the sentence in (56a).

(56) a. The movie is disappointing to John (=49b)

b.

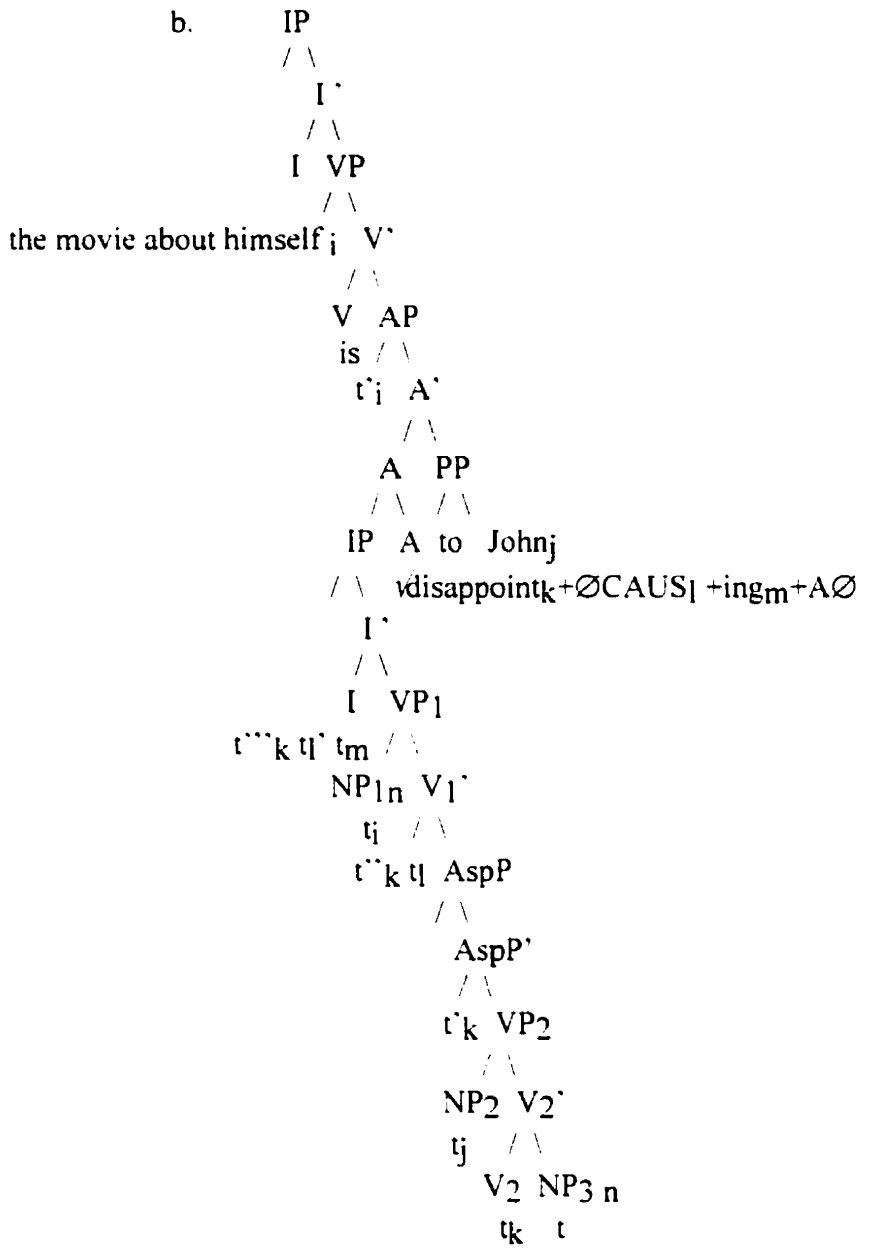


The ungrammaticality of (49c) follows from the generalization (43a).

(57b) is the S-structure for the backwards binding with *-ing* adjectives like (49d). For the phenomenon of backwards binding with *-ing* adjectives, as the antecedent *John* c-commands the trace of the anaphoric pro (i.e., NP_3) in S-structure, it can bind the anaphor *himself* backwards through the chain-binding. This account is the same as the one offered for backwards binding with EO verbs.

(57) a. The movie about himself is disappointing to John (=49d)

b.



To sum up, English has two types of adjectives. One is derived from the causative EO verb and thus keeps the zero CAUS in its outcome; the other is derived from the noncausative root and thus lacks the zero CAUS. Since CAUS is with *-ing* adjectives but not with *-ed* adjectives, the syntactic differences related to these two classes of adjectives are explained by the current analysis proposed for psych verbs. With *-ing* adjectives, in particular, the T/SM violation falls within the generalization. The existence of the zero

CAUS and the anaphoric pro is directly responsible for the possibility of backwards binding.

3.2.3 Psych Adjectives in French

Having said how and why psych adjectives behave in Chinese and English, let us now look at psych adjectives in French. French also has two types of morphologically distinctive adjectives. One is the class of *-é* adjectives, corresponding to the English *-ed* type, and the other is the class of *-ant* adjectives, corresponding to *-ing* adjectives in English, as noted by Ruwet (1976). Since *-é* adjectives can take the T/SM argument, as in (58a), while *-ant* adjectives cannot take the T/SM argument in addition to the Causer, as given in (58c), and *-ant* adjectives allow backwards binding (58d), French is exactly the same as English with respect to the unusual properties in question. The examples in (58) suggest that *-ant* adjectives are causative, while *-é* adjectives are noncausative.

(58) a. Jean est désappointé (par le film)
Jean is disappointed with the movie
'Jean is disappointed (with the movie)'

b. Le film est désappointant pour Jean
the movie is disappointing to Jean
'The movie is disappointing to Jean'

c. *Le film est désappointant pour Jean par l'actrice
the movie is disappointing to Jean with the actress
*'The movie is disappointing to Jean with the actress'

d. Le film sur lui-même est désappointant pour Jean.
the movie about himself is disappointing to John
'The movie about himself is disappointing to John'

Like the way in which psych adjectives in English were explained above, here I will also assume that *-ant* adjectives are derived by adding *-ant* to the root with the zero

CAUS, as shown in (59a), and that CAUS remains in their final outcomes. As to *-é* adjectives, they are derived by adding *-é* to the root without the zero CAUS, as shown in (59b), therefore, no CAUS exists in their final outcomes. As French is like English in this regard, the D-structures for the *-é* adjectives and *-ant* adjectives should be the same as the ones for the English counterparts, as illustrated above.

(59) a. *vdésappointer* + ØCAUS + *ant*
b. *vdésappointer* + *é*

In summary, Chinese psych adjectives are almost the same as their verbal counterparts in terms of morphological and syntactic properties. Morphologically, there is a causative EO-like type of adjective which takes the causative verb *shi*. Syntactically, the analysis proposed for the psych EO verbs can apply easily to this type of causative psych adjective. The type of noncausative adjective is captured by the structure proposed for the EO verbs, since it is just the root of the complex verb. In English and French, the EO-like adjectives are marked by either *-ing* or *-ant* in morphology. They are formed by adding *-ing* or *-ant* directly to the root with the zero CAUS, presenting certain syntactic properties related to the zero causative morpheme. Namely, the T/SM restriction is observed and backwards binding is allowed. The ES-like adjectives are morphologically marked by either *-ed* or *-é*. Since they are derived from the root without the zero CAUS, they do not show any of those syntactic properties involving the zero CAUS.

3.3 Psych Nouns

Now the final class awaiting examination is psych nouns. First of all, what are the psych nouns? What particular properties do they have? Do nouns require arguments? If they do, what would be the argument structure for psych nouns? Are there any differences

between psych nouns and psych verbs, between psych nouns and psych adjectives in terms of argument taking? In this section, I will discuss these questions by looking at psych nouns in Chinese, English and French. As usual, I start with Chinese data.

3.3.1 Psych Nouns in Chinese

In Chinese, psych nouns are not distinctive. As a unique property in this language, nominal forms, when they exist, are not morphologically different from their verbal or adjectival counterparts. For instance, the examples in (60) show that nouns, adjectives and verbs are the same morphologically, though they can be distinguished from one another in terms of the position they are in. Using the test for nounhood in Chinese which involves a numeral such as *xüduo* "many" or "much", we can see that the form that can occur after the numeral *xüduo* is a noun, as in (60a); the form that can be modified by the adverbial *hen* is an adjective, as in (60b); and the form that appears in the *shi* construction is an adjective and the two form a complex verb, as in (60c).

(60) a. Fangfang (dui zhe jian shi) you xüduo/*hen/ shiwang
Fangfang to this CL matter has much disappointment
'Fangfang has much disappointment (about this matter)'

b. Fangfang (dui zhe jian shi) hen/*xüduo/ shiwang
Fangfang to this CL matter very disappoint
'Fanfang is very disappointed'

c. Zhe jian shi shi Fangfang shiwang
this CL matter make Fangfang disappointed
'This matter made Fangfang disappointed'

Irrespective of the syntactic function that *shiwan* has, adjectival, verbal or nominal, they all have one thing in common: they require arguments such as Experiencer

and T/SM. [57] It is clear from (60) that the T/SM can always be omitted, but the Experiencer is obligatory. Note that psych nominals are not popular in Chinese, because people usually express emotions by using adjectival forms like (60b). [58] As shown in (61), Chinese psych nouns do not present any flip or backwards binding.

(61) a. Fangfang dui zhe bu dianying de shiwang hen mingxian
Fangfang to this CL movie DE disappoint very obvious
'Fangfang's disappointment at the movie is obvious'

b. *Zhe bu dianying dui Fangfang de shiwang hen mingxian
this CL movie to Fangfang DE disappoint very obvious
*'The movie's disappointment of Fangfang is obvious'

c. *Dui ziji de shiwang Fangfang hen mingxian
to self DE disappoint Fangfang very obvious
*'The disappointment with herself of Fangfang is obvious'

I will answer the question of why there is a lack of flip and of backwards binding in psych nouns as compared with psych adjectives and psych verbs when I move on to English psych nouns in the next section.

3.3.2 Psych Nouns in English

One thing to make clear first about English psych nouns is that I refer only to those nominal forms which are derived from their corresponding EO verbs but not those

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[57] It is not clear in Chinese whether it is nouns that serve as base forms, from which verbs and adjectives are derived, or it is verbs or adjectives that are the base forms, and nouns are the derivations from them. This is the same question that was raised above when psych adjectives were discussed. Again, at this time, I am not going to explore any possibilities.

[58] It may be true that English-speaking people also prefer verbal or adjectival forms to nominal forms. This phenomenon was noticed through the English native controls' corrections of certain grammatical sentences which make use of psych nominals. In their corrections, they used adjectival or verbal expressions instead. This issue will be further discussed in Chapters 5 and 6.

derived from ES verbs. Thus, I will only discuss the psych nominals such as *amusement, annoyance, frustration*, which share the same root as the EO verbs discussed above.

Unlike psych nominals in Chinese which have the same morphology as adjectives, English psych nouns are distinguished by adding certain nominal affixes to EO verbs.[59] According to Pesetsky (1995), English psych nominals which look like result nominals may be event nominals.[60] Namely, they are argument-taking nouns. For instance, the following psych nouns take the arguments Experiencer and T/SM (from Pesetsky (1995:72)).

(62) a. Bill's continual agitation about the exam was silly
b. Mary's constant annoyance about/at/with us got on our nerves
c. John's constant embarrassment about his looks was unnecessary

It is interesting to note that while psych nominals are considered as event nominals, they bear a result interpretation, but not a process interpretation. For instance, *agitation* means the state of having become agitated, but not the process of becoming agitated. Similarly, *annoyance* refers to the state of having become annoyed but not the process of becoming annoyed. If psych nominals are interpreted as in a state of having become V-*ed*, they are like *-ed* adjectives in certain aspects. I argue that, like *-ed* adjectives, nominals lack CAUS.

If there is no CAUS in the nominal forms such as *agitation, annoyance*, and *embarrassment*, then the flip does not arise, nor do the T/SM restriction and backwards binding. The English data in (63) illustrate that this is the case.

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[59] The type of psych nouns which is derived by adding *-ing* to either ES or EO verbs is not included in this work. For discussion of these psych gerundive nominals, see Bouchard (1995) and Grimshaw (1990).

[60] Grimshaw (1990) argues that psych EO verbs cannot be nominalized to give event nominals, because these verbs do not have an external argument based on her theory. However, she assumes that there are nonevent psych nominals which take a referential external argument, R. Grimshaw (1990) proposed a number of tests to distinguish event nominals from result nominals.

(63) a. John's amusement with the movie is obvious
b. *The movie's amusement of John is obvious
c. *Each other's parents' amusement with the children is obvious

(63a) is good, because the Experiencer precedes the T/SM, in accordance with the Thematic Hierarchy (19). If *the movie* in (63b) is not a Causer, then it cannot occur before the Experiencer, because this violates the Thematic Hierarchy, which requires the Experiencer to be the highest argument if there is no Causer involved. [61]

The fact that there is no T/SM restriction or backwards binding with psych nominals are precisely the consequences that follow from the generalization and the analysis that we proposed before. Our generalization predicts that when there is a CAUS involved, then there is a matter of the T/SM restriction. Psych nominals lack the zero CAUS, therefore, the T/SM restriction does not arise. According to the analysis, backwards binding is crucially accounted for by the anaphoric pro through the mechanism of chain-binding. The absence of the zero CAUS in psych nominals makes the presence of an anaphoric pro impossible, thus the anaphor cannot be bound backwards, and (63c) is ungrammatical.

Now a question arises at this point. If psych nominals are morphologically derived from psych EO verbs, how can the zero CAUS which is part of EO verbs not be part of nominal forms? This is the same question that arose when the *-ed* adjectives were discussed. Here, following Pesetsky (1995), I assume that psych nominals like *annoyance*

[61] In the literature, there are some explanations of the contrast in grammaticality between (63a) and (63b). For instance, Anderson (1979), based on the lexicalist hypothesis (Chomsky 1970), accounts for the ungrammatical sentence in (63b) by means of a constraint on movement of "nonaffected" objects inside NPs. Rappaport (1983), as cited in Emonds (1991), attributes the ungrammaticality of the sentence to the fact that a range of direct object NPs, which carry a theta role of Goal, cannot be introduced by the preposition *of* in derived nominals. Here, the Goal in Rappaport (or the Location in Emonds (1991) includes what we call the Experiencer for psych EO predicates). Rozwadowska (1988) proposes that a Neutral argument like *the movie* in (63b) cannot occur in specifier position of a nominal (See Footnote 27 in Chapter 2 for the notion of Neutral in Rozwadowska's explanation).

are derived from the root *√annoy* without CAUS, as given in (64), similar to what I proposed above for *-ed* adjectives due to Myers's Generalization.

(64) *√annoy + ance*

To sum up, in this section, it has been shown that English psych nominals are morphologically derived from EO verbs without the zero CAUS. Since there is no CAUS, psych nominals show no flip, nor backwards binding, a consequence following from the generalization and the analysis.

3.3.3 Psych Nouns in French

French also has a class of psych nominals, which are formed by adding nominal affixes to the roots of psych verbs, as shown in (65). Again, like English, nominal affixes attach to the root without the zero CAUS to observe Myers's Generalization.[62] Consequently, the phenomenon of flip and backwards binding does not occur, as illustrated in (66).

(65) *√fasciner + ation*

(66) a. La fascination de Jean pour le film est évidente
the fascination of Jean for the movie is evident

b. *La fascination du film de lui-même est évidente pour Jean
the fascination of the movie of himself is evident for Jean

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[62] It is pointed out by Julie Auger (personal communication) that the French counterpart of the English sentence (63a) *L'amusement de Jean pour le film est évidente* is not acceptable. Here, the ungrammaticality of this sentence might be related to the fact that in addition to the EO verb *amuser*, there is a reflexive ES verb *s'amuser* in French. The affixation of the nominal marker *-ment* to the reflexive ES root *s'amuser* might produce some unexpected derivative. But I will leave the details open for future research.

3.4 Conclusion

I have proposed an alternative way to look at the unusual problems of psych verbs. On this analysis, separate theta grids are suggested for two types of psych verbs (i.e., [Experiencer, T/SM] for the ES class and [Causer, [Experiencer, T/SM]] for the EO class), thus reducing the linking problem to a predictable mapping of arguments to syntactic positions: more prominent arguments project to a higher position and less prominent arguments project to a lower position in accordance with the thematic hierarchy. With two separate theta grids, EO and ES verbs are argued to have their own different D-structures, with a projection of CAUS for the former and a projection of BE for the latter. The structure proposed for EO verbs is the one in which the Causer is base-generated in a position higher than the Experiencer which in turn is higher than the T/SM. At this D-structure no NP-movement is motivated but an anaphoric pro is assumed, which solves the backwards binding problem within the extension of the chain-binding theory. For EO verbs, a generalization is proposed. When CAUS is covert, the T/SM restriction is observed, because the zero CAUS selects a VP, which only subcategorizes an NP as its internal argument. In that case, the T/SM argument cannot be overtly realized. When CAUS is overt, the T/SM restriction is not observed, because an overt CAUS selects an AP, which subcategorizes a PP as its internal argument. Accordingly, a lexical T/SM is possible. While this generalization is established on the characteristics of EO verbs, it is shown to apply to adjectives and nominals which are morphologically derived from these verbs.

It is demonstrated that this account is able to accommodate the data in Chinese, English and French concerning the T/SM restriction. Chinese has an overt CAUS which requires an adjective to form a periphrastic complex EO verb. An AP can select a PP, thus there is no T/SM violation with the periphrastic structure. In English there is a class of productive synthetic EO verbs, though it also has periphrastic forms. The English

synthetic class involves a zero CAUS which selects a VP that cannot take a PP to realize its T/SM argument. French resembles English in this regard.

With respect to psych adjectives, Chinese lacks a distinction between adjectives and verbs in morphology. Thus, the analysis proposed for periphrastic EO verbs can be used to explain adjectives.

In both English and French, there are two types of adjectives corresponding to the two types of verbs. They are the *-ing* or *-ant* class and the *-ed* or *-é* class, each marked morphologically. These two classes are different from each other in the way that the *-ing/-ant* class possesses a CAUS whereas the *-ed/-é* class does not. For *-ing/-ant* adjectives, the affix is attached to a base with the zero CAUS, thus the CAUS remains in the derivation. In contrast, for *-ed/-é* adjectives, the affix attaches to the root with no zero CAUS. These differences in derivations lead to the consequence that *-ing/-ant* adjectives do not allow the T/SM but allow backwards binding, while *-ed/-é* adjectives allow the T/SM argument but not backwards binding.

Psych nominals are argument-taking nouns. They take [Experiencer, T/SM] as their theta grid. In Chinese, again no morphological differences are observed between nouns and adjectives or verbs. In English and French, psych nominals are more or less like psych *-ed* adjectives in the sense that they do not contain a CAUS since they are derived from the noncausative root. As they do not contain a CAUS, the phenomena of flip and backwards binding do not occur.

CHAPTER 4

PSYCH PREDICATES IN LANGUAGE ACQUISITION

4.0 Introduction

In Chapter 1, it was shown that the syntactic structure of predicates relies heavily on their lexical properties. Regarding the acquisition of psych predicates, it is thus important to first of all acquire their lexical properties. As argued in Chapter 3, a zero causative morpheme is lexically encoded with EO verbs in English and these EO verbs are the core from which other types of psych predicates are directly or indirectly derived. Therefore, the acquisition of EO verbs, and of psych predicates is mainly the acquisition of this zero morphology. Since there is a logical problem of language acquisition in the mapping of thematic arguments of psych predicates onto structural positions, the acquisition of psych predicates constitutes a way to look at whether L2 learners are able to access principles of UG, such as the UTAH, the Thematic Hierarchy and Principle A in Binding Theory. If L2 learners can acquire the zero CAUS, all the problematic properties of psych verbs should just "fall out", if these principles are available.

In this chapter I will review current research on the acquisition of psych predicates in L1 and L2 acquisition. While there have been some studies on the acquisition of psych predicates with a general conclusion that psych verbs of the EO class cause more problems for learners, a theory accounting for the problematic nature of psych verbs is still not available. In particular, given a target language like English, how the argument structures of each different kind of psych predicates, namely, verbs, adjectives and nominals are represented and interpreted by L2 learners has not been investigated by any current study. A complete examination of the learning of these morphologically related psych predicates can be significant and crucial in testing whether L2 learners have the knowledge of UG.

I will start with a discussion of relevant L1 acquisition literature in 4.1. In 4.2, I will review the literature on the L2 acquisition of psych verbs followed by a discussion of the motivation for conducting a new study on the L2 acquisition of three kinds of psych predicates.

4.1 Psych Predicates in L1 Acquisition

Surprisingly there is very little work on children's L1 acquisition of psych predicates. There are two possible reasons for this. On the one hand psych predicates are usually more abstract than nonpsych ones and thus it is much harder for researchers to come up with good tests to tap children's knowledge of these predicates. On the other hand small children may be cognitively too immature to interpret predicates involving psychological emotions and processes. However, there are two studies reported in the L1 literature that include some data concerning psych verbs and one study purposely examines the L1 acquisition of psych verbs by small children. These are the work by Lord (1979) which looks at the issue of generalizations relating to the causative/noncausative alternation in child L1 acquisition; the work by Bowerman (1990) which looks at how English-speaking children map thematic roles onto syntactic positions with respect to verbs showing apparently arbitrary linking; and the work by De Guzman (1992) which looks at the L1 acquisition of Tagalog psych verbs. In the following I will review these studies.

4.1.1 Lord (1979)

Among Lord's data of language errors collected from a couple of English-speaking children's naturalistic utterances, there were three errors, given in (1), involving psych verbs of the EO class.

(1) a. (Jennifer 4;7) I'm just gonna hold 'em and look at 'em and, uh, interest them.
(=have an interest in)

b. (Benjy 3;11) You're bothering me! You keep on talking to her! And that makes me bother!
(=be bothered)

c. (Jennifer 8;5) They attract by the peanuts in the snow.
(=are attracted by)

(1a) shows that the verb *interest* was used as if it were an ES verb with the Experiencer in the subject position. The errors in (1b) and (1c) suggest that the children mistakenly used the transitive EO verbs intransitively and again they place the Experiencer NP in the subject position. It is interesting to notice that, as to (1b), Benjy was correct about the use of *bother* on one occasion, but wrong on another in the same utterance, indicating that he had not mastered the correct use of this EO verb.

Lord (1979) does not report any data involving ES psych verbs. However, some errors of transitive perception verbs such as *hear*, and *see* were observed from the children studied, as shown in (2), which might suggest a pattern of errors that children could probably make for the ES class.

(2) a. (Jennifer 2;9) I can't hear it. (puts clock to ear). It can hear now.
(=it can be heard now)

b. (Benjy 3;8) They don't seem to see. Where are they?
(they=sandals)
(=I don't seem to see them)

Here in both (2a) and (2b) Theme arguments were raised to subject position and Experiencer arguments were omitted. Lord interprets the data as showing that children

treat the verbs *hear* and *see* as *open* and *break*, which can undergo a transitive/intransitive alternation.

It seems that all the above errors except for (1a) involve a wrong use of transitive verbs intransitively, which is part of Lord's central claim that children overgeneralize transitive verbs as intransitive ones just as they often overgeneralize intransitive verbs as transitive ones. Since no errors of the ES class of psych verbs were found, we cannot draw any conclusion regarding the L1 acquisition of psych ES and EO verbs by these two children except that they tended to place the Experiencer in the subject position for EO verbs. While it is true that the perception verbs *hear* and *see* pattern quite similarly with psych verbs of the ES class such as *fear* and *like*, it is not at all clear how children would actually deal with the real class of ES psych verbs with respect to the linking of arguments and positions. Furthermore, it is not clear why the children preferred to have the Experiencer in the subject position for EO verbs. Is this simply an indication of children' knowledge which is generalized from the canonical structure that an animate person must be realized as the subject or is this a piece of evidence that small children already knew that the Experiencer should project in a higher position?

4.1.2 Bowerman (1990)

In this paper Bowerman attempts to investigate whether children map thematic roles onto syntactic functions through innate rules or through learning. To verify the two hypotheses, Bowerman (1990) employed longitudinal spontaneous production data gathered from her own two children through diary data over several years. In her data is a set of utterances which are concerned with psych verbs. Some examples are given in (3).

(3). a. Christy (8;7) I have an idea, but it won't approve to you or daddy.
(=you and daddy won't approve of it)

b. Christy (9;0) How does "Hurly Girl" fancy you?
(=how do you fancy/like ...)

c. Eva (6;2) It didn't mind me very much.
(=I didn't mind it/it didn't bother me)

d. Eva (6;6) I saw a picture that enjoyed me.
(=that I enjoyed)

e. Christy (7;0) Don't do that! I don't appeal to that!
(=That doesn't appeal to me)

From (3a)-(3e) it can be seen that unlike Lord's data which only reflect children's errors of EO psych verbs, Bowerman's data only reveal errors with ES psych verbs, except the one *appeal* in (3e), which is an EO verb.

Two points are worth mentioning here. First, all the errors with ES psych verbs had the Experiencer incorrectly in the object position, except that in (3a), where the Experiencer is a prepositional object. These errors show a direction which is opposite of what has been found in Lord's (1979) data, where the Experiencer was placed in the subject position if it was expressed. Now the question is why Bowerman's children projected the Experiencer in a position lower than the other argument. Second, the age of the two children who made these errors is above six which is much later than that for the children reported in Lord (1979). According to Bowerman, her diary notes did not catch any mapping errors regarding psych verbs from the children before they were six. The question arises as to why the children did not make any errors with psych verbs before the age of six.

In Bowerman's view, the errors in (3) suggest that children were generalizing a learned linking rule that required the Stimulus to be in the subject position and the Experiencer in the object position. What Bowerman claims is that children built up this rule through hearing input like "*The ghost frightened me*", simply because EO verbs like

frighten, please, etc. are statistically more preponderant in English than ES verbs like *fear, approve, enjoy, picture*, etc., as observed by Talmy (1985). Once children got the rule, they did not make any error in terms of mapping. However, with time passing by, they began to overgeneralize the rule to verbs like *approve, enjoy, picture* which are less predominant in English. Thus, errors of generalization occur. Here Bowerman uses the lateness of errors with psych verbs as important evidence for her claim that the linking pattern is learned through the input. That is to say, children learned that certain rules exist for mapping arguments to positions with respect to psych verbs. The rule that the Stimulus is placed in the subject position and the Experiencer in the object position is accumulated by children based on the predominant type of EO verbs. Being this way, children could not but overgeneralize less preponderant ES verbs according to the stimulus-subject pattern.

If Bowerman's explanation was correct that children overgeneralized the dominant EO pattern to the less dominant ES verbs, two questions arise: (i) why did the children fail to use the EO verb *appeal* in (3e) correctly? Is it because *appeal* requires a dative Experiencer that causes more difficulty for the child? (ii) why did the children not use existing EO verbs for the ES verbs in (3a)-(3d) since all the above ES verbs have approximately semantically-matched EO counterparts, such as *please* for *approve* in (3a), *amuse* for *fancy* in (3b), *bother* for *mind* in (3c), and *please* for *enjoy* in (3d) if the EO class verbs are claimed to be more common in English?

Another puzzle is why children did not overgeneralize the linking pattern before the age of six years old if the errors were the results of overgeneralization. Is it because before that period of time (i.e., before six years old) children were at the initial stage of learning the linking pattern, and thus were accurate or is it because children had not yet mastered the correct pattern? What does it really mean if no errors are found in the naturalistic production data? Does no errors mean that no mistakes occur simply because children already know the correct pattern, or that no mistakes occur because in these

limited contexts children have not yet had a chance to make the relevant mistakes? From another group of naturalistic data (the data from the same two children studied here and four other children) reported in Bowerman (1982), children produced the EO type of verbs derived from adjectives, as shown in (4). While the morphological forms were wrong, the argument structures were correct, indicating that younger children actually did produce structures with EO verbs before the age of six.

(4) a. John (2;3) You sad me.
(=You saddened me)

b. Eva (4;8) You can't happy me up.
(=You can't cheer me up)

Both Lord (1979) and Bowerman (1990) make use of children's naturalistic production data collected through diary studies. A common weakness is that naturalistic data cannot always give researchers what they are really interested in. As noted by Maratsos et al (1987), diary studies do not give researchers any certainty whether children have already mastered a particular structure if no errors are observed. Here, when there are no errors with ES or EO verbs from the children studied, we could not tell whether these children have really mastered the correct patterns or not. Regarding psych verbs, since neither Lord (1979) nor Bowerman (1990) provides us with a complete picture of errors involving the ES class and the EO class, we cannot determine the degree of difficulty or error direction that children might have shown in the acquisition of both classes. Finally, if no errors early on were interpreted as meaning that the child had got the relevant knowledge, then it is doubtful that children who knew how to map thematic roles to syntactic positions for EO verbs before a certain age suddenly lost the knowledge after that age simply because of overgeneralization.

4.1.3 De Guzman (1992)

This paper investigates which class of psych verbs is acquired first, the one taking an object focus or the one taking an experiencer focus in the L1 acquisition of Tagalog. Three types of psychological verbs were tested including emotion verbs (psych verbs in our sense here), perception verbs and cognition verbs. As is well known, Tagalog, an Austronesian language, has a rich and complex verbal system. Normally, a verb requires a nominal affix as a focus constituent. Take psych verbs for example. If it is the ES class, an affix like *ma-* is attached to a root to serve as the experiencer focus (EF). If it is the EO class, then an affix like *ka- -an* is attached to the root, forming an object focus (OF). The root is always the same in both classes. This is shown in (5).

(5) a. ES class: **ma-** V root
e.g., ma-takot
EF-fear
"fear"

b. EO class: **ka-** V root **-an**
e.g., ka-takut-an
OF-fear-OF
"frighten"

Since the root for both types of psych verbs is the same, with different affixes used to form the different verb classes, the acquisition of psych verbs seems to reduce to the acquisition of the focus affixes to a large extent. As Tagalog presents a much more productive pattern of the object focus morphology, and the Patient is more primary than the Agent in the language, De Guzman predicts that the OF morphology for the EO class would be acquired before the EF morphology for the ES class.

Altogether 16 children (divided into four age groups: 3, 5, 7, and 8 years old, each having 4 subjects) were tested through two tasks. In the comprehension task, children were presented with a stimulus picture for a given verb and had to reproduce the verb under the experimenter's instruction like "Point to the one that sees" or "What is it that he feels?" In the production task, pictures were also shown, each containing two or three animate and inanimate things together with two or three incomplete statements like "It is the child that _____". Subjects were required to fill in the blank with a correct verb form. Results from both comprehension and production tasks showed that each group of subjects performed significantly better on the ES class taking an EF affix *ma-* than the EO class taking an OF affix such as *ka- -an*. These results were interpreted by De Guzman as evidence that the ES class of psych verbs was acquired earlier than the EO class.

De Guzman attributes these results to two basic factors. First, for the ES class, the Experiencer is like the Theme or Patient which gets +affected. Being affected, the Experiencer is more prominent and more intimately related to the verb, therefore, they are mastered earlier. In contrast, the Theme for the EO class is not +affected. Thus, it is not prominent, which in turn rends it difficult to master. Second, the ES class has much more regularity with respect to the focus form compared with the EO class which has less regularity. Thus, the greater consistency in the morphological form with the former leads to an easier acquisition.

Note that if children performed better on the ES class than the EO class, it does not necessarily mean that there is a sequence of acquisition with the EF affix for ES verbs acquired earlier than the OF affix for EO verbs. Order of difficulty does not necessarily reflect order of acquisition. While it could be true that something being acquired earlier can be used or processed better, this is not always so. In addition, as there were only two emotion verbs used in the test, this is insufficient to draw conclusions as to acquisition order.

4.2 Psych Predicates in L2 Acquisition

As observed by Burt and Kiparsky (1972) and Scovel (1974), L2 learners of English often make errors with psych verbs and psych adjectives. They tend to say **I frighten the exam.* or **I'm interesting in the book* instead of *I fear the exam/The exam frightens me* or *I'm interested in the book/The book is interesting to me.* However, no experimental work has been conducted on the acquisition of these predicates until recently. Juffs (1996), Montrul (1995), White (1995a), White et al (1996a) and White et al (1996b) are the only studies that, as far as I am aware, have either directly or indirectly examined the L2 acquisition of psych verbs. [62]

Of the five studies that exist, psych verbs are not the main focus for Juffs (1996) and Montrul (1995). It is the work by White (1995a), White et al (1996a) and White et al (1996b) that purposely aims to investigate whether L2 learners' IL grammar is arbitrary in terms of the mapping of psych verbs and whether their knowledge of psych verbs in general is related with their knowledge of the T/SM restriction in particular.

4.2.1 Juffs (1996)

Juffs (1996) investigates the knowledge of semantics-syntax correspondences in L2 acquisition from a learnability perspective. In particular, Juffs examines a proposed parameter (i.e., the Root Morpheme STATE Conflation Parameter) by testing Chinese learners of English on the two superficially distinct verb classes: change of state locatives, and psych verbs. Relevant to my study here are his results on the acquisition of psych verbs by Chinese subjects. In an elicited production task (which included only two psych

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[62] To my knowledge, C. Wang (1995) investigates the acquisition of English nonpsych adjectival *-ed* and *-ing* participles by Chinese ESL learners. As C. Wang only looks at those adjectives which are used as premodifiers versus postmodifiers, it is still not clear how L2 learners of English acquire psych adjectives as predicates.

verbs, i.e., *interest* and *disappoint*), the low and intermediate level learners did not produce sentences like (6a) with a correct transitive use of psych verbs. Statistically, their actual use of transitive psych verbs was significantly less than the controls. As for the advanced level learners, they acted just like the controls.

(6) a. The report interested the man
b. The report made the man interested
c. *The man interested the report
d. The man was interested in the report

As each subject was allowed to produce, for the same picture, three sentences similar in meaning but different in structure, I recalculated subjects' responses based on Juffs' (1993) original data. The mean accuracy of subjects' responses which involve sentences like those in (6) are given in the following table.

Table 1: Mean Accuracy of Subjects' Responses of Four Types of Structures (%)

Resp.	Low	Intermediate	High	Advanced	Native
(6a)	16.67	9	25.66	31.19	33.43
(6b)	5.46	18.94	16.40	21.72	4.63
(6c)	11.26	2.27	3.33	0	0
(6d)	24.33	32.58	27.37	36.75	33.24

Here it is clear that the low level and the intermediate level learners were reluctant to use psych verb *interest* transitively. However, the learners of higher levels seemed to like the transitive use of psych verbs. Where the lower level groups used the verbs transitively, then they made errors like (6c). Table 1 indicates that only the low level group made such errors at a high rate. Two phenomena are worth pointing out. First, the low level learners seldom produced a sentence like (6b); according to Juffs' original data they did not

produce any such sentences for their first attempts, though the Chinese counterpart is very popular in the language. It is a puzzle as to why there was no L1 transfer for the low level learners at the beginning stage of English learning with respect to this point. Second, all the groups of L2 learners liked to use the adjectival form, as in (6d). Actually, the percentage of their using this structure was the highest across the four types of structures.

In a grammaticality judgment task, subjects were required to judge on a 7 point scale how they felt about the sentence. Five psych verb (i.e., *bore, disappoint, frighten, frustrate, interest*) were included and used in both transitive and periphrastic constructions such as in (7).

(7) a. The slow progress frustrated the leaders
b. The slow progress made the leaders disappointed

Again, the lower level learners significantly rejected psych verbs used transitively compared with the controls, and this rejection lasted until they reached a high level of proficiency. Regarding the difference in acceptance between the transitive use of psych verbs, i.e., (7a), and the periphrastic use of psych verbs, i.e., (7b), the results are that all the Chinese learners of English tended to prefer the latter to the former. Even the low level learners showed a higher acceptance of (7b) than (7a). This result is inconsistent with the result in the production task where the transitive version was produced more than the periphrastic one.

While the low and intermediate Chinese learners produced or accepted fewer transitive uses of psych verbs, the advanced Chinese learners patterned with the controls. In Juffs' view, these findings suggest that a process of parameter resetting is involved in the course of second language, because as learners' English proficiency improved, the L1 parameter setting was replaced by the L2 parameter setting. Since Juffs did not include a

class of ES verbs in his test, there is no way to judge how his Chinese learners of English acted on this class compared with the EO class.

4.2.2 White et al (1996a)

White et al (1996a) explore the question of whether the mapping of psych arguments to grammatical positions is arbitrary in L2 learners' IL grammars. In particular, they examine whether principles such as the UTAH and the Thematic Hierarchy are available to L2 learners. The predictions tested in the paper are as follows: L2 learners would not map thematic arguments onto any syntactic position in an arbitrary way, for example, with the Experiencer linked to the subject for the EO class verbs but to the object for the ES class verbs. Instead, they would, according to the UTAH, project the argument which is higher in the thematic hierarchy onto the higher position in syntax, and the argument which is lower in the hierarchy onto the lower position. In other words, if psych verbs should cause any problems for L2 learners, it is the EO class rather than the ES class that would be problematic. The errors that learners make should be on the EO class only, like **John frightens the exam*, but not on both the EO class and the ES class, such as **The exam fears John* and **John frightens the exam*. This hypothesis was more or less borne out by three separate experiments: one on Malagasy and Japanese ESL learners, one on Japanese and French ESL learners and one on Malagasy and Spanish ESL learners. In the following, I will describe the three experiments respectively.

The first experiment involved an elicited production task which included 20 pictures. Each picture contained two NPs and a verb underneath. Subjects were required to complete a sentence describing the meaning of the picture by using the given verb and NPs. There were five ES verbs (*fear, detest, enjoy, miss, trust*) and five EO verbs (*frighten, disgust, excite, depress, embarrass*), together with five nonpsych active verbs (*hit, wash, throw, paint, buy*) and five passives (*write, pour, bounce, pack, eat*).

Subjects were 43 native speakers of Malagasy (divided into Low intermediate Malagasy and High intermediate Malagasy) and 18 native speakers of Japanese with an intermediate level of English, as well as a group of 19 native speakers of English as controls. The results from the sentence completion task show that all the experimental groups were very accurate on all sentences types, with no significant difference in performance on ES verbs versus EO verbs. In terms of ES verbs, the Japanese and the High Malagasy groups were significantly less accurate than the controls; in terms of EO verbs, the Japanese and the Low Malagasy groups were significantly less accurate than the controls. Obviously, these results neither support nor oppose the hypothesis.

The second experiment was an extension of the first experiment. Subjects were 15 francophones and 12 Japanese speaking learners of English. Different tasks were designed and more psych verbs included (i.e., ten *fear* class verbs and ten *frighten* class verbs). In a picture identification task, there was a pair of different pictures and one sentence written underneath. Subjects had to judge which of the two pictures matched the sentence. Unlike the picture task in the previous experiment, this time each verb was purposely designed to select two animate arguments. This special arrangement of the pictures with two animate arguments was to ensure that there was not any clue that would guide learners to place the arguments in the appropriate syntactic position.

Results from the picture identification task show that the Japanese learners were significantly less accurate than the controls and the francophones on EO verbs, having considerable problems with all the ten items. These Japanese learners were significantly more accurate on ES verbs than EO verbs. The French learners were not significantly different from the controls on either class of verbs, and they did as well on the EO class as on the ES verbs. The findings in this experiment suggest that wherever L2 learners had difficulty with psych verbs, it is the EO class that is more difficult. In addition, the findings show that learners' L1 is also crucial in the course of acquisition, because the francophones performed significantly better than the Japanese on EO verbs.

The third experiment tested 27 adult Malagasy speakers (20 High intermediate Malagasy and 7 Low intermediate Malagasy) in Madagascar and 29 adult Spanish speakers in Colombia, using the same task as in the second experiment. Results from the picture identification task show that all the groups were significantly more accurate on ES verbs than EO verbs. Individual results from this task suggest that most subjects acquired both the ES and EO classes of verbs; most of those who had not acquired both had particular problems with EO verbs.

The conclusions that White et al drew from the previous three experiments are that generally there is no arbitrary mapping problem for psych verbs for the L2 learners of English: it is the UTAH and the Thematic Hierarchy rather than properties of the L1 or the L2 input alone that constrain the IL grammar of L2 learners.

4.2.3 White et al (1996b)

The work of White et al (1996b), which was expanded from White (1995a), examines whether those who had mastered the basic properties of psych verbs would know the T/SM restriction. Recall that in English a sentence taking a T/SM argument with EO verbs is not grammatical, as shown in (8b), but a sentence of similar structure with a non-psych verb is good, as shown in (8c), and a sentence of a periphrastic causative verb *make* with the T/SM argument is also good, as in (8d). Here, the interest of the study is to explore whether L2 learners' knowledge of the T/SM restriction will correlate with their knowledge of psych verbs in general, as claimed by Pesetsky (1995).

(8) a. The tidy room pleased the mother
b. *The tidy room pleased the mother with her son
c. The boy provided his mother with an explanation
d. The tidy room made the mother pleased with her son

A subset of the subjects from the second and third experiments in White et al (1996a) were tested. They were 15 francophones ESL learners, 19 Malagasy-speaking ESL learners and 17 Spanish-speaking ESL learners, together with English and French native controls. The task was a grammaticality judgment which contained 30 sentences.[63] Subjects had to make their judgments on a 5 point scale ranging from -2 (for completely impossible) to +2 (for completely possible). Five psych verbs of the EO class were chosen for the test (i.e., *anger, annoy, disappoint, frighten, please*). There were five grammatical sentences concerning EO verbs like (8a), five ungrammatical T/SM sentences like (8b), five grammatical prepositional sentences like (8c), five grammatical periphrastic causative sentences such as (8d) and five ungrammatical sentences with psych verbs in general.

Concentrating on the results about the T/SM restriction (8b), it is found that the L2 groups were not significantly different from each other; and they accepted the ungrammatical T/SM sentences, significantly more than the English controls who rejected these ungrammatical sentences. The French controls performed like the L2 learners, with a significant difference from the English controls in terms of acceptance of T/SM violations. Compared with the ungrammatical T/SM sentences, all the L2 learners accepted the grammatical sentences involving the periphrastic verb *make* like (8d); the Romance speaking learners were significantly less accurate than the English controls, while the Malagasy speakers acted like the controls. Again, the French controls' acceptance of the French periphrastic sentences was significantly lower than the English controls' acceptance of the English periphrastic sentences, and it was not significantly different from the L2 learners' performance.

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[63] The task had an aural version and a written version. Both the Malagasy and the Spanish groups were tested through the written version and the French group the aural version. Thus, to control the modality of the test, two groups of English controls were tested, with one group taking the aural version and the other the written one. No significant differences were found based on task modality.

One interesting result that White et al noticed is that although the controls did not like the ungrammatical T/SM sentences like (8b), as expected, their mean score on rejecting this kind of ungrammatical sentences was significantly lower than their mean score on rejecting the other type of ungrammatical sentences. This suggests that T/SM violations are not as bad as ordinary ungrammatical sentences.

White et al conclude that it is still a question whether ESL learners are able to acquire the knowledge of T/SM restriction, but it seems clear that the knowledge of the T/SM restriction does not follow from the general knowledge of psych verbs in English, and that L2 learners' L1 does not play a crucial role with respect to the T/SM restriction.

4.2.4 Montrul (1995)

Montrul (1995) is a longitudinal study of the L2 acquisition of Spanish dative Experiencer verbs by English and French learners. Spanish has a class of psych verbs that takes a dative Experiencer which is like the third class of psych verbs in Italian and French. Using an Interpretation Task and a Preference Task, Montrul found that both English and French learners of Spanish had considerably more difficulty with EO verbs as compared with ES verbs. The pattern of errors for both groups of learners was uniform, with the Experiencer in the subject position. Montrul considered this finding to be a support for the claim that UG-like knowledge, in particular the Thematic Hierarchy, is available in SLA: both groups of L2 learners thought that the Experiencer should project in a higher position.

Since psych verbs were not the focus of this study, Montrul concludes that her results on psych verbs can only be treated as tentative. However, it is clear that her L2 learners' problems with the EO verbs are consistent with what Juffs (1996) and White et al (1996a) have reported.

4.2.5 Summary

The findings of the research on the L2 acquisition of psych verbs show that generally L2 learners knew that the Experiencer projects in a higher position, consistent with the UTAH and the Thematic Hierarchy. Where learners had difficulties, they treated the two classes of verbs alike. This way, L2 learners had no difficulty with the ES class psych verbs (except some individual verbs), as the mapping is very straightforward with the Experiencer to the subject and the Theme to the object. But they ran into difficulty when they applied the same mapping mechanism to the EO class. Here, they missed something that the EO verbs undergo. Therefore, they ended up with particular problems with the EO class by placing the Experiencer argument in the subject position.

None of the existing studies has examined the unusual binding property of psych verbs which is related to the linking problems of these verbs, as illustrated in Chapters 2 and 3. Therefore, research is needed to explore how L2 learners would perform on the binding properties of psych verbs in comparison with the linking properties. Given the uniqueness of psych verbs whose unusual linking properties are closely interrelated with the unusual binding properties, it is necessary to examine whether learners who have got the linking correct would also be able to get the binding correct.

A second insufficiency in the current research on the L2 acquisition of psych predicates is that no study has touched upon the class of psych adjectives or psych nouns. As discussed in Chapter 3, psych adjectives also present similar linking and binding problems. It is therefore important to examine whether learners who have got the linking correct with verbs would also be able to get it correct with adjectives, and whether learners who have got the binding correct with verbs would also be able to get it correct with adjectives. Furthermore, since both psych adjectives and psych nouns are morphologically related to psych verbs, it is of significance to investigate systematically how psych adjectives (both *-ing* and *-ed* adjectives) and psych nominals are acquired

compared with psych verbs. In particular, it will be very important to find out (i) whether psych adjectives, i.e., the class of *-ing* adjectives which are syntactically more or less like the class of EO verbs, would also present special problems for L2 learners as EO verbs do; (ii) what would be more difficult to be acquired, verbs or adjectives or nominals among the three kinds of predicates.

In Chapter 3 it was shown that, English psych verbs, psych adjectives and psych nouns all share one stem. This same property in morphology has led the three kinds of predicates to share more or less the same argument structure. Thus, it is appropriate for a study to investigate L2 learners' acquisition of the three types of psych predicates, comparing representation and interpretation of one particular class with their representation and interpretation of the other two classes of predicates.

4.3 Conclusion

In this chapter I have discussed research on the acquisition of psych verbs in L1 and L2. For the L1 acquisition, the findings are not consistent, with one study (i.e., Bowerman (1990)) showing that the ES class is more problematic for children, and the other two studies (i.e., Lord (1990) and De Guzman (1992)) showing that the EO class causes more problems. For the L2 acquisition, researchers have found the similar results: it is the EO class that presents more problems for L2 learners, though the ES class is also not easy for them compared with nonpsych active verbs.

As none of the current research has ever dealt with the unusual properties related to psych predicates of different categories, the present work was set up for that purpose. In the next chapter, I will show in detail how English psych verbs, adjectives and nouns are acquired by Chinese and French ESL learners with respect to the argument structure, the T/SM restriction and backwards binding.

CHAPTER 5

EXPERIMENT: ACQUISITION OF ENGLISH PSYCH PREDICATES

5.0 Introduction

As outlined in Chapter 1, the major goal of this work is to explore the following general issues: Do principles of UG like the UTAH, the Thematic Hierarchy and Binding Theory mediate the L2 acquisition of English psych predicates? What role does L1 play in SLA with respect to the acquisition of argument structure of psych predicates? Is the acquisition of argument structure of psych predicates dependent mostly on the acquisition of lexicon or the acquisition of syntax? An account of psych predicates was proposed in Chapter 3 which crucially claims that English psych predicates, including psych verbs of the EO type and psych adjectives of the *-ing* type involve a zero causative morpheme, whereas psych verbs of the ES type, psych adjectives of the *-ed* type, and psych nominals do not contain such a zero morpheme, and that the unusual behaviors of psych predicates such as the T/SM restriction and backwards binding are more or less, directly or indirectly, related to this zero morpheme.

To investigate the above questions, an experiment was conducted, involving a group of Chinese-speaking adults and a group of French-speaking adults learning English as an L2. In this chapter I will report on this experimental study. In 5.1, I will first present the specific predictions in regard to the argument structure of psych predicates and other related properties. I will then describe the subjects in 5.2, the predicates in 5.3, the tasks in 5.4 and the procedure in 5.5. I will provide detailed results including group and individual results, and results across tasks in 5.6. Discussion of the results will be reserved for Chapter 6.

5.1 Hypotheses

We know from Chapter 1 that syntactic properties of a predicate are crucially dependent on lexical properties. Thus, to acquire a certain predicate involves knowing how to pronounce the predicate, what it means, how many arguments it takes and which argument is linked to which structural position. There are two steps to go through before a predicate is acquired, the acquisition of lexicon and the acquisition of syntax. The acquisition of lexicon is the first step, which leads to the acquisition of syntax. With respect to the three kinds of psych predicates that are of particular concern in this work, they are all morphologically related to the EO class of psych verbs by the attachment of different kinds of morphemes, in the sense that *-ed* and *-ing* adjectives are derived from EO verbs and that nominals are formed by attaching nominal affixes to EO verbs. We would like to claim that the acquisition of these predicates can mostly be reduced to the acquisition of EO verbs.

Recall that English psych verbs of the EO class involve a zero CAUS. As demonstrated and argued in Chapter 3, the zero CAUS is a grammatical morpheme which changes the argument structure of the root to which it is affixed by means of adding the theta role of Causer and triggering the anaphoric pro to move up so as to be licensed. Thus, it is this null CAUS that is responsible for the unique syntactic properties of psych EO verbs, such as the T/SM restriction and backwards binding. As for psych adjectives and psych nominals, the interaction of the zero CAUS with the *-ing* affix but not with the *-ed* affix or nominal affixes results in the consequences that *-ing* adjectives are grouped with EO verbs on the one side, while *-ed* adjectives and nouns with ES verbs on the other side with respect to the above mentioned properties.

That said, the acquisition of EO verbs relies, to a large extent, on the acquisition of this zero morpheme CAUS. This leads to our first general hypothesis: where there is a zero CAUS, there should be a potential problem for L2 learners. This is because the zero

CAUS will crucially add a Causer argument when it is attached to the root. Since this zero CAUS is invisible in phonology, L2 learners of English may have considerable difficulty recognizing its existence. If they fail to detect the presence of the zero CAUS, they should fail to recognize the role of the Causer argument. Consequently, they should incorrectly assume that EO verbs take an Experiencer and a T/SM as the θ-grid. As a result, they should mistakenly map the Experiencer to the subject position and the T/SM to the object position, producing ungrammatical sentences like **John frightens the exam.*

If the hypothesis is correct that the zero CAUS is problematic for learners, then those psych predicates which do not involve a zero CAUS should not be problematic. When there is no zero CAUS, there is no Causer. Thus, the Experiencer is realized as the subject and the T/SM as the object. As it stands, ES verbs, *-ed* adjectives and nominals are predicted to be relatively easier with respect to the semantics-syntax correspondence. In contrast, *-ing* adjectives bear the zero CAUS, therefore, they should constitute particular problems. To be more specific, L2 learners of English should have difficulty recognizing the existence of the zero CAUS in *-ing* adjectives. In that case, learners should also incorrectly place the Experiencer in the subject position, producing such ungrammatical sentences as **John is frightening to the exam.*

Once zero CAUS is acquired, the properties that go with it (i.e., the T/SM restriction and the possibility of backwards binding) should also be acquired, for both EO verbs and *-ing* adjectives.

In addition to the zero CAUS, there is another potential source of difficulty with psych EO verbs and *-ing* adjectives. That is the factor of animacy. When EO verbs and *-ing* adjectives take two animate arguments, this may create two potential confusions for learners. First, they may not know which argument to choose as the Experiencer since both are animate. Second, if they happen to place the right argument in the subject position, they may still have some difficulty interpreting the structure. This is because EO verbs with animate subjects are semantically ambiguous as showing an agentive reading

and a psych reading, as discussed in Chapter 2. This may also be true with *-ing* adjectives in terms of difficulty in selecting the right argument and in interpreting the structure. Therefore, animacy interacting with the zero CAUS may add one more problem to the acquisition of psych predicates.

Finally, if L1 transfer is crucial in L2 acquisition, another hypothesis is made. Namely, should L1 be influential in L2 acquisition, then among the two groups of ESL learners, Chinese learners of English should undergo more difficulty in acquiring psych predicates than French learners of English, because Chinese is more different from English than French in terms of verbs, adjectives and nouns. As illustrated in Chapter 3, psych predicates in Chinese differ from psych predicates in English. In terms of EO psych verbs, Chinese involves an overt causative morpheme, whereas English contains a zero causative morpheme. In terms of psych adjectives, Chinese does not have any morphological markers distinguishing the class of adjective which takes the Experiencer as the subject from the class of adjective which takes the Causer as the subject; while English has a distinction in morphology between the two classes, with one marked by *-ing* and the other by *-ed*. In terms of psych nouns, again Chinese does not have any morphological markers, whereas English has nominal affixes such as *-ance, -ment, -ion*, which attach to EO verbs to form psych nouns.

As far as French is concerned, psych predicates present quite a number of similarities with psych predicates in English. Just as in English, EO verbs in French contain a zero causative morpheme. Psych adjectives in French also have a distinction between the class of adjective which is morphologically marked by *-ant*, corresponding to the English *-ing* class of adjective, and the class of adjective which is morphologically marked by *-é*, corresponding to the English *-ed* class. For French psych nouns, they can also be derived from EO verbs by adding certain nominal affixes, as is the case in English. In a word, the most crucial difference between Chinese and French is that Chinese lacks the null CAUS, whereas French has it.

To address the issue of L2 acquisition of psych predicates, three specific questions need to be answered. First, is the mapping between thematic roles and structural positions arbitrary or systematic in learners' IL grammars? If the UTAH and the Thematic Hierarchy are available in SLA, learners' IL grammars should be systematic. Second, is the T/SM restriction learnable for L2 learners? If L2 learners know that there is a zero CAUS with EO verbs, then they should know that the existence of this zero CAUS is not compatible with the presence of a T/SM. In other words, they should know that the T/SM argument is not allowed to cooccur with the Causer. Third, is the property of backward binding learnable for L2 learners? If the c-command condition and the binding principles (specifically, Principle A) are available in SLA, and if L2 learners are able to recognize the zero CAUS, then they should accept backward binding with psych predicates.

Overall, the above predictions for the present work are summarized as main and secondary hypotheses, given as follows:

Main Hypothesis I: L2 learners will initially fail to detect the zero CAUS; this predicts the following:

A. EO verbs should be more difficult than ES verbs due to the existence of the zero CAUS in the former. In particular, an incorrect mapping of thematic arguments onto syntactic positions should occur, with the Experiencer being placed in the subject position for EO verbs.

B. *-ing* adjectives should be more difficult than *-ed* adjectives due to the presence of the zero CAUS in the former. Specifically, an incorrect mapping of thematic arguments onto syntactic positions should occur, with the Experiencer projecting in the subject position for the class of *-ing* adjectives.

C. Psych nouns and *-ed* adjectives should be the easiest to acquire among the three types of psych predicates, because they do not have the zero CAUS.

Main Hypothesis II: When the zero CAUS is acquired, there will be the following predictions:

A. a T/SM with the Causer should be rejected for both EO verbs and *-ing* adjectives.

B. backwards binding should be accepted with both EO verbs and *-ing* adjectives.

Secondary Hypothesis I: If animacy interacts with the zero CAUS in the representation of argument structure, then

A. EO verbs with animate subjects should be more difficult than EO verbs with inanimate subjects due to the confusion in choosing the appropriate Experiencer from the two animate arguments and the ambiguity in readings.

B. *-ing* class adjectives with animate subjects should be harder than the same class of adjectives with inanimate subjects for the same reasons.

Secondary Hypothesis II: If L1 plays a crucial role in L2 acquisition, then

Chinese learners of English should have more difficulty acquiring English psych predicates than French learners of English.

5.2 Subjects

Altogether 101 Chinese learners of English and 35 French learners of English were tested, as well as a group of 28 English natives speakers as controls. All Chinese subjects were university students from Guangzhou Foreign Language Institute, P.R.China. Their average age was 20.5, ranging from 18 to 23 years old. These students, who were majoring in Foreign Trade, were recruited from four different levels: 25 freshmen, 26 sophomores, 25 juniors and 25 seniors. At the time of testing, the 25 freshmen had been in the Institute for almost one academic year; the English courses that

they took were Essential English I, Communicative English I, Listening Comprehension I, Spoken English I, English Video, Listening and Speaking, and International Business English.[64] The 26 sophomores had been in the Institute for two years. In addition to what they had learned for the first year, they had the following courses: Essential English II, Communicative English II, Listening Comprehension II, International Business English, English Composition I, Spoken English II, and English Video, Listening and Speaking. The 25 juniors who were at the Institute for the third year had the following courses: Advanced English I, English Composition II, Oral Translation I and Written Translation II. Finally, the 25 seniors had Advanced English II, English lexicography, Oral Translation II and Written Translation.

For the first-year and second-year students, Spoken English or English Composition was taught by native speakers of English. For the third-year and fourth-year students, International Business or International Trade was taught by native speakers of English and some of the commerce courses were taught in English by Chinese teachers. All the Chinese subjects' exposure to English was mainly from various classes, from English television programs and English broadcast programs such as VOA (Voice of America) and the BBC (British Broadcasting Corporation), and occasionally from communication with English native speakers who worked and studied inside and outside the Institute. Some of them may also have read English newspapers, magazines and novels available in the library in the Institute. It is estimated that these students listened to VOA and the BBC at least an hour per day.

While the time for the English courses was reduced quite a lot by the fourth year, the English input for these fourth-year students did not decrease. Courses in foreign trade and business were all taught in English either by Chinese teachers or English-speaking teachers. Furthermore, these students were required to have a period of six weeks of

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[64] An academic year in a Chinese university consists of two semesters, each having 18 teaching weeks. The subjects were tested one week before the final examination period started.

practical training as part of the program, usually in the Guangzhou Export Commodities Fair, where they got more chances to speak and communicate in English.[65]

None of the above Chinese students had any experience of living in an English-speaking community. However, because of its geographic location (near Hong Kong), a lot of international exhibitions are frequently held in the city of Guangzhou. Furthermore, there are a lot of English-speaking tourists traveling in Guangzhou. Thus, the students in this Institute had considerable exposure to English. From the third year on, students began to learn a second foreign language, usually selected by students themselves. So half of the students that were tested knew a little Japanese, French, or German.

The 35 French subjects were summer school students from the English Language Institute at Queen's University in Kingston, Canada. These students whose average age was 21.74, ranging from 18 to 37 years old, came from different parts of Quebec Province, Canada. At the time of testing, they were enrolled in a 5-week immersion English program at Queen's, including courses in Grammar, Reading, Vocabulary, English Conversation, and Spoken English. All these subjects, who were either college or university students from Quebec, had already received English in a classroom setting in high school before they came to Queen's. It is relevant to mention that the communicative approach to English learning was the only methodology adopted in the classroom at the University.

These learners' exposure to English was certainly much more both in quantity and quality than the Chinese learners, since quite a lot of them came from places where English is also spoken and all of them were living in Kingston at the time of testing. Furthermore, for these French subjects, the average length of time learning English was 10.65 years, which was a bit longer than that for the Chinese subjects, whose average length was 9.22 years. However, the English proficiency of the French subjects as a

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[65] The Guangzhou Export Commodities Fair is the biggest internationally commercial activity in China , held twice a year in Guangzhou. Usually big companies all over the world come to this Fair for business, thus English is used as a communicative language.

whole was relatively much lower than the English proficiency of the Chinese subjects. This is mainly due to the fact that the Chinese subjects were students of foreign trade with quite a demanding requirement on the mastery of English and they entered the Guangzhou Foreign Language Institute through a very competitive nationwide matriculation examination.

There were 28 controls who were either students or staff members from McGill University, Canada. The average mean age for this group of subjects was 24.64, ranging from 18 to 43. All of them were unilingual English speakers, but some of them knew a little bit of French, Spanish, Mandarin, or Japanese which they had learned as adults. None of them were linguistics students.

As the two groups of English learners were from two different schools, having different levels of English proficiency, an independent measure of subjects' English proficiency was needed to allow for comparison of the Chinese subjects and the French subjects' level of English. For this purpose, a Cloze Test was designed, which can be considered as a valid and reliable means to measure learners' English proficiency (Brown 1983; Jonz 1990). The Cloze Test was adapted from a text passage in American Kernel Lessons: Advanced Students' Book (O'Neill et al 1981). On the basis of omitting every sixth word throughout the whole passage, altogether 40 blanks were made. Subjects were required to fill in each blank with one and only one word so as to make the passage meaningful (See Appendix A for the Test). If a blank was filled in with a word which was exactly the same as the word from the original passage, one point was given. Thus, the maximum possible was 40 points. The mean accuracy for the controls was 25.54, ranging from 16 to 31; the mean accuracy for the Chinese learners was 16.69, ranging from 8 to 23; the mean accuracy for the French learners was 11.06, from 0 to 22.

To design a test to measure L2 learners' English proficiency is only the first step. The second step is to establish a norm by which learners of English could be reliably and validly grouped into different levels of proficiency according to their performance on the

test. To satisfy this need, I took the Chinese subjects' mean average of 16.69 as a criterion and set the following standards: If learners' scores of the Cloze Test fell into the range of 15 to 19, they were considered to be at the intermediate level; if learners' scores fell into the range of 20 to over, they were considered to be at a high level; the learners were considered as belonging to the low level if their scores fell into the range of 8 to 14. In this way, the Chinese subjects were divided into three groups: low, intermediate, and high. Similarly, the French subjects were grouped into two classes: low and intermediate. Detailed information about the groupings of subjects are reported in Table 1.[66]

Table 1. Grouping of Chinese and French Subjects by Cloze Test

Groups of Subjects	Mean	SD	Score Range	Mean Age
Controls (n=24)	25.54	2.39	20-31	23.65
LowChi (n=25)	12.160*	1.908	8-14	19.96
InterChi (n=44)	17.159*	1.328	15-19	20.61
HighChi (n=22)	20.909*	1.192	20-23	20.77
LowFre (n=15)	11.133*	2.066	8-14	20.46
InterFre (n=9)	16.222*	1.302	15-19	19.11

*: Significant at ($p<.05$)

There were significant differences between the mean scores of these groups on the Cloze Test ($F(5, 133)=210.83$, $p<.001$). Scheffé tests show that all L2 groups were significantly lower than the controls. In addition to that, the low level Chinese were significantly lower than the intermediate level Chinese, who were significantly lower than the high level Chinese; similarly, the low level French were significantly lower than the

[66] As a result of excluding those who got a score which was lower than 8 and those who failed to complete the tests, only 91 Chinese subjects and 24 French subjects were qualified to be retained as subjects in the investigations of psych predicates. As for the controls, 4 were also removed from the analysis due to the failure to reach the minimum score of 20 in terms of the Cloze Test and the failure to complete the tests.

intermediate level French. But no significant differences showed up between the low level Chinese and the low level French, between the intermediate level Chinese and the intermediate French. [67]

One would expect that the higher the grade in the Institute, the higher the English proficiency. But this was not always the case, due to various factors. As shown in Table 2, which presents how the Chinese students are distributed with respect to the three levels of English proficiency based on their performance on the Cloze Test, one of the first-year and four of the second-year students fell into the high level group, while five of the third-year students fell into the low level group.

Table 2: English Proficiency on Cloze Test and University Levels for Chinese Subjects

Levels on the Cloze Test	Levels in the Institute	Gender Composition
LowChinese n=25	U1 n=13 U2 n=7 U3 n=5	F n=7; M n=6 F n=3; M n=4 F n=4; M n=1
InterChinese n=44	U1 n=7 U2 n=14 U3 n=10 U4 n=13	F n=6; M n=1 F n=11; M n=3 F n=4; M n=6 F n=2; M n=11
HighChinese n=22	U1 n=1 U2 n=4 U3 n=9 U4 n=8	F n=1; F n=2; M n=2 F n=5; M n=4 F n=7; M n=1

[67]One might argue that the way of grouping subjects into different levels was quite arbitrary. This grouping has some statistic justification through a regression test of subjects' scores of the Cloze Test. The results of such regression test on the three groups of Chinese subjects were significantly reliable (R^2=.74, p<.0001), so were the results of the regression test on the two groups of French subjects (R^2=.83, p<.0001), suggesting that subjects were appropriately grouped by this means. I should thank Johanne Paradis for helping me with this.

5.3 Predicates

Six ES class verbs were tested: *enjoy, blame, admire, dislike, like* and *fear*. Six EO verbs were chosen which approximately matched the above six ES verbs in meaning, *amuse, annoy, fascinate, frustrate, please, terrify*. In addition, there were six agentive verbs which were used either as controls or as distracters throughout the test. They were *chase, kick, hit, lift, pull, push*.

The *-ing* adjectives derived from the six EO verbs were *amusing, annoying, fascinating, frustrating, pleasing* and *terrifying*. The six corresponding *-ed* adjectives were *amused, annoyed, fascinated, frustrated, pleased* and *terrified*. Three *-ing* and three *-ed* adjectives derived from ES verbs, and three *-ed* adjectives derived from nonpsych action verbs were used as controls: *admiring, enjoying, loving, admired, enjoyed, loved, improved, performed, refused*. Finally, the six corresponding nominals were *amusement, annoyance, fascination, frustration, pleasure* and *terror*. As controls, there were three nominals derived from ES verbs *love, admiration, enjoyment*, and six nominals derived from nonpsych verbs, *imitation, improvement, performance, refusal, rejection, treatment*. A summary of the psych predicates used in the tests is given in Table 3.

Table 3: Psych Predicates Used in the Experiment

Psych Verbs (n=12)		Psych Adjectives (n=12)		Psych Nouns (n=6)
ES	EO	*-ing*	*-ed*	
enjoy	amuse	amusing	amused	amusement
blame	annoy	annoying	annoyed	annoyance
admire	fascinate	fascinating	fascinated	fascination
dislike	frustrate	frustrating	frustrated	frustration
like	please	pleasuring	pleased	pleasure
fear	terrify	terrifying	terrified	terror

5.4 Tasks

Three tasks were designed to evaluate the above hypotheses. The first task was a Picture Identification Task (PI) to look at the argument structure of ES and EO verbs. The second task was a Multiple Choice Task (MC) to investigate psych adjectives, including the *-ing* class and the *-ed* class, and psych nouns. The third task was a Grammaticality Judgment and Correction Task (GJ), which covered all the three kinds of psych predicates, with a focus on the T/SM restriction and the binding phenomenon. Details of these tasks are described in the following sections.

5.4.1 Picture Identification Task

In the PI task which tests learners' knowledge of the mapping of arguments of ES and EO verbs onto syntactic positions, subjects were required to judge by choosing TRUE or FALSE whether a picture matched a sentence given underneath. There were six types of structures involved, each with six tokens for TRUE choices and six tokens for FALSE choices. The coding and examples of these six types of structures are given in Table 4.

Table 4: Coding and Examples of Six Structures in the PI Task

Types	Coding	Examples
I	Active	Tom pulls Mary
II	Passive	Mary is pulled by Tom
III	ES+AO	Mary admires the model
IV	ES-AO	Mary admires the painting
V	EO+AS	The clown amuses Tom
VI	EO-AS	The book amuses Tom

Note: +AO=animate object, -AO=inanimate object, +AS=animate subject, -AS=inanimate subject

Type I and Type II were included to determine whether subjects are successful with regular verbs in mapping the Agent and the Theme onto subject and object positions in both active and passive structures. In other words, we need to know, first, whether learners of English were capable of placing a Theme in the subject position for a passive sentence as well as choosing an Agent in the subject position for an active sentence. If learners who do well with actives do not perform well with passives, these learners might have difficulty choosing an argument other than the Agent in subject position in general. Then these learners might also have some difficulty correctly mapping the arguments of psych verbs onto syntactic positions. In particular, they would not feel comfortable to have a non Experiencer as the subject. If there are no passive structures used as controls in the test, we cannot tell from mistakes on EO verbs whether learners had a special problem with psych verbs in particular or had a general problem with choosing a Theme in the subject position. Type V and Type VI were designed to examine whether animacy in the subject position would be interacting with the zero CAUS in EO verbs. Type III and Type IV were included to test whether the factor of animacy plays a role with ES verbs which involve no zero CAUS.

For each verb, the same sentence was used twice, with one picture intended to trigger the answer TRUE and the other triggering the answer FALSE. Each ES verb alternatively took an animate object and an inanimate object; each EO verb had an alternation of taking an animate subject and an inanimate subject. There were altogether 72 stimuli. Each page in the test booklet contained only one picture/sentence. Examples are provided in (1). For the details of the task, refer to Appendix B.

(1)

Tom enjoys the book (T)

(2)

Tom enjoys the book (F)

5.4.2 Multiple Choice Task

In the MC task which tests learners' knowledge of psych adjectives and psych nouns, subjects had to choose out of three options one answer which should best describe a given sentence. There were eight types of structures in this task. The information about these types of structures, and examples are given in Table 5.

Table 5: Coding and Examples of Eight Types of Structures in the MC task

Types	Coding	Examples
I	-ing+AS	Tom was annoying
II	-ing-AS	The weather was annoying
III	-ed	Tom was annoyed
IV	Nonpsych-ed	The task was nicely performed
V	PsychN+AC	John's amusement at the clown was considerable
VI	PsychN-AC	John's amusement at the show was considerable
VII	NonpsychN+AC	John's treatment of Cathy was rude
VIII	NonpsychN-AC	John's refusal of the offer was reasonable

Note: +AS=animate subject,-AS=inanimate subject,
+AC=animate complement, -AC=inanimate complement

As one of the hypotheses to be tested is whether animacy interacting with the zero CAUS interferes in learners' interpretations of psych predicates, the factor of animacy was purposefully manipulated in this task. Except for Type III and Type IV, all the other six types were the minimal pairs, with the only difference being whether the subject or a complement was animate or inanimate. Type I and Type II which involved *-ing* adjectives were to examine whether learners would be aware that both animate and inanimate arguments could be used as the subject for *-ing* adjectives. Type III was to test whether learners would know that for *-ed* adjectives only the animate but not inanimate argument should be used as the subject. Type IV was to check whether learners know that some nonpsych verbs and ES verbs can also take the *-ed* morpheme to form adjectives.[68] They were adjectives with the *-ed* morpheme attaching to action verbs *improved, performed* and *refused* and adjectives with *-ed* attaching to ES verbs *admired, enjoyed* and *loved*. Type V and Type VI were to determine whether learners know the argument structure of psych nominals. Type VII and Type VIII were to test whether learners are familiar with

[68] For the sake of reference, we call this type of adjectives Nonpsych-ed adjectives rather than nonpsychEO-ed adjectives, though they are derivatives of both nonpsych verbs and psych ES verbs. We use this term simply in contrast with psych *-ed* adjectives in Type III, which are adjectives derived from EO verbs.

the argument structure of nonpsych nominals. If learners have difficulty with regular nominal structures, we could hardly expect them to do well with psych nominals. From this perspective, Types VII and VIII were used as the controls for psych nouns, and Type IV as the control for *-ed* adjectives. No such parallel controls were created for *-ing* adjectives because it was not easy to construct *-ing* adjectives with nonpsych verbs.

For this task, a sentence was provided as a context followed by three options: two options had adjectives used as predicates, with one of them in the *-ing* form and the other in the *-ed* form. The third option always gave the opposite meaning of the given context sentence. If it was an *-ing* adjectival structure, the subject could either be animate or inanimate. Thus, for each *-ing* adjective, two kinds of structures were intended to be prompted, one with an animate subject and the other with an inanimate subject. Note that for some of the stimuli which were intended to trigger an *-ing* adjective with an inanimate subject, the *-ed* form was actually ungrammatical, but it had to be there for purposes of consistency. Sometimes the context sentence contained an adjectival structure itself, using an adjective which was a synonym of the *-ing* adjective. As a rule, a word morphologically related to the psych predicate which was to be primed in the options never appeared in the stimulus sentence. The examples given in (2) and (3) were used in the test, intended to trigger the acceptance of the *-ing* adjectival structure, with one taking an animate subject and the other taking an inanimate subject.

(2) The waiter provided good service and the customer was happy. (C)
   A. The waiter was impatient.
   B. The waiter was pleased.
   C. The waiter was pleasing.

(3) John's presentation at the conference was excellent. (A)
   A. The presentation was pleasing.
   B. The presentation was pleased.
   C. The presentation was terrible.

In contrast, an *-ed* adjective could only take an animate subject, therefore, only one kind of structure was primed. As an animate subject can be used either with an *-ing* adjective or an *-ed* adjective, the options provided for choice could both be grammatical but only one of them would be correct in the given context. Again, any word morphologically related to the psych predicate primed in the options did not appear in the stimulus sentence. An example intended to trigger the choice of an *-ed* adjective is given in (4).

(4) The tourist was happy with the sights of Montreal. (B)
   A. The tourist was unhappy.
   B. The tourist was pleased.
   C. The tourist was pleasing.

In the case of nominals, a context sentence with no nominal form was given as a stimulus. Two options were parallel structures having a nominal use of psych verbs, with one beginning with an animate NP followed by an inanimate complement and the other beginning with an inanimate NP followed by an animate complement. Again, the third option was semantically the opposite of what was given in the stimulus. As before, any word morphologically related to the nominal form of the prompted predicate did not appear in the stimulus. For each psych nominal, the stimulus was controlled to take an animate object on one occasion, and an inanimate object on the other occasion. In this way, each psych noun had two chances to be primed. Examples of two kinds of nominal structures are given below, with one having an animate complement, as in (5), and the other having an inanimate complement, as in (6).

(5) Children really love whales. (C)
   A. Children do not like whales.
   B. Whales' pleasure of children is incredible.
   C. Children's pleasure with whales is incredible.

(6) Jane especially liked the food at the French restaurant. (B)

A. Jane was sick of the food at the French restaurant.

B. Jane's pleasure with the food was great.

C. The food's pleasure of Jane was great.

There were 30 items for psych adjectives and nouns, and 18 controls (including 6 *-ed* adjectives and 12 nominals, all derived from ES verbs and nonpsych verbs). Altogether the test contained 48 items. For the details of this task, refer to Appendix C.

5.4.3 Grammaticality Judgment and Correction Task

In the GJ task which tests learners' knowledge of all the three type of psych predicates with respect to the T/SM restriction and binding properties, subjects had to first of all judge whether a given sentence was grammatical; if a sentence was considered to be ungrammatical, mistakes were expected to be corrected. Since it is sometimes difficult for a learner of English to correct an ungrammatical sentence, subjects were instructed to, at least, circle the part of a sentence where they thought a mistake had occurred, if they could not correct it. Altogether eleven types of structures were designed, each having 6 tokens. The information about the coding, and examples are given in Table 6. For details of the task, refer to Appendix D.

Table 6: Coding and Examples of Eleven Types of Structures in the GJ Task

Types	Coding	Examples
I	ES (G)	Drivers blame snowstorms for accidents
II	EO (U)	*Politicians annoy political essays
III	EO-T/SM (U)	*The essay annoyed the politicians at the author
IV	-ing-T/SM (U)	*The essay is annoying to the politicians at the author
V	-ed-T/SM (G)	The politicians are annoyed with the political essay
VI	Noun (G)	The politician's annoyance with the political essay is considerable
VII	make (G)	The essay made the politicians annoyed with the author
VIII	Nonpsych-FB (G)	The politician wrote a book about himself
IX	Nonpsych-BB (U)	*A friend of himself hit John
X	EO-BB (G)	The essay about himself annoyed the politician
XI	-ing-BB (G)	The essay about himself is annoying to the politician

Note: FB=forwards binding, BB=backwards binding

Type I and Type II were included to determine whether subjects know the basic argument structure of ES and EO verbs, namely that the Experiencer is placed in the subject position for ES verbs but in the object position for EO verbs. Type III, Type IV, Type V, Type VI, and Type VII were designed to examine subjects' knowledge about the T/SM restriction. Specifically, we would like to know whether subjects would be aware that the structures having a T/SM argument are ungrammatical with EO verbs (i.e., Type III) and *-ing* adjectives (i.e., Type IV), because both contain a zero CAUS which rules out the cooccurrence of the T/SM argument with a Causer; and that the structures having a T/SM are grammatical with *-ed* adjectives (i.e., Type V) and psych nominals (i.e., type VI), because both of them do not have a zero CAUS; and that the structures having a T/SM are grammatical with the verb *make* (i.e., Type VII) which has an overt CAUS, allowing the coocurrence of the T/SM argument with a Causer. Type VIII, Type IX, Type X and Type XI were included to test whether subjects have knowledge about binding properties. In particular, we are interested in finding whether subjects know that for

nonpsych verbs like *write, describe*, etc, only forwards binding is allowed (i.e. Type VIII) but not backwards binding (IX); however, for psych verbs like *amuse* (i.e. Type X) and psych adjectives like *amusing* (i.e., Type XI), only backwards binding is allowed.

5.5 Procedure

All the three tests were constructed with two versions differing only in the order of items presented to control for any possible order bias. For the MC task, the correct item was also randomly placed in each of the three options so that subjects could not work out a pattern for correct answers merely by guessing. The same methodology was adopted for the GJ task, in which orders of grammatical and ungrammatical sentences and the various types were randomized. All the tests including the Cloze Test were piloted once on ten native controls and twice on ten Chinese learners of English separately.

Two groups of experimental subjects were tested together in a classroom by two trained assistants in Guangzhou, P.R.China and in Kingston, Canada respectively. Native controls were tested, some individually and some in groups in Montreal, Canada. Irrespective of where the subjects were tested, the order of administration of the tests was the same. Subjects first filled in a Language Profile including questions about age, sex, the period of time of English learning, etc. Then they did the three tasks in a random order. When they finished the three tasks, they did the Cloze Test. There was no time limit for any of the tests, but most of the subjects completed the tests within an hour and a half.

5.6 Results

In 5.6.1, I will outline the correlation results between subjects' performance on the Cloze Test and their performance on the three tasks. I will provide group results of the

three tasks in 5.6.2, and individual results in 5.6.3. In 5.6.4, I will report on the results across three tasks.

5.6.1 Correlation Results between the Cloze Test and the Three Tasks

Recall that the Cloze Test was used to evaluate subjects' English proficiency. Therefore, it is important to know whether the test does the job effectively. If it is valid in this regard, then a statistical correlation should exist between subjects' performance on the Cloze Test and their performance on the three tasks. For this purpose, three correlation tests were run between the scores of the Cloze Test and the total accuracy scores on each task for the two groups of learners. As the French subjects had scores of the English Language Institute's Test of English as a Foreign Language used by Queen's University as an English placement test, a correlation test was also conducted between their Cloze Test scores and their placement test scores. Results of the correlations are given in Table 7 for the Chinese subjects and in Table 8 for the French subjects.

Table 7: Correlation between Cloze Test Scores and Total Scores on Other 3 Tests

Subjects	Tasks	Co. Coefficient	Prob.
Chinese n=91	PI	.215	P=.0403*
Chinese n=91	MC	.389	P=.0001**
Chinese n=91	GJ	.392	P=.0001**

*: Significant at (p<.05), **: Significant at (p<.005)

Table 8: Correlation between Cloze Test Scores and Total Scores on Other 4 Tests

Subjects	Tasks	Co. Coefficient	Prob.
French n=24	Placement	.603	P=.0018**
French n=24	PI	.451	P=.0269*
French n=24	MC	.713	P=.0001**
French n=24	GJ	.619	P=.0001**

*: Significant at (p<.05), **: Significant at (p<.005)

It can be seen from Table 7 and Table 8 that both the Chinese and the French groups of learners showed significant correlations between their performance on the Cloze Test and their performance on the other tasks, suggesting that those who had a good score on the Cloze Test also acted well on the other three tests; those who had a bad score on the Cloze Test were less accurate on the other tests. These results suggest that the Cloze Test was a valid measure of proficiency.

5.6.2 Group Results

In this section I will show how subjects at different levels of English proficiency performed on the three tasks in terms of the hypotheses. I will concentrate on whether subjects were able to recognize the zero CAUS with EO verbs and *-ing* adjectives, whether subjects were sensitive to the animacy factor, whether subjects were able to determine the grammaticality of the T/SM restrictions with various kinds of structures, and whether subjects were able to judge the grammaticality of sentences with backwards binding. While doing so, I will compare the performance of the Chinese with that of the French. I will first look at the PI task, then the MC task, and finally the GJ task.

5.6.2.1 Results of Picture Identification Task

Recall that this task focused on the two types of psych verbs. Our main prediction is that if the zero CAUS has not been acquired, learners should incorrectly assume that both ES and EO verbs take an Experiencer as the subject, and that performance will be worse on EO verbs, because only the Causer can occur as subject with these verbs.

Since active and passive sentences with nonpsych verbs were included to determine whether subjects were able to correctly place an argument in the correct syntactic position with agentive verbs, we first look at subjects' performance on these two types of structures. Table 9 shows the results, with total mean accuracy scores for TRUE

answers and total mean accuracy scores for FALSE answers added together for both actives and passives.

Accuracy is defined as follows: If a given sentence matched a given picture and the subject chose the answer TRUE, then a point was granted; if a given sentence did not match a picture and the subject chose the answer FALSE, then the subject would also get a point. With 6 TRUE items and 6 FALSE items, the total mean accuracy should be 12 as the maximum. As can be seen in Table 9, on both actives and passives, accuracy was high for all groups. Statistically, there was no significant difference between the learners and the controls, and no significant difference between any groups of L2 learners.

Table 9: Accuracy on Actives and Passives in the PI Task

Groups of Subjects	Type I Active Mean	SD	Type II Passive Mean	SD
Controls (n=24)	11.96	.20	11.88	.33
LowChi (n=25)	11.04	1.17	10.96	1.37
InterChi (n=44)	11.14	1.09	11.25	1.06
HighChi (n=22)	11.55	.86	11.05	1.25
LowFre (n=15)	11.53	.74	11.33	.90
InterFre (n=9)	12.00	0	11.78	.44

Subjects' performance on ES and EO verbs is given in Table 10. Here, the maximum accuracy score possible was 24, with 6 animate subjects or objects and 6 inanimate subjects or objects, each having 6 TRUE and 6 FALSE items. Accuracy was high on both verb types. With respect to the performance on ES verbs versus the performance on EO verbs, there was a significant group effect ($F(5, 133)=8.267$, $p<.0001$), a significant verb type effect ($F(1, 133)=27.3$, $p<.0001$), and a significant interaction effect between the groups of subjects and the types of verbs ($F(5, 133)=8.892$, $p<.0001$).

Table 10: Accuracy on ES and EO as a Whole in the PI Task

Groups of Subjects	ES (12+12) Mean	SD	EO (12+12) Mean	SD
Controls (n=24)	23.67	0.87	23.50	0.78
LowChi (n=25)	22.16	1.63	19.36	2.91
InterChi (n=44)	22.25	1.84	21.02	2.27
HighChi (n=22)	22.23	2.07	21.83	2.26
LowFre (n=15)	20.67	1.29	21.93	1.49
InterFre (n=9)	22.56	0.88	22.00	1.41

Scheffé tests show that the intermediate level Chinese learners were significantly worse than the controls on ES verbs, as were the low level French learners; on EO verbs, the low and intermediate level Chinese learners were significantly worse than the controls; the low level French learners were not significantly worse than the controls. In terms of performance on ES verbs versus EO verbs, the low and intermediate level Chinese learners were significantly more accurate on ES verbs than on EO verbs, supporting the hypothesis. The high level Chinese learners acted like the controls, with no significant difference between the two types of psych verbs. As for the French subjects, the intermediate level learners also acted like the controls, showing no significant difference between the performance on ES verbs and the performance on EO verbs. However, the low level French learners were significantly more accurate on EO verbs than on ES verbs, which is against our hypothesis.

Results of learners' performance on ES and EO verbs in terms of animacy are given in Table 11. First, comparing the results by animacy across the two subclasses of ES verbs, (i.e., ES+AO versus ES-AO), a repeated measures ANOVA shows a significant group effect ($F(5, 133)=6.61$, $p<.0001$), a significant verb type effect ($F(1, 133)=34.646$, $p<.0001$), and a significant interaction effect between the groups of subjects and the subclasses of ES verbs ($F(5, 133)=6.045$, $p<.0001$).

Table 11: Accuracy on ES and EO verbs by Animacy in the PI Task

Groups of Subjects	Type III ES+AO Mean	SD	Type IV ES-AO Mean	SD	Type V EO+AS Mean	SD	Type VI EO-AS Mean	SD
Controls(24)	11.83	.57	11.83	.57	11.58	.65	11.92	.28
LowChi(25)	10.68	1.07	11.48	.92	9.16	1.52	10.60	1.38
InterChi(44)	10.89	1.26	11.36	1.10	9.91	1.52	11.11	1.22
HighChi(22)	10.96	1.33	11.27	1.12	10.41	1.68	11.41	1.01
LowFre(15)	9.27	1.63	11.40	.63	10.27	1.39	11.67	.49
InterFre(9)	10.89	.93	11.67	.71	10.22	1.30	11.78	.44

Next, comparing the results by animacy across the two EO types, (i.e., EO+AS versus EO-AS), there was a significant group effect ($F(5, 133)=9.635$, $p<.0001$), and a significant verb type effect ($F(1, 133)=79.769$, $p<.0001$), but there was no significant interaction effect between the groups of subjects and the types of EO verbs ($F(5, 133)=1.955$, $p=.0895$).

According to Scheffé tests, the low level Chinese learners were significantly less accurate than the controls on ES verbs taking animate objects; the low level French learners were also significantly less accurate than the controls, and all the three groups of Chinese subjects. As for ES verbs taking inanimate objects, no significant differences showed up between any of the groups. On EO verbs, when the subject is animate, the low and intermediate level Chinese learners were significantly worse than the controls; no significant difference showed up between any groups of French learners and the controls. When the subject is inanimate, it is only the low group of Chinese learners who were significantly worse than the controls, with no significant difference between the French subjects and the controls. For both ES and EO verbs, the high level Chinese learners acted quite like the controls.

As the hypothesis predicts, animacy in the class of EO verbs should adversely affect L2 learners of English. This is supported by the following results. In terms of

performance on EO verbs taking animate subjects versus EO verbs taking inanimate subjects, all the groups except for the controls and the high level Chinese learners showed a significantly better performance on the type involving inanimate subjects than the type involving animate subjects. However, more or less the same results were also found with respect to the performance on ES verbs involving animacy, though no zero CAUS is concerned. That is, the low level French learners performed significantly better on ES verbs taking inanimate objects than ES verbs taking animate objects, so did the low level Chinese and the intermediate level French according to Fisher tests. The controls, the high level Chinese and the intermediate level Chinese learners did not show a significant difference between their performance on the two types.

While ES verbs were generally not problematic, two did cause a particular difficulty for both Chinese and French learners, namely *enjoy* and *fear*. The EO verbs which caused more difficulty for Chinese learners are *fascinate, frustrate* and *please*. While the EO verbs *fascinate* and *frustrate* were not at all problematic for the French subjects when they took inanimate subjects, these two verbs caused some problems when they took animate subjects. Similarly, the ES verb *enjoy* which was not at all problematic for the French learners when it had an inanimate object turned out to be quite problematic when it had an animate object. As for the ES verb *fear*, it was problematic no matter whether it had an animate or inanimate object. As far as the Chinese learners are concerned, the ES and EO verbs *enjoy, fear, fascinate, frustrate* and *please* were problematic in all the cases. Nevertheless, the structures having animate objects with *enjoy* and *fear* were more problematic than the ones having inanimate objects. Likewise, the structures having animate subjects with *fascinate, frustrate* and *please* were more problematic than the ones having inanimate subjects.

To sum up, the group results of the PI task suggest that on the whole the two types of psych verbs were not very difficult for our learners of English contrary to the hypothesis. Where the learners had difficulty, however, the low and intermediate level

Chinese learners of English failed to correctly grasp the argument structure of EO verbs as compared with ES verbs, which is in accordance with the prediction. While the French learners were generally not significantly worse than the controls except for the case of ES verbs taking an animate object, they were not significantly better than the Chinese learners, again contrary to the prediction. In the exceptional case mentioned above, the low level Chinese were significantly more accurate than the low level French. It was also found that EO verbs taking an animate subject were more problematic for low level learners compared with EO verbs taking an inanimate subject; similarly, ES verbs having an animate object were harder for low level learners than ES verbs having an inanimate object. In both situations, the factor of animacy seems to have played a role.

5.6.2.2 Results of Multiple Choice Task

Recall that this task focused on the two types of psych adjectives and psych nouns. Our prediction is that if learners fail to detect the zero CAUS, then *-ing* adjectives should be more difficult than nominals. If the zero CAUS is the source of difficulty, then within the class of psych adjectives, the *-ing* class should be more difficult than the *-ed* class due to the existence of the zero CAUS in the former. As for the *-ed* class adjectives and nominal forms, since neither contain zero CAUS, they should not cause any particular problems.

Subjects' mean accuracy scores of *-ing, -ed* adjectives and nominals are provided in Table 12. Here, accuracy is defined as follows. If a subject chose a correct answer, then the subject got one point. The total accuracy for the 12 *-ing* adjectives (6 taking animate subjects and 6 taking inanimate subjects in the options provided for choice) and 12 nominals (6 animate complements and 6 inanimate complements in the context sentences) is 12 for each type, while the total accuracy for the 6 *-ed* adjectives is 6. To allow comparison on the same basis, subjects' mean accuracy is reported in terms of percentage.

Table 12: Accuracy on *-ing* and *-ed* Adjectives and Nominals in the MC Task

Groups of Subjects	-ing (n=12) Mean	SD	-ed (n=6) Mean	SD	Nouns (n=12) Mean	SD
Controls (n=24)	99.3	.02	100	0	98.0	.06
LowChi (n=25)	85.1	.17	92.6	.13	84.7	.11
InterChi (n=44)	91.5	.11	98.5	.05	93.8	.08
HighChi (n=22)	97.4	.05	98.5	.05	91.7	.12
LowFre (n=15)	78.3	.19	80.0	.35	70.6	.22
InterFre (n=9)	90.8	.11	98.1	.06	91.7	.13

Based on a repeated measures ANOVA test, there was a significant difference between the groups of subjects ($F(5,133)=18.002$, $p<.0001$), a significant difference between the performance on each type of structure ($F(2, 133)=10.587$, $p<.0001$), but there was no significant interaction effect ($F(5, 133)=.992$, $p=.451$)

Accuracy is in general quite high, even on *-ing* adjectives, which is contrary to the prediction. In terms of *-ing* adjectives, the low level Chinese were significantly less accurate than the controls and the high level Chinese; the low level French were significantly less accurate than the controls and the Chinese learners of two higher levels. In the case of *-ed* adjectives, the low level Chinese were less accurate than the controls, the low level French were less accurate than both the controls and the two higher level Chinese. As for psych nominals, significant differences showed up between the low level Chinese and the controls, and the low level French learners were significantly less accurate than the controls and all the three groups of Chinese learners.

As shown in Table 12, accuracy on *-ed* class adjectives is the highest compared with the accuracy on *-ing* and on nouns. However, statistically speaking, only the intermediate Chinese learners acted significantly better on *-ed* adjectives than on *-ing* adjectives. No significant differences showed up between the two types of adjectives for

all the other groups. Regarding *-ed* adjectives and nominals which were not supposed to show any difference, the intermediate and high level Chinese learners were significantly more accurate on *-ed* class adjectives than nominals. Regarding the performance on *-ing* adjectives and the performance on nominals, no significant differences showed up for any groups. It is against our hypothesis that nominal forms should be problematic compared with *-ing* and *-ed* classes adjectives. I will discuss this unexpected result in the next chapter.

Further detailed results of accuracy on *-ing* with animate and inanimate subjects and psych and nonpsych *-ed* adjectives are provided in Table 13. In each case, defining accuracy as described before, 6 is the maximum possible.

Table 13: Accuracy on Adjectival Structures in the MC Task

Groups of Subjects	Type I -ing+AS Mean	SD	Type II -ing-AS Mean	SD	Type III -ed Mean	SD	Type IV NonP-ed Mean	SD
Controls(24)	5.96	.20	5.96	.20	6.00	0	5.83	.38
LowChi(25)	4.88	1.27	5.36	.92	5.56	.77	4.24	1.05
InterChi(44)	5.32	.80	5.66	.65	5.91	.29	4.75	1.01
HighChi(22)	5.77	.43	5.91	.29	5.91	.29	4.64	1.05
LowFre(15)	4.67	1.29	4.73	1.16	4.80	2.08	4.27	1.49
InterFre(9)	5.44	.88	5.44	.73	5.89	.33	5.00	1.12

In terms of performance on the four types of adjectives, a repeated measures ANOVA shows a significant group effect ($F(5, 133)=16.664$, $p<.0001$), a significant type effect ($F(3, 133)=37.111$, $p<.0001$), and a significant interaction effect between the groups of subjects and the types of verbs ($F(5, 133)=1.911$, $p<.0208$).

Concerning the performance on *-ing* adjectives with animate subjects and *-ing* adjectives with inanimate subjects, there was a significant group effect ($F(5, 133)=8.397$,

p<.0001), a significant adjective type effect (F (1, 133)=9.819, p<.0021); on the interaction between the groups of subjects and the types of adjectives, there was no significant difference (F (5, 133)=1.26, p=.2851). As for the performance on the two types of *-ed* adjectives, there was a significant group effect (F (5, 133)=8.238, p<.0001), a significant adjective type effect (F (1, 133)=12.354, p<.0001), and a significant interaction effect between the groups of subjects and the types of adjectives (F (1, 133)=4.506, p<.0001).

Specifically, with respect to *-ing* adjectives taking an animate subject, Scheffé tests show that the low level Chinese and the low level French learners were significantly worse than the controls, but they were not significantly different from each other. Regarding *-ing* adjectives with inanimate subjects, only the low level French subjects were significantly less accurate than the controls. As for psych *-ed* adjectives, again, only the low level French subjects were significantly less accurate than the controls. In the case of nonpsych *-ed* adjectives, all the three groups of Chinese learners were significantly less accurate than the controls: the low French learners were also significantly less accurate than the controls. This unexpected poor performance on nonpsych *-ed* adjectives (i.e., those *-ed* adjectives derived from ES and nonpsych verbs, cf. Footnote 68) was mainly caused by the three *-ed* adjectives which were derived from ES verbs, *admired, enjoyed, loved*. Around half of the learners chose the *-ing* forms, *admiring, enjoying* and *loving* for these *-ed* adjectives.

Concentrating on the performance of *-ing* adjectives taking animate subjects versus the performance on *-ing* adjectives taking inanimate subjects, the results are the following. The controls acted the same on the two structures. Both the low and intermediate level Chinese learners were significantly less accurate on *-ing* adjectives with animate subjects than *-ing* adjectives with inanimate subjects; the high level Chinese learners showed no significant difference. As for the French learners, no significant differences showed up between the two types of structures.

Results of accuracy on nominals with animate and inanimate complements are given in Table 14. Again, 6 is the maximum possible for each type of structure, using the methodology of defining accuracy before.

Table 14: Accuracy on Nominal Structures in the MC Task

Groups of Subjects	Type V PsyN+AC Mean	SD	Type VI PsyN-AC Mean	SD	Type VII nonPN+AC Mean	SD	Type VIII nonPN-AC Mean	SD
Controls (24)	5.83	.38	5.92	.41	5.96	.20	5.96	.20
LowChi (25)	4.92	1.00	5.40	.76	5.56	.92	5.64	.70
InterChi (44)	5.61	.49	5.64	.69	5.84	.53	5.73	.59
HighChi (22)	5.36	.85	5.64	.73	5.91	.29	5.82	.40
LowFre (15)	4.27	1.28	4.20	1.86	4.60	1.60	4.33	1.88
InterFre (9)	5.44	.88	5.56	.73	5.89	.33	5.44	.73

With respect to the four types of nominal structures, a repeated measures ANOVA shows that there was a significant group effect ($F(5, 133)=15.017$, $p<.0001$) and a significant type effect ($F(3, 133)=9.031$, $p<.0001$), with no significant interaction effect between the groups of subjects and the types of verbs ($F(5, 133)=1.299$, $p=.1991$).

In the case of psych nominals involving animate complements and psych nominals involving inanimate complements, we found a significant group effect ($F(5, 133)=13.098$, $p<.0001$), but neither a significant type effect ($F(1, 133)=3.67$, $p=.0575$), nor a significant interaction effect between the groups of subjects and the types of adjectives ($F(1, 133)=1.335$, $p=.2528$). Similar results were obtained for nonpsych nominals having animate complements versus nonpsych nominals having inanimate complements: there was a significant group effect ($F(5, 133)=10.499$, $p<.0001$); but there was no significant type effect ($F(1, 133)=3.327$, $p=.0704$), or significant interaction

effect between the groups of subjects and the types of adjectives (F (1, 133)=1.102, p=.3623).

In terms of psych nominals taking animate complements, it is the low level Chinese and the low level French subjects who were significantly worse than the controls. In terms of the psych nominals taking inanimate complements, only the low level French subjects were significantly worse than the controls. Indeed, this group of learners were also quite inaccurate on nonpsych nominals, indicating that they had problems with nominal structures in general. Between the Chinese subjects and the French subjects, there was no significant difference except for the nominals (psych and nonpsych) taking inanimate complements, where the low level Chinese were better than the low French subjects. However, we did not find any significant differences for any group of subjects with respect to their performance of psych and nonpsych nominals with animate complements versus their performance of psych and nonpsych nominals with inanimate complements.

The results reported above show that the existence of the zero CAUS with *-ing* adjectives did not appear to constitute a bigger problem as compared with *-ed* adjectives and nominals, contrary to the prediction. The results of a one factor ANOVA test on the performance on *-ing* adjectives, *-ed* adjectives and nominals are summarized in Table 15.

Table 15: Performance on *-ing* Adjectives, *-ed* Adjectives and Nominals

Subjects	*-ing* vs. *-ed*	*-ing* vs. Noun	*-ed* vs. Noun
Controls	No difference	No difference	No difference
LowChinese	No difference	No difference	No difference
InterChinese	*-ed* better than - *ing*	No difference	*-ed* better than Noun
HighChinese	No difference	No difference	*-ed* better than Noun
LowFrench	No difference	No difference	No difference
InterFrench	No difference	No difference	No difference

To sum up, the group results of the MC task shows that *-ing* adjectives are more difficult than *-ed* adjectives only for the intermediate level Chinese learners. Nominals which contain no zero CAUS are not easier for learners as compared to *-ing* adjectives. Regarding *-ed* adjectives and nominals, they are generally the same in terms of difficulty degree. For the low and intermediate level Chinese learners, *-ing* adjectives are more difficult when they take an animate subject as compared with the same type of adjectives taking an inanimate subject. While animacy is a real cause of difficulty with psych *-ing* adjectives, it did not cause any particular problem with psych nominals.

5.6.2.3 Results of Grammaticality Judgment and Correction Task

In the GJ task we were testing whether subjects who knew the basic argument structure of ES and EO verbs also knew the particular properties with EO verbs and *-ing* adjectives such as the T/SM restriction and backwards binding. As this task required subjects to judge the grammaticality of a given sentence, and to correct any mistakes of the sentence which was considered to be ungrammatical, I will report the results of this task in two sections, the results of the subjects' judgments in 5.6.2.3.1, and the results of their corrections in 5.6.2.3.2.

5.6.2.3.1 Results of Judgment in the GJ Task

Recall that the hypothesis related to the T/SM and backwards binding properties is as follows. If learners are able to figure out the presence of the zero CAUS, we should expect them to work out the ungrammaticality of the T/SM with EO verbs and *-ing* adjectives, and the grammaticality of the T/SM with *-ed* adjectives, nominals and *make* constructions; we should also expect them to realize that backwards binding was acceptable with EO verbs and *-ing* adjectives even though only forwards binding was acceptable with nonpsych verbs.

Results of the judgments are reported in terms of mean accuracy. Mean accuracy is defined as follows. If a grammatical sentence was judged as grammatical and an ungrammatical sentence as ungrammatical with an acceptable correction (the criteria used to determine whether corrections were considered to be acceptable will be explained in detail in the section of results about corrections), a point was granted. The total maximum possible for each type of structure is 6. Table 16 presents subjects' performance on the basic properties of ES and EO verbs.

Table 16: Accuracy on ES and EO Verbs in the GJ Task

Groups of Subjects	I (G) ES Mean	SD	II (U) EO Mean	SD
Controls (n=24)	6.00	0	5.54	.78
LowC (n=25)	5.72	.54	3.12	2.05
InterC (n=44)	5.84	.43	4.75	1.45
HighC (n=22)	5.92	.29	5.05	1.36
LowF (n=15)	5.87	.35	3.07	1.71
InterF (n=9)	6.00	0	4.33	1.58

A repeated measures ANOVA shows that there was a significant difference between the groups of subjects ($F(5,133)=10.768$, $p<.0001$), a significant difference between the performance on the ES class versus the EO class ($F(1, 133)=117.997$, $p<.0001$), and a significant interaction ($F(5, 133)=8.037$, $p<.0001$).

In terms of verb types, a one factor ANOVA test indicates no significant difference between the six groups of subjects ($F(5, 133)=1.715$, $P<.1354$) for the ES class. For the EO class, a one factor ANOVA test reveals a significant difference among the six groups of subjects ($F(5, 133)=9.895$, $P<.0001$). For this particular class, Scheffé tests show that the low level Chinese learners and the low French learners were

significantly worse than the controls, and they were significantly worse than the intermediate and the high Chinese learners respectively. No significant differences showed up between the low Chinese and the low French, nor was there any significant difference between the intermediate Chinese and the intermediate French. In terms of performance by each group of learners on the two verb types, the low and intermediate level Chinese were significantly less accurate on EO verbs than ES verbs; the low and intermediate level French learners were also significantly less accurate on EO verbs than ES verbs. Only the performance by the high level Chinese patterns with the controls, showing no significant differences between the two.

Table 17 provides subjects' performance on the T/SM restriction with EO verbs, *-ing* adjectives, *-ed* adjectives, nominals, and the periphrastic causative (i.e., *make*). Maximum possible score in each category is 6.

Table 17: Accuracy on the T/SM Restriction in the GJ Task

	III (U) EO-T/SM		IV (U) -ing-T/SM		V (G) -ed-T/SM		VI (G) PsychN-T/SM		VII (G) Make-T/SM	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Cont(n=24)	4.58	1.28	5.29	.96	5.67	.76	5.46	1.06	5.42	.83
LowC (n=25)	2.24	1.72	1.96	1.43	4.08	1.53	5.36	.91	3.68	2.02
InterC (n=44)	3.02	1.27	3.23	1.71	4.48	1.46	5.48	.93	4.30	1.97
HighC (n=22)	3.27	1.61	3.73	1.67	4.82	1.30	5.77	.43	4.86	1.46
LowF (n=15)	2.27	1.87	2.80	1.97	3.27	1.91	5.40	1.21	4.93	1.16
InterF (n=9)	3.67	2.00	4.11	1.27	5.22	1.64	5.11	1.05	4.22	1.79

All the five structures contain a T/SM, the grammaticality of which is decided by whether there is a presence of a zero CAUS. If there is a zero CAUS, then a T/SM is not allowed to occur together with the Causer; if there is no zero CAUS or if there is an overt CAUS, then such a T/SM can cooccur with the Causer. EO verbs and *-ing* adjectives have

a zero CAUS, therefore, the sentences with the T/SM are ungrammatical. Both *-ed* adjectives and nominals do not contain a zero CAUS, and the periphrastic structure has an overt CAUS, therefore, all these sentences with the T/SM are grammatical. Here we predict some performance differences between the Chinese learners and the French learners regarding the first four types, since Chinese is different from English, whereas French is similar to English with respect to these structures. We also predict that no performance difference should show up on the structure of the T/SM with the verb *make*, since there is an equivalent of the *make* construction in both Chinese and French.

For all the five types of structures, a repeated measures ANOVA test shows a significant difference between the groups of subjects ($F(5, 133)=20.079$, $p<.0001$), a significant difference between the performance on each type of structures ($F(4,133)=61.023$, $p<.0001$), and a significant interaction ($F(5,133)=2.79$, $p<.0001$).

Further results on each structure are as follows: First, let us look at the subjects' performance on the ungrammatical structures having a T/SM with EO verbs and *-ing* adjectives. All the L2 groups were less willing to reject the bad sentences with EO verbs; as can be seen from Table 17, the mean accuracy is around 3, i.e., chance. In contrast, the controls were more ready to reject the bad sentences with a mean accuracy 4.58, though they were far less accurate than how they acted on ES and EO verbs. Statistically, the low and intermediate level Chinese learners and the low French learners were significantly worse than the controls. The ungrammatical sentences of the T/SM with *-ing* adjectives are also quite problematic: all the L2 learners even including the high level Chinese learners had great difficulty rejecting them, an exception being the intermediate French learners who were fairly accurate. Statistically, all the Chinese learners and the low level French learners were significantly worse than the controls. The low Chinese were significantly less accurate than the high Chinese and the intermediate French.

Next, let us look at subjects' performance on *-ed* adjectives and nominals which are grammatical in English. Regarding these two kinds of predicates, our prediction is

that they should not be problematic, as they do not contain a zero CAUS. This prediction is more or less borne out by the results obtained. In the case of *-ed* adjectives, only the low Chinese and the low French learners were significantly less accurate than the controls. The low level learners' difficulty with *-ed* adjectives is mainly due to the idiosyncratic prepositions that these predicates require. In the case of nominals, no significant differences showed up between any group of learners and the controls, with a high level of accuracy by all groups.

Finally, let us turn to the performance on the *make* construction. As pointed out above, both Chinese and French have the counterparts of the *make* pattern, *shi* in the former and *rendre* in the latter. Our prediction is that both Chinese and French learners of English should have no special difficulty with this structure due to the similarity of L1 and L2. Furthermore, the overt CAUS *make* should be much easier than the zero CAUS in leading learners to the realization that a T/SM is permitted with this structure in English. This prediction is also more or less borne out by the results. All the experimental subjects accepted the T/SM in the *make* structure with an exception for the low level Chinese learners, who were significantly less accurate than the controls.

Since *-ing* adjectives are morphologically derived from EO verbs, and since both behave the same in terms of T/SM violations, a correlation test was conducted between the performance on EO verbs with the T/SM versus *-ing* adjectives with the T/SM. Results show significant performance correlations for the low level Chinese learners ($r=.555$, $p<.004$), for the intermediate level Chinese learners ($r=.584$, $p<.0001$), for the high level learners ($r=.691$, $p<.0004$), for the low level French learners ($r=.731$, $p<.0002$), and almost for the controls ($r=.374$, $p<.0714$), but not for the intermediate level French learners ($r=.538$, $p<.1535$). These results suggest that all the Chinese learners (and maybe the controls) who did better on EO verbs with the T/SM also did better on *-ing* adjectives with the T/SM: and those who did worse on EO verbs also did worse on *-ing* adjectives with the T/SM.

Some of the above results with the T/SM restriction are in favor of our hypotheses, but some are against our hypotheses. The reason why these findings occurred will be discussed in the next chapter.

Table 18 gives subjects' performance on the four structures involving the binding phenomenon. Through a repeated measures ANOVA test, significant differences showed up between the groups of subjects ($F(5,133)=3.125$, $p<.0106$), but not between the performance on each type of structures ($F(3, 133)= 2.36$, $p=.1269$). However, there was a significant interaction effect between the groups of subjects and the types of structures ($F(5, 133)=3.429$, $p<.006$).

Table 18: Accuracy on Binding in the GJ Task

Groups of Subjects	VIII (G) NonPV-FB Mean	SD	IX (U) X (G) NonPV-BB Mean	SD	XI (G) EO-BB-ing-BB Mean	SD	Mean	SD
Controls (n=24)	5.96	.20	5.96	.20	5.21	.98	5.13	1.04
LowC (n=25)	5.32	1.11	3.80	2.31	4.68	.68	4.44	1.32
InterC (n=44)	5.27	.90	4.41	2.26	3.71	2.22	3.64	2.25
HighC (n=22)	5.82	.40	4.68	2.12	3.59	2.40	4.18	2.09
LowF (n=15)	5.60	.63	2.87	2.16	5.60	.83	4.20	2.15
InterF (n=9)	5.67	.71	4.44	1.94	5.22	.97	4.11	2.57

Note: NonPV=nonpsych verbs, FB=forwards binding, BB=backwards binding

Here only psych EO verbs and *-ing* adjectives taking backwards binding are of particular concern, with nonpsych verbs having forwards and backwards binding used as the controls. Mean accuracy on nonpsych verbs with forwards binding is generally high for each group of subjects, with no significant differences between any groups. Learners had some difficulty rejecting backwards binding in nonpsych verbs, with the low level Chinese and the low level French learners significantly worse than the controls. These

results suggest that subjects may not have had basic knowledge of binding properties with agentive verbs, so the binding results with psych verbs must be interpreted with caution.

Looking at the Chinese learners' performance on backwards binding with EO verbs, it is surprising to note that the low group performed best, while the high group performed worst. Regarding the French learners' performance in the same type of structures, both groups were very accurate. There were no significant differences between any groups of learners and the controls on backwards binding with EO verbs, but the low level French learners were significantly better than the intermediate level Chinese learners. In the case of *-ing* adjectives with backwards binding, there were no significant difference between any group of subjects.

Correlation tests were carried out between each group's performance on EO verbs with backwards binding versus *-ing* adjectives with backwards binding. Results show that there existed a significant negative correlation between the performance on the two types of structures for the controls ($r=-.447$, $p<.0282$), for the low level Chinese ($r=-.557$, $p<.0025$), and for the intermediate level Chinese ($r=-.691$, $p<.0001$), but a significant positive correlation for the high level Chinese ($r=.909$, $p<.0001$). No significant correlations were found for the two groups of French learners. These results suggest that the low and intermediate level Chinese and the controls who acted well on EO verbs with backwards binding failed to act well on *-ing* adjectives with backwards binding, but the high level Chinese acted in an opposite way, a somewhat surprising result.

It is obvious from Tables 16, 17 and 18 that the mean accuracy for EO verbs and *-ing* adjectives with T/SM restrictions was the lowest of all the eleven structures. This suggests that these two types of structures are the most difficult. A careful examination of the subjects' corrections shows that learners' poorest performance was, to some extent, related to three ambiguous sentences in the two structures respectively. The ambiguity of three sentences lies in the interpretation of the prepositional phrase used in the original sentences. For instance, the sentence in the class of EO verbs with the T/SM restriction

**The circus show amused the children with the clown* has either a reading of the T/SM restriction ("The circus show made the children amused with the clown), which was of interest in this work, and a literal reading of the PP ("The circus show amused the children who were together with the clown"). When such an ambiguous sentence takes the first reading, it is ungrammatical; when it is the second reading, it is grammatical. Thus, the fact that quite a number of subjects, even including the controls, accepted the bad sentences with the T/SM restriction could be due to the possibility that they interpreted these sentences as having a literal reading of the PP and judged them grammatical. To reduce this unwanted effect of ambiguity, the three ambiguous sentences were therefore removed from the analysis. I give the results of mean accuracy on the 11 structures in Table 19 in terms of percentage for the sake of comparison.

Table 19: Accuracy on all Structures without Ambiguous Sentences in the GJ Task

Types of Structure	Controls (N=24)		LChinese (N=25)		IChinese (N=44)		HChinse (N=22)		LFrench (N=15)		IFrenh (N=9)	
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD
ES	100	0	95.3	.09	97.3	.07	98.5	.05	97.8	.06	100	0
EO	92.4	.13	52.0	.34	79.2	.24	84.1	.23	51.1	.29	72.2	.26
EO-T/SM	73.6	.31	37.3	.34	47.0	.25	51.5	.30	44.4	.35	74.1	.28
ing-T/SM	91.7	.18	28.0	.28	50.8	.33	56.1	.30	53.3	.37	71.4	.35
ed-T/SM	94.4	.13	68.0	.25	74.2	.25	80.3	.22	54.4	.32	87.6	.27
Noun-T/SM	91.0	.18	89.3	.15	91.3	.16	96.2	.07	90.0	.19	83.0	.23
Make-T/SM	90.3	.14	61.3	.34	71.6	.33	81.0	.24	81.0	.22	70.3	.30
Nonpsy-FB	99.3	.03	88.7	.19	87.9	.15	97.0	.07	93.3	.11	94.4	.12
Nonpsy-BB	99.3	.03	63.3	.39	73.5	.38	78.0	.35	47.8	.36	74.1	.32
EO-BB	86.8	.16	78.0	.28	61.7	.37	59.8	.40	93.3	.14	87.0	.16
ing-BB	85.4	.17	74.0	.32	60.6	.38	69.7	.36	68.9	.36	68.5	.43

With the ambiguous sentences removed, the mean accuracy for EO verbs and *-ing* adjectives with the T/SM restriction is still quite low. Overall, the subjects did not act well as expected. The statistical results are consistent with the results reported above, where ambiguous sentences were included in the two types of structures.

In order to check whether there exists a relationship between the recognition of the zero CAUS and the recognition of the T/SM restriction with EO verbs and *-ing* adjectives, and whether there exists a similar relationship between the recognition of the zero CAUS and the recognition of backwards binding, correlation tests were run between each group of subjects' performance on the structure of EO verbs and their performance on the T/SM structures and the backwards binding structures. Results show no significant correlations between the performance on EO verbs versus performance on the T/SM restriction with EO verbs and *-ing* adjectives for all the groups of subjects except for the intermediate Chinese learners. No significant correlations showed up for any of the groups of subjects in terms of performance on EO verbs versus performance on backwards binding structures. Why the results obtained failed to support our hypothesis that the recognition of the zero CAUS in EO verbs would lead to the recognition of the ungrammaticality of the T/SM restriction with EO verbs and *-ing* adjectives and to the recognition of the grammaticality of backwards binding with EO verbs and *-ing* adjectives will be discussed in the next chapter.

To sum up, the group results of the GJ task show that for the Chinese and the French learners of English, there appeared to be no correlation between the acquisition of the zero CAUS and the acquisition of the T/SM restriction and of backwards binding.

5.6.2.3.2 Results of Correction in the GJ Task

Grammaticality judgment tasks have been traditionally adopted in studying adult linguistic competence. This is considered as an effective means for inquiring whether subjects truly possess the knowledge that experimenters are interested in, which is rarely evidenced in production. However, a mere judgment on the grammaticality of a certain

phenomenon can be misleading sometimes, because it may fail to reflect whether the subject who considers certain structures ungrammatical accurately judges the structures to be ungrammatical for the appropriate reason (Birdsong 1989). In other words, if a bad sentence is judged to be ungrammatical, it can be considered as ungrammatical for a wrong reason, which is either trivial or not relevant. In such cases, the judgment of ungrammaticality cannot be counted as being accurate. Likewise, a good sentence can be accidentally judged as grammatical without subjects' knowing why. In this case, the judgment of being grammatical cannot be counted as accurate either. In order to minimize these two possibilities, the present GJ task was designed to have subjects correct mistakes in the sentences they had judged to be ungrammatical. In what follows, subjects' corrections are reported in detail, which, in some degree, reveals that most of the subjects were accurate about the judgments they had made. However, there were a number of subjects (in particular low level learners) who had judged a bad sentence to be ungrammatical but corrected it incorrectly. This suggests that they actually had no correct knowledge of what was being tested.

Before reporting the results of the corrections, I first explain how the corrections were coded. Three major kinds of corrections were isolated: (i) relevant corrections (RC), (ii) irrelevant corrections (IC) and (iii) no corrections (NC). RCs include all kinds of corrections related to the structures under consideration. For instance, a correction like *The French food pleased the tourist* is a RC for the ungrammatical sentence **The French food pleased the tourist with his trip to Paris*, because the T/SM restriction is recognized and the T/SM argument is removed. ICs cover the corrections involving something extraneous like tense, number, etc. An example is like the correction of *The students frustrated their bad grade* for the ungrammatical sentence **The students frustrated their bad grades*. Here, the plural form *-s* is removed from the countable noun *grade* in the correction with the real problem of the T/SM violation untouched upon. Inside RCs, there may be some wrong corrections in the sense that the sentences corrected are still ungrammatical in English. Nevertheless, the specific phenomenon that we are looking at

Table 20: Number of Subjects Whose Corrections Show the Sensitivity to the Argument Structure of ES Verbs

Groups of Subjects	Admire(G)			Blame(G)			Dislike(G)			Enjoy(G)			Fear(G)			Like(G)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
No.of LowChinese	0	1	0	0	1	2	0	0	1	1	0	0	0	2	0	1	0	0
No.of InterChinese	0	0	0	0	0	4	0	0	1	0	0	0	0	1	0	0	1	1
No.of HighChinese	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
No.of LowFrench	0	0	0	0	0	0	0	5	0	0	1	1	1	4	0	0	0	0
No.of InterFrench	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Table 21: Number of Subjects Whose Corrections Show the Sensitivity to the Argument Structure of EO Verbs

Groups of Subjects	Amuse(U)			Annoy(U)			Fascinate(U)			Fascinate(U)			Please(U)			Terrify(U)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	21	0	1	17	1	6	21	0	3	21	0	3	21	0	2	16	0	2
No.of LowChinese	13	0	3	11	3	2	4	9	4	9	3	5	12	1	3	10	2	2
No.of InterChinese	32	2	8	30	1	8	16	3	9	24	2	10	26	1	10	28	1	8
No.of HighChinese	20	0	1	18	1	2	13	5	1	17	3	0	20	1	1	16	0	1
No.of LowFrench	5	3	3	3	1	0	4	1	3	5	2	2	5	0	3	8	1	5
No.of InterFrench	4	0	3	1	1	2	4	1	3	5	1	3	3	0	2	6	0	3

Table 22: Number of Subjects Whose Corrections Show the Sensitivity to the Argument Structure of *-ed* Adjectives

Groups of Subjects	Amused(G)			Annoyed(G)			Fascinated(G)			Frustrated(G)			Pleased(G)			Terrified(G)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	2	0	1	2	0	0	2	0	0	1	0	0	0	0	0	0	0	0
No.of LowChinese	12	0	0	11	0	1	2	2	1	4	0	0	2	0	0	11	1	1
No.of InterChinese	12	0	2	10	1	3	6	0	3	5	1	1	1	0	0	17	0	6
No.of HighChinese	6	0	0	4	0	0	3	0	0	3	0	0	0	0	0	10	0	1
No.of LowFrench	2	4	2	0	4	1	5	2	2	1	2	3	2	3	1	3	3	1
No.of InterFrench	2	0	0	1	1	0	1	0	0	0	0	0	1	0	0	2	0	0

Table 23: Number of Subjects Whose Corrections Show the Sensitivity to the Argument Structure of EO-Nominals

Groups of Subjects	Amusement(G)			Annoyance(G)			Fascination(G)			FrustrationG)			Pleasure(G)			TerrorG)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	2	0	1	2	0	1	0	0	0	0	0	2	4	0	0	1	0	1
No.of LowChinese	2	0	2	1	0	1	2	2	0	0	1	1	2	1	0	1	0	0
No.of InterChinese	0	1	2	0	2	2	0	2	1	0	1	3	0	2	2	2	1	0
No.of HighChinese	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	2	0	0
No.of LowFrench	1	0	0	0	0	0	0	0	0	0	0	1	0	1	3	0	0	0
No.of InterFrench	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0

is accurately corrected. Still take the above ungrammatical sentence for example. Some learners corrected **The students frustrated their bad grades* to *The students were frustrate with their bad grades* or *The students was frustrated with their bad grades*. Here the ungrammaticality of placing the Experiencer in the subject position for the EO verb *frustrate* is noticed and the arguments are correctly inverted. But, the sentence is still not good in English, because in the first correction, the *-ed* is not added, while in the second correction, a third person singular rather than the plural form of the verb BE in its past tense, *was*, is misused after the plural noun *the students*. ICs may also contain some right corrections. For example, the sentence *Girls admire movie stars* was considered as ungrammatical and the verb *admire* was changed into its past tense form. We only considered some right RCs and some right ICs to be appropriate or acceptable corrections. Specific details about corrections regarding a given structure will be provided whenever necessary in the following discussion.

Tables 20 and 21 show corrections by subjects on ES and EO verbs by individual verb. Recall that all the sentences containing ES verbs are grammatical. Therefore, we expect few corrections on this type of sentences. As can be seen in Table 20, this expectation is observed. Most of the subjects considered the sentences as grammatical. For those who judged them to be ungrammatical, they either used a synonym for the verb provided in a given sentence, e.g., *love* for *enjoy*, *be afraid of* for *fear*, *not like* for *dislike*, falling into the category of RC, or used the past tense of a verb for its present form and the third person singular form for the plural form (particularly by the low level French learners for the verbs *fear*, *dislike*), classified as IC. However, there was one subject, a low French learner, who corrected the grammatical sentence *People fear wars* into an ungrammatical one **Wars fear people*, a mistake that we did not predict.

For the sentences with EO verbs which are ungrammatical (e.g.,**Children amused circus shows*), the majority of the subjects judged the sentences to be ungrammatical and corrected them. Most of the RCs used the adjectival/verbal pattern with the *-ed* form

Table 24: Number of Subjects Whose Corrections Show the Sensitivity to the Argument Structure of *Make* Construction

Groups of Subjects	M+amused(G)			M+annoyed(G)			M+fascinated(G)			M+frustratedG)			M+pleased(G)			M+TerrifiedG)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	6	0	4	1	0	0	3	0	0	0	0	1	1	0	0	0	0	0
No.of LowChinese	5	0	1	10	0	1	12	0	1	8	0	3	8	0	1	10	0	2
No.of InterChinese	11	0	2	10	0	4	7	0	3	10	0	4	14	0	6	11	0	2
No.of HighChinese	4	0	1	3	0	0	2	0	0	4	0	2	4	0	0	4	0	0
No.of LowFrench	3	0	1	1	0	3	3	0	1	2	0	0	3	0	2	2	0	1
No.of InterFrench	1	0	2	2	0	2	2	0	2	1	1	2	1	0	1	2	0	2

Table 25: Number of Subjects Whose Corrections Show the Sensitivity to the T/SM with EO-T/SM

Groups of Subjects	Amuse (U)			Annoy(U)			Fascinate(U)			Frustrate(U)			Please(U)			Terrify(U)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	17	0	3	20	0	2	11	0	0	15	0	4	16	0	4	16	1	2
No.of LowChinese	3	3	1	6	6	3	2	4	3	9	7	3	12	0	2	8	3	4
No.of InterChinese	11	3	5	18	4	6	3	1	1	22	2	6	27	2	7	18	2	9
No.of HighChinese	9	0	0	16	2	0	5	1	0	16	2	0	13	1	1	12	0	1
No.of LowFrench	2	1	1	3	1	5	4	1	0	2	2	3	5	3	3	4	1	2
No.of InterFrench	3	0	2	5	0	3	3	0	3	1	1	3	2	1	4	1	1	3

Table 26: Number of Subjects Whose Corrections Show the Sensitivity to the T/SM with *-ing* Adjectives

Groups of Subjects	Amusing(U)			Annoying(U)			Fascinating(U)			Frustrating(U)			Pleasing(G)			Terrifying(U)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	18	0	2	22	0	2	17	3	3	19	2	2	20	2	2	18	1	2
No.of LowChinese	3	8	2	5	6	1	3	5	2	7	9	2	8	2	1	9	3	4
No.of InterChinese	11	10	6	17	3	11	7	3	4	19	6	10	19	5	6	23	2	6
No.of HighChinese	12	3	0	18	0	1	7	2	0	15	3	2	12	0	0	13	2	0
No.of LowFrench	4	5	1	4	1	7	4	2	2	2	4	3	6	1	1	5	1	2
No.of InterFrench	4	1	3	3	3	3	4	1	2	2	4	1	5	2	2	6	0	2

Table 27: Number of Subjects Whose Corrections Show the Sensitivity to Forwards Binding in Nonpsych Verbs

Groups of Subjects	Compose(G)			Criticise(G)			Describe(G)			Draw(G)			Tell(G)			Write(G)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
No.of LowChinese	2	1	0	1	1	2	2	1	2	1	0	1	0	1	1	0	1	0
No.of InterChinese	3	0	2	2	7	6	4	1	4	0	1	1	0	0	0	0	0	0
No.of HighChinese	1	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0
No.of LowFrench	0	0	1	0	0	2	0	0	0	0	2	0	0	0	0	0	1	0
No.of InterFrench	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

(e.g., *Children are amused about/with/by circus shows*). Quite a few exchanged the order of the arguments (e.g., *Circus shows amused children*). Occasionally, the ES verb *enjoy* or *love* was used to replace the EO verb *amuse* (e.g., *Children enjoy/love circus shows*). All these RCs show that subjects knew the correct argument structure of EO verbs. Those who gave ICs either removed the third person singular *-s* from a verb or the plural form *-s* from a noun. These ICs suggest that learners accepted the wrongly inverted argument structure, since their corrections did not alter the argument structure.

Tables 22, 23 and 24 show the results of corrections on the *-ed* adjectives, nominals and the periphrastic *make* structures which are all grammatical. First, regarding the corrections of *-ed* adjectives, as in Table 22, most RCs are concerned with the use of the preposition *by* instead of the idiosyncratic prepositions such as *with, about, at* adopted in the original sentences. Sentences corrected in this way are grammatical in the sense of verbal passives, but not in the sense of adjectival passives. The results suggest that *-ed* adjectives mostly caused problems because of idiosyncrasies related to preposition rather than argument structure. However, there are some corrections provided particularly by the low level French learners, who used *-ing* adjectives for *-ed* adjectives because of confusion about the two.

Concerning the corrections of nominals in Table 23 (e.g., *The public's fascination with the exhibition is obvious*), we found that among RCs, some used a verbal form, some used different prepositions, some provided wrong corrections like *The public's fascinated is obvious*; among those ICs, a few moved the T/SM prepositional phrase to the end of a sentence, such as *The public's fascination is great with the work of artists*.

As for the periphrastic *make* structure in Table 24 (e.g., *The essay made the politicians annoyed with the author*), almost all the corrections are RCs: some involving a correct use of the *make* pattern, for instance, simply removing the T/SM from the sentence, or changing the preposition preceding the T/SM; some involving a wrong use

Table 28: Number of Subjects Whose Corrections Show the Sensitivity to Backwards Binding in Nonpsych Verbs

Groups of Subjects	Chase(U)			Hit(U)			Kick(U)			Lift(U)			Pull(U)			Push(U)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	21	0	3	22	0	2	21	0	3	20	0	3	22	0	2	21	0	3
No.of LowChinese	11	3	2	15	2	2	13	4	2	13	2	3	13	3	2	13	1	3
No.of InterChinese	23	3	8	26	5	9	22	4	8	23	5	9	25	5	8	24	3	11
No.of HighChinese	18	3	0	15	5	0	17	4	0	15	4	0	16	4	1	19	3	0
No.of LowFrench	4	0	3	3	0	4	3	0	3	5	0	4	3	0	4	7	0	3
No.of InterFrench	4	0	3	4	0	3	4	0	3	2	1	3	5	0	3	5	0	2

Table 29: Number of Subjects Whose Corrections Show the Sensitivity to Backwards Binding in EO Verbs

Groups of Subjects	Amuse(G)			Annoy(G)			Fascinate(G)			Frustrate(G)			Please(G)			Terrify(G)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	1	0	1	3	0	0	3	0	0	6	0	1	1	0	1	1	0	2
No.of LowChinese	4	0	3	4	0	1	4	1	1	2	0	1	5	1	0	4	1	1
No.of InterChinese	16	1	5	14	0	5	11	1	3	10	2	5	13	1	2	12	0	4
No.of HighChinese	12	0	0	9	0	0	10	0	0	9	0	0	7	0	0	6	0	0
No.of LowFrench	0	1	0	0	0	1	0	0	1	0	0	1	0	1	1	0	1	0
No.of InterFrench	1	0	0	0	0	1	2	0	1	0	0	1	0	0	0	0	0	0

Table 30: Number of Subjects Whose Corrections Show the Sensitivity to Backwards Binding in *-ing* Adjectives

Groups of Subjects	Amusing(G)			Annoying(G)			Fascinating(G)			Frustrating(G)			Pleasing(G)			Terrifying(G)		
	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC	ReC	IrreC	NC
No.of Controls	6	0	1	5	0	1	4	0	0	6	0	1	5	0	1	6	0	1
No.of LowChinese	5	1	3	8	1	3	9	1	1	3	1	1	11	0	1	7	1	1
No.of InterChinese	16	1	6	17	0	6	11	0	4	14	0	8	15	0	6	17	0	5
No.of HighChinese	10	0	1	7	0	0	6	0	0	9	1	0	7	0	0	6	0	0
No.of LowFrench	4	0	4	3	1	5	3	0	4	5	0	5	1	0	3	6	1	3
No.of InterFrench	5	0	3	1	0	3	3	0	2	5	0	3	1	0	2	0	0	2

of the *make* structure as in the following correction *make the boy annoy with the nurse, made the boy terrified the nurse, made tourists feel please with the French food.* There are four RCs (two from Chinese and two from French) using EO verbs with the T/SM.

Tables 25 and 26 show the corrections of EO verbs and *-ing* adjectives taking the T/SM (e.g, **The essay annoyed the politicians at the author, *The essay is annoying to the politicians at the author*). As these two types of structures are ungrammatical due to the existence of the T/SM, we should expect more corrections which are related to this T/SM. As can be seen from the two tables, the major corrections fall into the category of RC, which includes the use of EO verbs without the T/SM, or the use of the periphrastic *make* construction. Presumably because these structures are more subtle, many more NCs occurred from both learners and controls. This suggests that quite a number of subjects had a holistic feeling about the ungrammaticality of these sentences, though they were not very clear how these sentences should be corrected.

Provided in Table 27 and Table 28 are the corrections of nonpsych verbs involving binding properties (e.g., *The clown drew a picture of himself, *A friend of himself hit John*). Forwards binding with nonpsych verbs is grammatical. As shown in Table 27, there are only a very small number of corrections, indicating that the majority of subjects judged the sentences as grammatical. The RCs are the ones using the reflexives in an emphatic way such as *The clown drew a picture himself.* It is interesting that out of the six verbs, the verb *criticize* is the only one causing difficulty, as there are more ICs and NCs from the low and intermediate Chinese learners. Some of the RCs are the use of *him* instead of *himself* for the sentence *The professor criticized an article about himself.*

Since nonpsych verbs allow only forwards binding, backwards binding with these verbs is ungrammatical. Table 28 shows that most of the subjects accurately judged the bad sentences (e.g., * *A friend of himself hit John*) as ungrammatical, and they corrected

them in a way as expected: rejecting the backwards binding by either using a pronominal form such as *A friend of his hit John*, or removing the anaphor from the sentence.

Table 29 illustrates the results of corrections concerning backwards binding with psych EO verbs (e.g.,*The videotape of himself amused the clown*). Since the sentences taking backwards binding are grammatical with these verbs, subjects are predicted to provide less corrections if they had the relevant knowledge. Beyond our expectation, a fair number of the Chinese learners rejected the good sentences and they thought that either forwards binding should be used, or the anaphor should be removed from the sentences. These RCs suggest that some of the Chinese learners did not like backwards binding. Table 30 shows the corrections of backwards binding with *-ing* adjectives. While there are still many more RCs (even from the controls) regarding this type of grammatical sentences (e.g., *The videotape of himself is amusing to the clown*), most of the RCs here are corrections which changed the adjectival structure into a verbal structure. In other words, learners used an EO verb for the *-ing* adjective as in *The videotape of himself amused the clown*. This suggests that some learners preferred backwards binding in EO verbs to backwards binding in *-ing* adjectives.

5.6.3 Individual Results

To some extent, group results can be very misleading. For example, we are interested in the correlation between learners' knowledge of the zero CAUS and their knowledge of the T/SM restriction and backwards binding with EO verbs. If we obtain group results that show that the majority of learners showed no such a correlated performance, we may conclude that learners who know the existence of the zero CAUS did not know the subtle properties about the T/SM restriction and backwards binding. However, this may obscure the reality, in one way or another. On the one hand some learners who failed to recognize the presence of zero CAUS with EO verbs might happen

to rule out the occurrence of the T/SM with the Causer; on the other hand some learners who detected the existence of zero CAUS may fail to realize the connection between the zero CAUS and the T/SM restriction. Such discrepancies may be hidden by group results. To reduce this effect, an examination of individual results is necessary. Moreover, since we are interested in the variability of L2 learners' IL grammars, it is of significance to examine whether responses from individual subjects are consistent across tasks.

5.6.3.1 Results of Picture Identification Task

Recall that in the PI task, we tested subjects' knowledge of argument structure of ES and EO verbs. Our hypotheses are that the zero CAUS will cause a problem for learners. In particular, with respect to EO verbs, if learners do not notice the zero CAUS, they might fail to recognize the existence of the Causer. Consequently they might assume that there was a theta role of Theme and a theta role of Experiencer involved, which would lead them to place the Experiencer in the subject position. Actives and passives were included in this task to ensure that learners know that both Agent and non-Agent arguments can become subjects. Those who do not know the argument structure of active and passive verbs respectively could not be expected to know the argument structure of ES and EO verbs. Therefore, for the individual results, we only look at how those learners who were accurate on both actives and passives performed on ES and EO verbs.

There were six TRUE cases and six FALSE cases for each structure. We assumed that if subjects made 4 or fewer errors out of the total 12 actives and 12 passives respectively, they could be considered to be accurate on both actives and passives (accurate at a level of 67% and over). These subjects would be included for the analysis of their performance on ES and EO verbs. If subjects made 4 or fewer errors for the total 12 ES verbs with animate objects and 4 or fewer errors for the 12 ES verbs with inanimate objects, then we considered them to be accurate on ES verbs; likewise, if

subjects made 4 or fewer errors for the total 12 EO verbs with animate subjects and 12 EO verbs with inanimate subjects, they were accurate on EO verbs.

According to the hypothesis that the zero CAUS should cause difficulty, EO verbs should be quite problematic. ES verbs which have no zero CAUS behave quite like other nonpsych verbs, and therefore, they should not be problematic. Also based on the analysis proposed here, EO verbs are the causative versions of ES verbs, derived by zero affixation, so the linguistic representation for EO verbs contains the structure of ES verbs, but not vice versa. Thus, it is predicted that if learners get EO verbs correct, they should also get ES verbs correct, if they do not know ES verbs, they should hardly know EO verbs; it is likely that if learners do not know EO verbs, they might still know ES verbs, but it is unlikely that learners have no knowledge about either of the two. These predictions are summarized in Table 31, with subjects expected to fall into Cells A and B, but none in Cell C or Cell D. Removing those who were not accurate on actives or passives, only three out of 91 Chinese learners were eliminated. Table 32 shows the actual distribution of the number of subjects who were accurate on ES and EO verbs.

Table 31: Predicted Distribution of Number of Subjects Accurate on ES and EO Verbs

Performance	Accurate on EO	Inaccurate on EO
Accurate on ES	A	B
Inaccurate on ES	C	D

Table 32: Actual Distribution of Number of Subjects Accurate on ES and EO verbs

Performance	Accurate on EO	Inaccurate on EO
Accurate on ES	Controls=24 (100%) Chinese=79 (90%){LC=20/24 (83%)[a], IC=39/43 (91%), HC=20/21 (95%) French=23 (96%){LF=14 (93%), IF=9 (100%)	Controls=0 (0%) Chinese=9 (10%){LC=4/24 (17%), IC=4/43 (9%), HC=1/21 (5%) French=1 (4%) {LF=1 (7%)
Inaccurate on ES	Controls=0 (0%) Chinese=0 (0%) French=0 (0%)	Controls=0 (0%) Chinese=0 (0%) French=0 (0%)

Note: LC: LowChinese (n=25), IC: InterChinese(n=44), HC: HighChinese (n=22),
LF: LowFrench (n=15), IF: InterFrench (n=9)

(a) The percentage for the Chinese is calculated on the total number of 88 who were accurate on both actives and passives. Among these 88, 24 were from LC, 43 from IC, and 21 from HC.

From Table 32 we see that most of subjects knew both ES and EO verbs, falling into the expected Cell A. 9 Chinese and 1 French subjects who knew ES verbs did not get EO verbs right, falling in the expected Cell B. None of the subjects fell in the unexpected Cells C and D, not knowing ES verbs but knowing EO verbs or knowing neither ES nor EO verbs. Of the 9 Chinese subjects who fell into Cell B, 4 were from the low group, 4 from the intermediate group, and 1 from the high group; the 1 French subject falling in this cell was from the low group.

5.6.3.2 Results of Multiple Choice Task

For this task, subjects' knowledge of adjectives and nominals were tested. Since only the *-ing* class involves the zero CAUS, we predict that the number of subjects who

got *-ing* adjectives right should be less than the number of subjects who got *-ed* adjectives right. Results are given in Table 33, using the same criterion for accuracy.

Table 33: Number of Subjects Accurate on Adjectival and Nominal Structures in MC Task

Psych *-ing* Adj.	Psych *-ed* Adj.	Psych Nominal
Controls=24 (100%)	Controls=24 (100%)	Controls=24 (100%)
Chinese=85(93%){ LC=22 (88%) IC=41(93%) HC=22 (100%)	Chinese=90 (99%){ LC=24 (96%) IC=44(100%) HC=22 (100%)	Chinese=86 (95%){ LC=22 (88%) IC=43 (98%) HC=21 (95%)
French=20 (83%){ LF=11 (73%) IF=9 (100%)	French=22 (92%){ LF=13 (87%) IF=9 (100%)	French=17 (71%) { LF=9 (60%) IF=8 (89%)

Note: LC: LowChinese (n=25), IC: InterChinese(n=44), HC: HighChinese (n=22),
LF: LowFrench (n=15), IF: InterFrench (n=9)

Table 33 shows that the controls performed the same on *-ing*, *-ed* adjectives and nominal forms. For the Chinese group, there were more learners accurate on *-ed* adjectives than on *-ing* adjectives. The number of French learners accurate on *-ed* adjectives was also higher than that on *-ing* adjectives, which is further higher than that on nominal forms. Fewer learners from lower levels achieved accuracy than learners from higher levels.

As it is *-ing* adjectives but not *-ed* adjectives that should constitute more difficulty because of the zero CAUS, we might predict (for the time being, without considering the idiosyncrasy of prepositions) that if learners could get *-ing* adjectives right, they should get *-ed* adjectives as well; if they could not acquire *-ing* adjectives, they might still acquire *-ed* adjectives. What is not likely to happen is that learners would get *-ing* adjectives right but get *-ed* adjectives wrong or they could not get any of them correct.

This is along the lines of the predictions made for EO verbs versus ES verbs in the PI task discussed in the above section. Table 34 shows the real distribution of number of subjects who were accurate on *-ed* and *-ing* adjectives.

Table 34: Actual Distribution of Number of Subjects Accurate on *-ing* and *-ed* Adjectives

Performance	Accurate on *-ing* Adjectives	Inaccurate on *-ing* Adjectives
Accurate on *-ed* Adjectives	Controls=24 (100%) Chinese=85 (93%){LC=21 (84%), IC=42 (95%), HC=22 (100%)} French=18 (75%) {LF=9 (60%), IF=9 (100%)}	Controls=0 (0%) Chinese=5 (5%){LC=3 (12%), IC=2 (4%), HC=0 (0%)} French=4 (17%){LF=4 (27%), IF=0 (0%)}
Inaccurate on *ed* Adjectives	Controls=0 (0%) Chinese=0 (0%) French=2(8%) {LF=2 (13%)}	Controls=0 (0%) Chinese=1 (0%){LC=1 (4%)} French=0 (0%)

Note: LC: LowChinese (n=25), IC: InterChinese(n=44), HC: HighChinese (n=22),
LF: LowFrench (n=15), IF: InterFrench (n=9)

From Table 34 we can see that more subjects fall into Cell A and a few in Cell B. There were two low level French learners falling into Cell C, and one low level Chinese learner falling into Cell D. These results are more or less in accordance with our theoretical predictions. Recall that when we reported the general results, it was pointed out that the low level French learners on the whole acted much worse than the Chinese subjects on *-ed* adjectives in the MC task (with a mean accuracy of 4.8, as reported in Table 13). This turns out to be due to the poor performance of two individual subjects who had no knowledge about psych *-ed* adjectives or nonpsych *-ed* adjectives, with a

mean accuracy of 0 for both types of *-ed* adjectives. These are the two exceptional subjects falling into Cell C. Surprisingly, there was one Chinese learner from the low level group who did not get *-ed* or *-ing* adjectives right. This was the only subject who had not achieved an IL grammar within our prediction as regard to the linking property of psych adjectives, because this subject chose the sentence *The audience was fascinating* in the context which actually intended to trigger the sentence *The audience was fascinated*; in the meanwhile, the same person choose the sentence *The storm was terrified* over the one *The storm was terrifying*.

5.6.3.3 Results of Grammaticality Judgment and Correction Task

Table 35 reports the number of subjects who showed knowledge of the argument structure of ES and EO verbs and who at the same time knew that the T/SM is grammatical with *-ed* adjectives, with nouns, and with *make* constructions, but ungrammatical with EO verbs and *-ing* adjectives. We considered subjects to show knowledge of the structures tested if they gave 2 correct answers to 3 tokens for Type III and Type IV (i.e., the two types of structures having three ambiguous sentences) , and 4 correct answers to 6 tokens for all the other types. [69]

[69] Thomas (1991) also considered her subjects to show knowledge tested, if they provided 2 correct answers to three tokens.

Table 35: Number of Subjects Accurate on Psych Predicates with the T/SM

No.of Subjects who were accurate on ES and EO V	Controls (n=24) **23**	Chinese (n=91) **70** { LC=12 IC=38 HC=20	French (n=24) **12** { LF=5 IF=7
Accurate on the T/SM with *-ed* A	22 (96%)	57(81%){ LC=9 (75%) IC=30(79%) HC=18 (90%)	9 (75%){ LF=3 (60%) IF=6 (86%)
Accurate on the T/SM with Nouns	21 (91%)	67 (96%){ LC=11 (92%) IC=36 (95%) HC=20 (100%)	11 (92%){ LF=5 (100%) IF=6 (86%)
Accurate on the T/MS with *make*	22 (96%)	48 (69%){ LC=6 (50%) IC=25 (66%) HC=17 (85%)	8 (67%){ LF=4 (80%) IF=4 (57%)
Accurate on the T/SM with EO V	18a (78%) 19b (83%)	31a (44%) 41b (59%) LC=4 (33%) LC=5 (42%) IC=17(45%) IC=23(61%) HC=10(50%) HC=13(65%)	6a (50%) 8b (67%) LF=2 (40%) LF=2 (40%) IF=4 (57%) IF=6 (86%)
Accurate on the T/SM with *-ing* A	21a (91%) 22b (96%)	33a (47%) 39b (57%) LC=3 (25%) LC=3 (25%) IC=17(45%) IC=22 (58%) HC=13(65%) HC=14(70%)	8a (67%) 8b (67%) LF=3 (60%) LF=3 (60%) IF=5 (71%) IF=5 (71%)

Note: LC: LowChinese (n=25), IC: InterChinese(n=44), HC: HighChinese (n=22),
LF: LowFrench (n=15), IF: InterFrench (n=9)

(a) 6 items in each of the two relevant structures with a 4-out-of-6 accuracy rate
(b) only the 3 unambiguous items with a 2-out-of-3 accuracy rate

It can be seen from Table 35 that the two structures involving T/SM violations on the last two rows (i.e., the T/SM with EO verbs and *-ing* adjectives) are the most difficult for the learners, because the numbers of subjects who were accurate on them were the smallest as compared with those for the other three structures. When we looked at the total six tokens by the criterion of 4-out-6 accuracy rate, out of the 70 Chinese learners who were accurate on ES and EO verbs, we found 31 who correctly rejected the T/SM with EO verbs, and 33 who correctly rejected the T/SM with *-ing* adjectives. Out of those 12 French learners who were accurate on ES and EO verbs, there were 6 who recognized the ungrammaticality of the T/SM constraint with EO verbs, and 8 recognizing the ungrammaticality of the T/SM constraint with *-ing* adjectives.

If we focus on the three unambiguous tokens by the criterion of 2-out-3 accuracy rate, out of the 70 Chinese learners who got both ES and EO verbs right, 41 correctly rejected the T/SM with EO verbs, and 39 correctly rejected the T/SM with *-ing* adjectives. Among those 12 French learners who acquired ES and EO verbs, 8 got the T/SM pattern with EO verbs, and 8 got the T/SM pattern with *-ing* adjectives.

It is clear from Table 35 that for all the structures, it is the learners of higher levels who made up the majority of the accurate population.

Table 36 reports the number of subjects who knew ES and EO verbs and who at the same time knew that backwards binding is grammatical with EO verbs and *-ing* adjectives. Note that the percentage figures on the second and third rows in each column are the percentages based on the numbers on the second line of the first row. The three numbers there (i.e., 23, 51, and 8) refer to the subjects who were accurate on nonpsych verbs involving forwards and backwards binding as well as psych ES and EO verbs. Beyond our expectation, the Chinese learners at higher levels were less likely to be accurate on the binding phenomenon.

Table 36: Number of Subjects Accurate on Psych Predicates with Backwards Binding

No. of Subjects who were accurate on ES and EO V	Controls (n=24)	Total Chinese (n=91)	Total French (n=24)
	23	70	12
and on nonpsych V with FB and BB	**23**	**51** { LC=6 IC=28 HC=17	**8** { LF=2 IF=6
Accurate on psych V with BB	22 (96%)	34(67%){ LC=5 (83%) IC=19(68%) HC=10 (59%)	6 (75%){ LF=1 (50%) IF=5 (83%)
Accurate on psych *-ing* A with BB	20 (87%)	31(61%){ LC=5 (83%) IC=14(50%) HC=12 (71%)	4 (50%){ LF=1 (50%) IF=3 (50%)

Note: LC: LowChinese (n=25), IC: InterChinese(n=44), HC: HighChinese (n=22),
LF: LowFrench (n=15), IF: InterFrench (n=9)

5.6.4 Results Across the Three Tasks

Recall that the PI task tested learners' knowledge of the argument structure of ES and EO verbs, and the MC task tested learners' knowledge of adjectival and nominal structures. As for the GJ task, it involved all of them and looked at the T/SM and binding properties. Thus, both the PI task and the GJ task had something in common, which enables us to look at how subjects treated ES and EO verbs across the two tasks, while common aspects of the MC task and the GJ task enable us to look at how subjects handled adjectives and nominals in the two different tasks. However, one thing needs to be borne in mind. The three tasks do not tap exactly the same properties of the predicates. For instance, both the MC and the GJ tasks look at *-ing* adjectives. But *-ing* adjectives in the GJ task involve the T/SM restriction whereas *-ing* adjectives in the MC task do not.

Besides, different task requirements might produce different task effects upon subjects' performance.

If learners know ES and EO verbs tested in the PI task, they should know them in the GJ task; similarly, if learners know adjectives and nominal tested in the MC tasks, they should know them in the GJ task. In other words, we predict a significant correlation between how they acted in one task versus how they acted on another in terms of the same kind of predicates. Concerning the performance on ES verbs across the PI task and the GJ task, correlation tests show no significant correlations for all the groups of subjects. Regarding the performance on EO verbs across the two tasks, significant correlations showed up only for the low level Chinese ($r=.414$, $p<.0348$) and the high level Chinese ($r=.458$, $p<.0321$).

With respect to adjectives in the MC and the GJ tasks, there was a significant correlation for the low French learners in the case of *-ing* type ($r=.569$, $p<.027$) and in the case of *-ed* type ($r=.537$, $p<.0389$). With respect to nominals, the controls showed a significant correlation ($r=.493$, $p<.0144$); so did the low level French learners ($r=.660$, $p<.0074$).

5.7 Conclusion

In this chapter I have reported on an experiment on the L2 acquisition of English psych predicates by the Chinese-speaking and French-speaking adults. Group and individual results were presented. These results will be interpreted and implications of these findings will be discussed in next chapter.

CHAPTER 6

DISCUSSION AND CONCLUSION

6.0 Introduction

In the previous chapter the results of the experiment were presented. In this chapter I will first summarize the important results. I will then discuss these results in terms of my hypotheses. I will next briefly discuss the availability of UG in L2 acquisition with regard to our findings. I will also discuss some contributions of this work. I will finally outline some possibilities for further research.

6.1 Summary of Results

The results obtained from the PI task are the following. (i) Accuracy on both classes of verbs was high, but EO verbs were significantly more problematic than ES verbs for Chinese learners of English at low and intermediate levels. The high level learners had no difficulty with either of the two classes of verbs, patterning with the controls. (ii) The low level French learners were more accurate on EO than ES verbs. (iii) EO verbs taking animate subjects are significantly more difficult for the low level learners than EO verbs taking inanimate subjects. Like the controls, the high level learners treated the two types of verbs the same. (iv) Between the Chinese and the French at the same level, no significant differences showed up except for ES verbs involving animate objects, where the low level Chinese were significantly better than the low level French. (v) Analysis of performance by individual subjects shows that the majority of learners who knew the argument structure of EO verbs also knew the argument structure of ES verbs, but there are some learners who knew ES verbs but not EO verbs.

The results of the MC task are as follows: (i) *-ing* adjectives were significantly more difficult for the intermediate level Chinese learners than *-ed* adjectives: there was no significant difference for the other groups. (ii) *-ing* adjectives were not more difficult than nominals for any group of learners. (iii) *-ed* adjectives were significantly easier than nominals for the intermediate and high level Chinese learners. (iv) Those *-ing* adjectives with animate subjects were significantly harder than the same type of adjectives with inanimate subjects for the low and intermediate level Chinese learners. (v) When the level of English proficiency is the same, the Chinese were not significantly different from the French on all the testing structures except the class of psych and nonpsych nominals taking inanimate complements. (vi) The individual results also show that more learners achieved accuracy on *-ed* adjectives than *-ing* adjectives.

The results of the GJ task show that: (i) EO verbs were significantly more difficult than ES verbs for all groups except the high level Chinese, consistent with the results obtained from the PI task. (ii) Regarding the T/SM restriction, all the subjects, even including the controls, had some difficulty, but subjects at higher levels of English proficiency did better: the high level Chinese learners and the intermediate level French learners were significantly better than the low level learners, and they were not significantly less accurate than the controls. (iii) Regarding the backwards binding properties, the Chinese learners on the whole had considerable difficulty, unlike the French learners. (iv) The individual results of the T/SM structures show that out of those who knew the argument structure of EO verbs, more than 57% of the Chinese learners, and 67% of the French learners knew that the T/SM was not allowed with both EO verbs and *-ing* adjectives. (v) The individual results of backwards binding with psych predicates show that of those who knew the basic properties of psych verbs and the basic facts about binding with nonpsych verbs, 67% of the Chinese accepted backwards binding with EO verbs, and 61% accepted it with *-ing* adjectives; 75% of the French accepted it with EO verbs, and 50% accepted it with *-ing* adjectives.

6.2 Evidence for and against Hypotheses

In what follows, I discuss the above results in terms of the hypotheses formulated in Chapter 5. I will first look at the results in the three tasks which are in favor of our hypotheses, then attempt to provide some explanations for the unexpected results.

6.2.1 Main Hypothesis I: EO Verbs More Difficult than ES Verbs; -ing Adjectives More Difficult than -ed Adjectives

Our Main Hypothesis I predicts that L2 learners will initially fail to recognize the existence of the zero CAUS. In that case, EO verbs should be more difficult than ES verbs in terms of mapping properties due to the presence of the zero CAUS in the former but not in the latter; for the same reason the *-ing* class of adjectives should be harder than the *-ed* class, whereas between *-ed* adjectives and nominals there should be a similar degree of difficulty, because both lack a zero CAUS.

The results obtained from the PI task and the GJ task show that on the whole, all the L2 learners were fairly accurate on both ES and EO verbs; however, they, in particular the low level Chinese learners, did have some difficulty with EO but not ES verbs. This supports the hypothesis in a weaker form, namely that acquiring the presence of the zero CAUS is problematic for learners of English in the early stages. It was found that the low level Chinese learners were significantly more accurate on ES verbs than EO verbs across the two relevant tasks, and that the low level French learners were also significantly more accurate on ES verbs than EO verbs in the GJ task. These findings support the hypothesis that EO verbs are more difficult than ES verbs. The prediction of greater difficulty with EO predicates does not preclude eventual success. The results from the high level Chinese learners and the intermediate level French learners, who treated the two types of

psych verbs the same as the controls, suggest that EO verbs can be acquired (See also White et al (1996a) for similar results).

The results from the low level French learners, who performed better on the EO class than the ES class in the PI task, seem to challenge the hypothesis. But we found that the main problem they had with the ES class is restricted to one verb namely *fear*. When *fear* was removed from the ES class for the analysis, this group of learners no longer showed a worse performance on ES verbs than EO verbs. While it is still not clear why the particular verb *fear* caused considerably more problems for L2 learners of English, especially for the low level French learners, the hypothesis still holds: EO verbs are generally more difficult than ES verbs. Regarding the better performance on ES verbs in the GJ task by the low level French learners, in particular with the verb *fear*, four out of the six sentences have inanimate objects and the verb *fear* also takes an inanimate object, which helps them a great deal to decide the correct argument structure of ES verbs including *fear*. In the PI task, many more errors were observed in the case where *fear* takes an animate object (The issue of animacy will be discussed below). The fact that different sentence types were used in the two tasks may explain the performance differences across the two tasks by the same group of learners. The results that the verb *fear* is problematic replicates what is found in White et al (1996a).

Regarding the linking properties with psych verbs, our theory predicts that when the zero CAUS is not recognized with EO verbs, the theta role of Causer might not be noticed; consequently, learners should project the Experiencer to subject position and the T/SM to object position, generating bad sentences such as * *People frighten wars*. This is exactly what was found from learners' errors in judging pictures in the PI task and from their wrong corrections of bad EO sentences in the GJ task. As ES verbs contain no zero CAUS, no such problems should occur with respect to mapping arguments to structural positions. This is also what was found from this study: errors such as * *Wars fear people* were not explicitly made by learners, except for a low level French learner.

The MC task shows that on the whole learners were more accurate on the *-ed* adjectives than the *-ing* adjectives, though only the intermediate level Chinese learners showed a significant difference between the two. These results are in the predicted direction, although there were no significant differences for most L2 groups. Like the case of EO verbs versus ES verbs, learners should eventually come to acquire the zero CAUS in *-ing* adjectives, and hence not have problems with these adjectives.

The unexpected result that the low level learners were not significantly less accurate on *-ing* adjectives than *-ed* adjectives, despite the fact that they contain a zero CAUS, might be related to the following differences between *-ing* and *-ed* adjectives. As is well known, the prepositions required by *-ing* adjectives are consistent, typically *to* or *for*, whereas *-ed* adjectives require some idiosyncratic prepositions. It was found that even native speakers cannot agree upon which preposition should be used with certain *-ed* adjectives. Thus, when learners were required to choose a best answer in the MC task, their judgment of whether the preposition was correct might have influenced their performance. This is indeed suggested by learners' corrections in the GJ task. As pointed out in the discussion of corrections in Chapter 5, a large number of Chinese and French subjects judged the sentences with *-ed* adjectives as ungrammatical and they substituted the original prepositions with *by* in most cases. These results do not imply that the zero CAUS is not a cause of difficulty for *-ing* adjectives. What they suggest is that the actual difficulty caused by the zero CAUS in *-ing* adjectives was somewhat obscured by the difficulty caused by the idiosyncracy of prepositions with *-ed* adjectives.

In terms of the linking of arguments to syntactic positions, similarly, like the case of EO verbs versus ES verbs, when the zero CAUS is not noticed with *-ing* adjectives, the existence of the Causer might not be recognized. In that case, the Experiencer should be placed in the subject position and bad sentences like **John is annoying at the article* should be made. Indeed, a number of such errors were observed from low level learners'

choices in the MC task and their wrong corrections of *-ing* and *-ed* adjectives in the GJ task. But the linking errors such as **The article is annoyed at John* were barely observed.

The result that the intermediate and high level Chinese learners performed better on *-ed* adjectives than nominals, and that nominals seemed problematic for the low level French learners also deserves a comment, as nominals which contain no zero CAUS were predicted not to cause any difficulty. One of the possible explanations is that nominal structures in English are not as commonly used as *-ed* and *-ing* adjectives. The same seems to be true in French. The fact that the French learners did not show a good performance on this type of structure may be due to L1 transfer. Since French does not make much use of psych nominal structures, the French learners who were influenced by their L1 did not like the sentences using psych nominals. Some more evidence for this possibility is from subjects' corrections in the GJ task. It was found that some French learners judged the nominal structure as ungrammatical and simply used corresponding verbs instead. Another possibility is that there is a lack of L2 input, given the fact that English does not make much use of psych nominal structures. The Chinese learners on the other hand could not get any hint from their L1, as Chinese lacks a way of forming a noun by adding a nominal marker to a base. However, as students of English, they were usually explicitly taught how some English nouns are derived from verbs by the attachment of certain nominal affixes. Therefore, it is likely that the Chinese learners used a kind of word formation rule in judging these psych nominals, which enables them to arrive at a high level of accuracy as compared with the French learners.

6.2.2 Main Hypothesis II: Difficulty with T/SM and Backwards Binding Properties

Recall that our Main Hypothesis II states that when learners become aware of the existence of the zero CAUS, they should reject the T/SM restriction with psych predicates on the one hand, and accept backwards binding on the other hand.

At first sight, the low mean accuracy on the T/SM structures with psych predicates in the GJ task seems to indicate that no learners really exhibited knowledge of the T/SM restriction. For the low level learners who also had problems with the argument structure of EO verbs, this result is not surprising. As both the high level Chinese and the intermediate level French learners were significantly more accurate than the low level Chinese and French learners on the one hand, but not significantly less accurate than the controls on the other hand, it can be concluded that some knowledge of the T/SM restriction, subtle and abstract, can be eventually acquired by learners when they have achieved a certain level of English proficiency. Some more evidence for this conclusion is the individual results, which show that out of those who had knowledge of the correct argument structure of EO verbs, more than half of them knew that the T/SM was not allowed to cooccur with EO verbs or with the *-ing* adjectives.

Recall that 59% of the Chinese subjects correctly rejected the T/SM sentences with EO verbs and 57% of them correctly rejected the T/SM sentences with *-ing* adjectives (i.e., the results that were obtained from the three unambiguous sentences based on the criterion of 2-out-3 accuracy rate). It was found that the learners of higher levels constituted the majority and the low level learners the minority for both EO verbs and *-ing* adjectives involving the T/SM violation. Similar results were observed from the French subjects. These results show that the ones who did not get the T/SM structures right were mostly the learners at the low level; the results also suggest that as English proficiency improved, their sensitivity to the T/SM violation increased.

The group results on T/SM violations (i.e., the learners of higher levels were significantly better than the learners of lower levels and they were not significantly worse than the controls), and the individual results (i.e., more than half of the L2 learners correctly rejected the ungrammatical structures) suggest that many higher level learners had acquired the relevant knowledge. We may furthermore conclude that our hypothesis is partly supported, namely that there is a relationship between learners' knowledge of the

zero CAUS and their knowledge of the T/SM restriction with both EO verbs and *-ing* adjectives. However, if we focus on the fact that there were still around half of the subjects who failed to notice the T/SM violations, we may conclude that the L2 learners tested had not achieved the knowledge in question. In that case there is no relationship between learners' knowledge of the zero CAUS and their knowledge of the T/SM restriction with psych predicates. At this point, I will tentatively adopt the first conclusion (i.e., that learners had got the T/SM restriction after they acquired the zero CAUS), attributing the unsuccessful subjects' performance to their failure to recognize the exact nature of causative EO verbs. More work is definitely needed regarding this property.

With respect to backwards binding, the general results from the GJ task suggest that the French learners had acquired this knowledge, whereas the Chinese learners had not. These results only partly support the hypothesis. However, the individual results show that out of those who knew psych verbs and binding properties with nonpsych verbs, more than half of the subjects knew backwards binding was acceptable with psych predicates. If we concentrate on the results from the French learners, and the individual results from both the Chinese and the French, a weak conclusion can be made: the learners had achieved some knowledge about backwards binding, and the learners' knowledge of the zero CAUS may be related to their knowledge of backwards binding.

There are two unexpected aspects of the results which require explanation. First, why did learners perform worst on the structure involving the T/SM restriction with EO verbs as compared with all the other structures tested? A plausible answer to this question is related to the following factor. As mentioned above, the native controls in this experiment did not perform very well on this structure. In fact, they were significantly less accurate on this type than all the other types, though they were significantly more accurate than most of the L2 groups. This indicates that native speakers' knowledge of the T/SM restriction is not uniform or consistent, as first noted by Pesetsky (1995) and later confirmed by an experimental study in White (1995a) and White et al (1996b). At

this point, we can only claim that learners of English can develop some linguistic competence with respect to the T/SM restriction. This is a preliminary conclusion arrived at mostly on the basis of a significant improvement in judging the ungrammaticality of this structure (e.g., from a mean accuracy of 2.24 to 3.27 by the Chinese learners; from 2.27 to 3.67 by the French learners). However, further research is necessary to inquire into this subtle property.

Second, surprisingly, those low level learners (both the Chinese and the French), who were the least accurate on EO verbs and backwards binding with nonpsych verbs, turned out to be the most accurate on backwards binding with EO verbs. In contrast, the high level Chinese learners had performed worst on backwards binding with EO verbs, though they were quite accurate on both EO verbs and backwards binding with nonpsych verbs.

One might impute the above results to response biases in the GJ task (Birdsong 1989). That is, the low level learners actually did not know anything about backwards binding with either nonpsych or psych verbs, but they hit on the correct answers simply through a strategy of judging sentences as grammatical. Thus, when learners judged the ungrammatical sentences of EO verbs as grammatical, they got a low accuracy, indicating that they failed to acquired EO verbs; when they judged the ungrammatical sentences of nonpsych verbs with backwards binding as grammatical, they again got a low accuracy. But when they approached the grammatical sentences of EO verbs having backwards binding with the same strategy and judged them as grammatical, they obtained a high accuracy. This could explain the results obtained from the low level Chinese and the low level French learners.

In addition, as subjects in this experiment were asked to correct a sentence if it was judged to be ungrammatical, the correction requirement might have furthermore reinforced such a bias towards accepting sentences, because subjects might be afraid of correcting a sentence, if it is judged as ungrammatical. Zobl (1992) has also expressed a

similar worry. In his study, subjects were required to judge whether a given sentence was possible or not; if a sentence was considered as impossible, subjects were asked to paraphrase it. Zobl pointed out that a paraphrase requirement demanded of the subject would have depressed the ratios of rejection for sentences involving constraint violations.

However, the explanation of a general response bias does not necessarily hold here. If learners did adopt this kind of strategy in treating the sentences in the GJ task, i.e., showing a bias to accept all sentences, we should have obtained a low accuracy for all ungrammatical sentences and a high accuracy for all grammatical ones. Recall that the structures of ES verbs, *-ed* adjectives, nominals and the periphrastic *make* construction are all grammatical, as are the structures of backwards binding with EO verbs and *-ing* adjectives. One should expect that sentences with these structures should all be considered as grammatical with a high rate of accuracy if learners employed the same strategy. But the fact is that (i) the accuracy ratios for these grammatical structures are not similar, and (ii) the accuracy ratio for *-ed* adjectives, nominals and the *make* construction is not as high as the accuracy ratio for ES verbs.

Thus, we cannot generally attribute the low level learners' accurate performance on backwards binding to a response bias. But this does not exclude the possibility that there might be some subjects who sometimes employed a response bias, or that subjects resort to a response bias only for structures that they do not understand.

6.2.3 Secondary Hypothesis I: Animacy Adds More Difficulty

Our Secondary Hypothesis I predicts that animacy interacting with the zero CAUS should constitute another source of difficulty. From the PI task, we found that the learners at lower levels show a significantly better performance on EO verbs with inanimate subjects than EO verbs with animate subjects, apparently supporting the hypothesis.

Some more evidence for this hypothesis is observed in a significantly better performance on *-ing* adjectives with inanimate subjects than the same type of adjectives with animate subjects from the low and intermediate level Chinese learners in the MC task. However, ES verbs taking animate objects were also treated significantly less accurately than ES verbs taking inanimate objects. Psych nominals taking animate complements were not found significantly less accurate than psych nominals taking inanimate complements. This suggests that animacy is a potential problem for psych verbs in general, not just for the particular class which contains a zero CAUS.[70] When there are two animate individuals, this is likely to create a confusion for learners in trying to identify the Experiencer.

6.2.4 Secondary Hypothesis II: L1 Transfer

Our Secondary Hypothesis II states that if L1 transfer is crucial in L2 acquisition, then, when the level of English proficiency is held constant, the French learners should perform better than the Chinese learners due to similarities between French and English on the one hand, and differences between Chinese and English on the other hand; if the L1 does not play a crucial role, then the Chinese and French learners should show no performance difference. Concentrating on the two groups of learners who are at the same level of English proficiency (i.e., the low and intermediate levels), we found that, across the three tasks, the French did not perform significantly better than the Chinese except in the case of backwards binding with psych predicates; the Chinese learners did not

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[70] It cannot be established from the present work whether animacy also interferes in learners' interpretation of ungrammatical T/SM sentences and grammatical backwards binding sentences with EO verbs and *-ing* adjectives. In the situation of the T/SM restriction, animacy cannot be manipulated in the task, because as observed in Pesetsky (1995: Footnote No. 184), an animate subject may sometimes make the T/SM restriction disappear. That is to say, when the EO verb takes an animate subject with an agentive reading, a T/SM argument may occur. As for the backwards binding phenomenon, there are not any means for us to form such grammatical backwards binding sentences with the anaphor *himself* or *herself* where the subjects are animate, though it is possible to construct such grammatical backwards binding sentences with the anaphor *each other*.

perform significantly better than the French learners except in the case of ES verbs taking animate objects in the PI task and psych and nonpsych nominals with inanimate complements in the MC task. This leads us to conclude that L1 influence is not a deciding factor, though there are some cases which suggest the influence of L1 in L2 acquisition. In the following I will illustrate a potential role of L1 in the process of learning psych predicates by the Chinese and French learners.

Let us first examine potential cases of L1 transfer exhibited by the French learners. Recall that the low level French learners were significantly more accurate on EO verbs than ES verbs in the PI task contrary to the hypothesis. In the previous discussion, it was pointed out that most problems were caused by the individual verb *fear*. When *fear* was excluded from the analysis, the difference no longer exists. But the EO class was not significantly less accurate than the ES class (with the verb *fear* removed) for these low level French learners as compared with the Chinese learners at the same level. One possible explanation is that the influence of L1 was involved to some extent. There were more EO verbs than ES verbs used in the tests that had close counterparts in French (i.e., *amuse, fascinate, frustrate* in English versus *amuser, fasciner, frustrer* in French, and *blame* versus *blâmer*). The closeness of the two languages in this regard might have helped the French learners perform well on the EO class. The fact that the orthographic resemblance between L1 and L2 in vocabulary was helpful for the low level French learners was consistent with what Ard and Homburg (1992) have found. In an informal interview with Spanish and Arabic ESL learners, Ard and Homburg discovered that if a Spanish word resembles an English word, Spanish speakers would assume that this English word probably has roughly the same meaning as the Spanish word. [71]

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[71] One might expect that if those three orthographically-similar EO verbs have facilitated the performance of the low level French learners in the PI task, they should also help them in the GJ task. It was found from the GJ task that the low level French learners were significantly more accurate on ES verbs than EO verbs. Here it is not because the three verbs were not helpful, but because (i) the individual verb *annoy* caused most problems, which reduced the mean accuracy a great deal and (ii) the learners were quite accurate on ES verbs even including *fear*, which, as discussed above, is due to the fact that *fear* takes only an inanimate object in this task, that constituted less difficulty. But it is not clear why the verb *annoy* did not cause

As argued above, since French does not make much use of psych nominals, the low French learners might be influenced by their L1 and thus did not act well on the English psych nominals as a whole. This would be some sort of negative transfer.

Another potential case of negative transfer involves the periphrastic structure. Recall that French has a periphrastic structure using *rendre* which is similar to the *make* construction in English. The similarity between the two languages was expected to facilitate French learners to accept the English periphrastic construction in the GJ task. But contrary to expectation, the two French groups were not very accurate on this type of sentence and quite a number of them removed the T/SM argument from the sentences or used EO verbs instead in their corrections. White et al's (1996b) French learners of English also rejected the English periphrastic construction; furthermore, a group of French native speakers tested in that experiment rejected the periphrastic construction in French. These results indicate that even though French has a similar periphrastic structure, it is not common. As French native speakers were shown not to like the periphrastic construction in French, we may interpret the poor performance of the French learners as an indication of the L1 transfer.

In the case of backwards binding, both the low and intermediate levels French learners were quite accurate. We think that these French learners may have transferred knowledge of backwards binding in their L1 to the L2, and thus they performed quite accurately.

Now the question that remains to be answered is why there is no L1 transfer in the case of adjectival structures for the French learners of English. In the MC task, in terms of *-ing* and *-ed* adjectives, significant differences were not found between the Chinese and the French at the same proficiency levels, despite the fact that French has *-ant* and *-é* adjectives, corresponding to *-ing* and *-ed* adjectives, whereas Chinese does not.

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problems for the same group of learners in the PI task. As pointed out to me by Philippe Prévost (personal communication), the verb *annoy* does cause a lot of problems for French learners of English and the reason for this is unknown.

The most puzzling question is why the low level French learners also had problems with the zero CAUS, which is argued to be lexically encoded in the French EO verbs. If L1 influence is crucial, we should have expected this group of learners to perform much better than the low level Chinese learners.

Next let us examine whether there is a L1 transfer exhibited by the Chinese learners. As Chinese differs from English in a lot of properties of psych verbs, we may only look for potential occurrence of L1 transfer where the two languages have something in common. In the test materials, there is one case where Chinese closely resembles English --the periphrastic *make* construction. In terms of both the superficial and underlying representations, the two language systems are the same: there is an overt causative morpheme used, and a T/SM argument is grammatically allowed. However, the low level Chinese learners failed to perform well (with a mean accuracy of 3.68), suggesting that they had not made use of their L1.

These results seem to be inconsistent with what is reported in Juffs (1996). In that work, the Chinese learners of English were very reluctant to use synthetic EO verbs; instead, they preferred to use periphrastic EO verbs, i.e., the *make* construction. Juffs interpreted these results as evidence for L1 transfer. The different findings in question can be, to a large extent, explained by the fact that Juffs was not investigating T/SM arguments. According to my Chinese learners' corrections of the *make* structure, out of those who judged the *make* structure as ungrammatical, most simply did not like the T/SM argument. There are only 5% of the low level learners and 4% of the intermediate level learners rejecting the whole structure without acceptable corrections. This suggests that they would have accepted the *make* structure if there was no T/SM argument. If we are simply concentrating on this point, the results obtained in the present work are actually in agreement with Juffs' findings. But it is still a mystery why the Chinese learners had not transferred their prior linguistic knowledge so as to accept the *make*

construction with a T/SM; even the high level Chinese learners had only reached a moderate level of accuracy in terms of this structure.

It is not clear why L1 transfer occurred selectively as found in this work. [72] In other words, why did the French learners make use of their L1 grammar only for EO verbs in one task and backwards binding (the two cases of positive transfer), and in nominals and periphrastic structures (the two cases of negative transfer), but not in the case of adjectival structures? Why was the existence of the zero CAUS in French EO verbs not useful to the French learners in acquiring English psych predicates? Why did the Chinese learners fail to make use of their L1 where something could actually help them acquire the target language with respect to the *make* structure? Maybe L1 influence in L2 acquisition is restricted for unknown reasons. This conforms with what Kellerman (1983) has observed. According to Kellerman, L1 influence is rather unpredictable, occurring in some structures but not in others, appearing at some times, but not others.

6.2.5 Anomalous Results of Backwards Binding by the Chinese

In this section, I will discuss the anomalous results that involve the low level Chinese learners' better performance on backwards binding with EO verbs than the high level Chinese learners. These results are anomalous, because the high level learners who seemed quite accurate on psych verbs and basic binding properties with nonpsych verbs turned out to be the worst in terms of their performance on the sentences of backwards binding with EO verbs, whereas the low level learners who were less accurate on psych verbs and binding properties with nonpsych verbs were the most accurate regarding this

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[72] The issue of the selectivity of L1 transfer was addressed in Zobl (1980a). According to Zobl, there are some factors that govern the selectivity of L1 transfer. For instance, the correspondence between an L2 developmental stage and the structure in L1 is likely to facilitate L1 transfer, while the typological divergence between L1 and L2 may restrain L1 transfer. As the present experiment did not show any clear pattern as to when and where L1 transfer occurs, I will leave this issue for further research.

particular structure. In addition, the Chinese on the whole were less accurate than the French on the same structure.

An explanation was already offered for the better performance by the French: they got help from their L1. Here we can hardly say that the low level Chinese learners also got help from their L1, as Chinese is different from English in the way backwards binding is allowed, as well as in lacking a zero CAUS. If we assume that L1 transfer helped the low level Chinese learners, how can we explain the poor performance by the high level Chinese?

There are two possible interpretations for the results obtained from the high level Chinese learners. First, maybe this group of learners had not really acquired the zero CAUS. What they had realized about EO verbs is their causative meaning. Since they failed to discover exactly the complex morphological structure of EO verbs, they failed to discover that an anaphor can be bound backwards, a property which specially depends on the zero CAUS. This explanation is along the lines of what was offered in White et al (1996b) for failure to observe the T/SM restriction. White et al considered that probably the adult L2 learners they tested were still at the initial stage of learning causatives in the sense of Bowerman (1974, 1982).

According to Bowerman, children go through three stages before they finally acquire target-like knowledge of causative verbs: (i) they consider causatives as unanalyzed words but generally use them correctly; (ii) they recognize a zero causative morpheme and a non-causative root in a causative verb, and overgeneralize this zero causative morpheme to noncausative verbs, thus producing novel causatives; (iii) novel causatives disappear. While it is not clear how long each stage will last, it seems that the second stage of overgeneralization can last long, judging by the various kinds of novel causatives in children' speech, as reported in the literature (e.g., Bowerman 1974, 1982; Gropen et al 1996; Lord 1979). Supposing that the L2 acquisition of causatives involves similar stages, then the poor performance by the L2 learners suggests that they had not yet

gone beyond the first stage, i.e., that they had not isolated the zero CAUS. As far as my experiment is concerned, given the fact that the high level Chinese learners of English had reached a high level of English proficiency, it is implausible to assume that they still remain in the preliminary stage of causative acquisition. Furthermore, unlike small children who start the acquisition of causatives with little prior knowledge which can give them any hint or clue, our L2 adult learners have already acquired their L1 (i.e., Chinese), which has an overt causative morpheme *shi* in the causative construction in general and with EO verbs in particular. One might have expected that the existence of such an overt causative morpheme should, in one way or another, help learners to realize that English EO verbs are made up of two morphological parts. As pointed out to me by White (personal communication), since CAUS is null in English, this may lead the Chinese learners to think EO verbs are not bimorphemic. In other words, they expected an explicit morpheme like *shi* in Chinese and they did not find it. These are the issues that need to be explored in future research.

That said, we therefore, turn to another possible account for the high level Chinese learners' failure to recognize backwards binding with EO verbs. On this account, we assume that these learners had recognized the zero CAUS in EO verbs, but they failed to recognize the function of this zero CAUS. The failure to realize what this zero CAUS does in binding an anaphor backwards may be due to a lack of other knowledge, such as chain-binding theory or anaphoric pro. In Chapter 3 it is proposed that backwards binding is satisfied by means of the mechanism of chain-binding. In the case of EO verbs, the chain is formed by the trace of an anaphoric pro and the Causer that contains the anaphor, because the anaphoric pro moves to the position of the zero CAUS to get licensed. If learners have knowledge of basic binding theory, but no knowledge of chain-binding or anaphoric pro, it would be impossible for them to accept backwards binding with psych predicates. In other words, to acquire the knowledge of backwards binding, one needs at least three prerequisites: knowledge of Principle A of Binding Theory, knowledge of the

existence of zero CAUS, and knowledge of chain-binding and anaphoric pro. The lack of any of them may result in the lack of knowledge of backwards binding with psych predicates.

As reported in the literature (e.g., Yip and Tang 1994; Yuan 1992), Chinese learners of English are able to correctly interpret English sentences with the anaphor *himself herself*. The present work also shows that the high level Chinese learners did not have any difficulty with Principle A, because they correctly accepted the grammatical sentences of nonpsych verbs with forwards binding and also correctly rejected the ungrammatical sentences of nonpsych verbs with backwards binding. Maybe these high level learners had acquired Principle A, and they had also figured out the presence of the zero CAUS. But since they were not clear about chain-binding or anaphoric pro, they were not able to identify the grammatical sentences of EO verbs with backwards binding. For future research to pursue the issue of chain-binding, one needs to test whether learners are able to recognize the existence of a chain throughout the sentences involving a chain. If learners "notice" the chain, they may be considered as having the relevant knowledge. But how to test learners' knowledge of anaphoric pro is something not clear to me at this point. As this is a new theoretical concept proposed recently by Travis (To appear) in her account of the Tagalog causatives, and adopted in this work to analyze the EO class of psych verbs, further crosslinguistic research needs to be carried out before an acquisition study on an anaphoric pro can really be conducted.

Regarding the low level Chinese learners' good performance, as they were inaccurate on basic binding properties with agentive verbs, and knew little about the morphological structure of EO verbs, they had to rely on something else to handle the sentences involving backwards binding with psych verbs. As discussed above, it is possible that these learners adopted a response bias towards accepting this type of grammatical sentences, which gives rise to better performance.

6.2.6 Summary

So far results from the three tasks have been discussed in terms of the hypotheses. One side of the general picture is that the four hypotheses are more or less supported to some extent. But the other side of the picture also shows that some hypotheses can only be supported partly or only a weak form of a hypothesis can be maintained, or the hypothesis is not supported. The following summarizes the above discussion.

Regarding the two main hypotheses, a weak form of the first main hypothesis is supported. On the whole, L2 learners were accurate on psych verbs, though they did have some difficulty working out the argument structure of EO verbs, suggesting problems with the zero CAUS. Generally, EO verbs are a bit more difficult than ES verbs. Although *-ing* adjectives are only significantly more difficult than *-ed* adjectives for one L2 group, the fact that *-ed* adjectives require idiosyncratic prepositions may hide the effect of the difficulty with the zero CAUS in *-ing* adjectives. Psych nominals are not easier than *-ing* adjectives, which challenges the hypothesis.

The second main hypothesis is basically supported. The learners of the lower levels had problems recognizing the ungrammaticality of the T/SM violation, supporting the suggestion that the zero CAUS is not available. In contrast, the learners of higher levels became much sensitive to the violation when their English improved, suggesting that the T/SM violation is something that can be learnable once the zero CAUS is acquired. Regarding backwards binding, the French learners showed the relevant knowledge (perhaps because of help from L1 transfer), suggesting that when the zero CAUS is accessed, backwards binding is available accordingly. The high level Chinese learners did not exhibit the knowledge, though they were shown to have acquired the zero CAUS. The anomalous results were interpreted as a consequence of lack of some other knowledge, but not a result of failure to detect the zero CAUS. The low level Chinese learners appeared to show some knowledge of backwards binding, but they actually did

not really get the zero CAUS, nor did they know the basic binding properties with nonpsych verbs. This phenomenon was explained as a result of using performance strategy. Thus this hypothesis is not challenged by the results.

The two secondary hypotheses are supported to some extent. The hypothesis that animacy interacts with the zero CAUS in the representation of argument structure is supported by the fact that EO verbs taking animate subjects are significantly more difficult than EO verbs taking inanimate subjects, and the fact that *-ing* adjectives with animate subjects are significantly harder than *-ing* adjectives with inanimate subjects. This hypothesis is also supported by the fact that psych nominals which involve no zero CAUS do not show such an animacy effect. However, the hypothesis is somewhat challenged by the results that ES verbs with animate objects are also significantly more problematic than ES verbs with inanimate objects, suggesting that animacy is a more general problem.

The hypothesis of L1 transfer in L2 acquisition is only partly supported. It is a mystery why L1 transfer fails to show up in a number of cases where expected.

6.3 UG or No UG, Still a Question

In this section, the issue of availability of UG is briefly discussed with respect to the L2 acquisition of psych predicates. Regarding this general issue, the present work cannot make a comprehensive conclusion.

On the basis of the results on the argument structure of ES verbs versus the argument structure of EO verbs, we may conclude that principles like the UTAH, and the Thematic Hierarchy are available to L2 learners. The L2 learners' IL grammar was quite systematic with respect to the semantics-syntax linkage concerning both types of verbs. No "wild grammar" was found; there were no learners who produced both ungrammatical sentences such as **John annoyed the article*, **John is annoying at the article*, and bad

sentences like **The article blamed John*, **The article is annoyed at John*. With an exception for one low level French learner who made the bad sentence **Wars fear People*, and with an exception for one low level Chinese learner who accepted the bad sentence **The storm was terrified*, when problems occurred, they were only with the EO class, and the class of *-ing* adjectives, which, I have argued, is because of the failure to recognize the zero CAUS.

As far as the T/SM restriction is concerned, subjects were generally not very accurate on this restriction with psych predicates. While more than half of the subjects, in particular the learners at higher levels, gradually become aware of the T/SM constraint, there were still around half of the subjects, some being also learners of higher levels, who were not sensitive to the T/SM restriction. Thus, the insufficient evidence may only lead us to a weak conclusion that UG is available in this regard.

As for the backwards binding properties, the results do not show a clear-cut picture as to whether UG mediates the learning process, because only the French learners, whose L1 is like English in this regard, seemed to have acquired the properties. Several plausible factors might be involved. First, as claimed in this work, the zero CAUS is the first thing to be learned for the acquisition of psych predicates. What needs to be acquired concerning this zero CAUS is not just its causative meaning, but its morphological shape and its syntactic function as well. As CAUS is zero in form but crucially adds the theta role of Causer and simultaneously allows an anaphoric pro to realize the T/SM argument, it is not easy for learners to establish a complete and accurate representation concerning this zero morpheme. Thus, difficulty with backwards binding involving these predicates (as well as with the T/SM restriction) could be expected from the learners. Second, the acquisition of backwards binding depends on something else in addition to the recognition of the zero CAUS. As mentioned above, the acquisition of backwards binding also relies on the awareness of Principle A, chain-binding and anaphoric pro. If these things are not yet acquired, backwards binding is not expected either. It could also be

possible that the methodology failed to fully tap the learners' knowledge of backwards binding. There might be some other hidden factors which, at this time, are not clear.

It is possible that all the above factors may also apply to the T/SM restriction. Anyone of the above might prohibit the function of UG in the L2 acquisition of psych predicates regarding the subtle properties of the T/SM restriction and backwards binding. It seems that there is some evidence for UG regarding the argument structure, some weak evidence for UG concerning the T/SM constraint, and unclear evidence from the findings with backwards binding. These results do not necessarily imply that UG does not play a role, but the question as to whether UG is activated or not in the learning process with respect to the L2 acquisition of English psych predicates is still open.

6.4 Contributions

In this work I have examined the L2 acquisition of English psych predicates by Chinese and French speaking ESL learners. It has been suggested that the acquisition of English psych predicates depends crucially on the acquisition of the zero CAUS. When this zero CAUS is acquired, syntactic properties related to this zero CAUS will be eventually acquired. It has been found that low level L2 learners of English failed to work out syntactic properties such as the correct argument structure of EO verbs, the T/SM restriction and binding properties suggesting that they had not acquired the zero CAUS; however, for learners of higher levels of English proficiency, they acquired (to some extent) psych predicates and associated syntactic consequences, suggesting that they had acquired the zero CAUS.

One of the main contributions of this study is its investigation of the L2 acquisition of three different categories of psych predicates (i.e., verbal, adjectival and nominal), looking at different properties (the argument structure of the three kinds of

predicates, the T/SM restriction and backwards binding). These results may serve as kind of basis for further exploration in this field.

Second, the investigation of backwards binding with psych predicates adds something new to research on the L2 acquisition of binding, a topic which has attracted quite a lot of attention from SLA researchers (e.g., Bennett 1994; Chen 1995c; Finer and Broselow 1986; Hirakawa 1990; Thomas 1991, 1993, 1995; White 1994, 1995c; White et al 1996c). The present study has extended research on binding principles in the sense that chain-binding and anaphoric pro are brought in.

Third, the study provides an answer to the question raised long ago as to why psych verbs like *annoy, frighten,* etc. and psych adjectives like *annoying* and *annoyed, frightening* and *frightened*, etc. are so difficult for L2 learners of English. The answer to this question, based on the present work, is as follows. The predicates *annoy* and *annoying* both contain a zero CAUS. Because CAUS is null in form, it escapes L2 learners' attention. Hence, errors occur: EO verbs are treated like ES verbs and *-ing* adjectives are overgeneralized for *-ed* adjectives occasionally.

This study also provides some potential implications for the L2 teaching of English psych predicates. While it is not clear what will serve as the positive input for the recognition of the zero CAUS, some explicit instruction on the internal lexical composition of psych EO verbs, the lexical structures of *-ing* and *-ed* adjectives, and nominals may help learners to understand and interpret the argument structures of psych predicates. Explanations such as that EO verbs and *-ing* adjectives are causative whereas ES verbs and *-ed* adjectives are not may help learners correctly map thematic arguments onto syntactic positions. For the teaching of EO verbs to the Chinese ESL learners in particular, maybe some special attention should be directed towards the comparison between Chinese EO verbs and English EO verbs. Since Chinese has an overt causative morpheme, using only the periphrastic construction, while English has both an overt and a covert causative morpheme in the periphrastic and the synthetic constructions

respectively, learners may assume the periphrastic type only. Thus, an explicit comparison between the two languages in this aspect should make learners aware of the differences and help them acquire the structure in the target language.

Finally, in addition to its contribution to the SLA research, this work has proposed an original analysis of psych predicates of three categories, which makes a contribution to linguistic theory itself. In particular, the use of an anaphoric pro in accounting for the phenomenon of backwards binding has shown a different but plausible way to resolve the notorious binding problem with these predicates. Moreover, the study has contributed to the understanding of psych predicates crosslinguistically. This work is one of the first attempts in the literature to examine psych verbs, psych adjectives and psych nominals in Chinese, English and French under one uniform account. While the analysis proposed here has left open far more questions than it can answer, it has provided a new perspective to look at old problems.

6.5 Directions for Future Research

The central claim of this thesis is that the zero CAUS is the main source of difficulty for learners of English with respect to the acquisition of psych predicates. Given the limitations of the current study, further research is needed, with more subjects of different L1s, learning different L2s, with different tasks designed to evaluate the validity of the claim. I suggest some potential extensions of the present work.

First, the claim that the zero CAUS causes potential difficulties should apply to nonpsych causative predicates such as *break*, *sink*, etc., since these verbs also possess a zero CAUS. These verbs should be more difficult than other noncausative action verbs, if what is claimed here is true. Work along these lines should allow us to inquire into the remaining questions left by the present work as to whether L2 learners have succeeded in recognizing both the causative meaning and the existence of the zero CAUS in EO verbs

or whether they have merely realized the causative meaning without understanding the bimorphemic nature of EO verbs.

Second, it would be of significance to conduct crosslinguistic research on the L2 acquisition of psych predicates (e.g., Chinese speakers learn French or Spanish as a second language) to verify that the zero CAUS is universally problematic for L2 learners of psych predicates across different languages, not just for L2 learners of English.

Third, it would be of interest to explore how English speakers learning Chinese periphrastic EO verbs. Research of this kind would provide insights into the acquisition of an overt CAUS in comparison with the zero CAUS. My theory predicts that the Chinese EO verbs would not be problematic for English learners for the following two reasons: on the one hand, CAUS is overt in this case, which would be obvious for learners to recognize its existence; on the other hand, the periphrastic verb *make* in English would serve as kind of help for learners to start with, which would lead them to the realization that Chinese EO verbs are like the periphrastic construction in English. In either case, L2 learners should acquire the Chinese EO verbs easily.

Fourth, it would be of importance to study the L2 acquisition of zero morphology in English in general involving different types of zero-derived forms, for example, nonpsych verbs which are zero-derived from nouns, such as *water* in *water the flower*, *book* in *book the ticket*. Research of this kind will enable us to evaluate whether learning something that is invisible in form is a general problem or a special one for psych predicates.

Finally, it would be interesting to examine the L1 acquisition of English psych predicates by children to see whether small children would also have difficulty with this zero CAUS. Study in this area would shed light on the underpinnings of how a language is acquired.

6.6 Conclusion

This study on the L2 acquisition of English psych predicates has argued that the acquisition of psych predicates involves, to a large extent, the acquisition of the zero causative morpheme CAUS. This CAUS which is lexically encoded in psych verbs of the EO class has its own theta role to assign, and it changes the grammatical function of the root to which it is attached, resulting in some unique syntactic properties. As CAUS is null in English, it poses difficulties for L2 learners to recognize its existence. When learners fail to notice the presence of this zero CAUS, they may not be able to figure out its important functions in syntax. Alternatively, when this null CAUS is acquired, the syntactic properties related to psych predicates can be acquired accordingly.

Results from this work are consistent with the claim that EO verbs and *-ing* adjectives are quite problematic for L2 learners of English due to the presence of the zero CAUS, whereas ES verbs, *-ed* adjectives and nominals are not very difficult due to the lack of the zero CAUS. It was also found that once learners acquire the zero CAUS, they are able to work out the correct argument structure of EO verbs. Once the morphological structure of EO verbs is acquired, the ungrammaticality of the T/SM restriction can be eventually recognized. With the understanding of the zero CAUS, L2 learners may come to accept backwards binding (to some extent).

As for the acquisition of morphologically derived words, results from the present work indicate that acquiring the internal morphological structure of the base word is, first of all, the most important step, because otherwise grammar-changing morphemes involved in morphology will be ignored, and syntactic consequences will be missed.

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APPENDIX A

Cloze Test

Please fill in the blanks in the following passage. Each blank must have one and only one word.

Joe came home from work on Friday. It was payday, but he wasn't _____ excited about it. He knew that _____ he sat down and paid his _____ and set aside money for groceries, _____ for the car and a small _____ in his savings account, there wasn't _____ much left over for a good _____.

He thought about going out for _____ at his favorite restaurant, but he _____ wasn't in the mood. He wandered _____ his apartment and ate a sandwich. _____ a while, he couldn't stop himself _____ worrying about the money situation. Finally, _____ got into his car and started _____. He didn't have a destination in _____, but he knew that he wanted _____ be far away from the city _____ he lived.

He drove onto a quiet country _____. The country sights made him feel _____. His mind wandered as he drove _____ small farms and he began to _____ living on his own piece of _____ and becoming self-sufficient. It had always _____ a dream of his, but he _____ never done anything to make it _____ reality. Even as he was thinking, _____ logical side was scoffing at his _____ imaginings. He debated the advantages and _____ of living in the country and _____ his own food. He imagined his _____ equipped with a solar energy panel _____ the roof to heat the house _____ winter and power a water heater. _____ envisioned fields of vegetables for canning _____ preserving to last through the winter. _____ the crops had a good yield, _____ he could sell the surplus and _____ some farming equipment with the extra _____.

Suddenly, Joe stopped thinking and laughed _____ loud, "I'm really going to go _____ with this?"

APPENDIX B
Picture Identification Task (Version A)

(Instructions)

In this test you are presented with a series of sentences. In the pictures you will see two main characters, Tom and Mary, and some other people including a fashion model, a doctor, a clown, a musician, a policeman, and a math teacher. All these people are shown in the next two pages.

In the test you will also find a sentence in English under each picture. Please read each sentence carefully and judge whether the sentence is an appropriate description of the picture. Circle True on the answer sheet if you believe the sentence describes the picture, and False if you believe it does not. Begin with pictures A and B.

For picture A, you should have circled False. The sentence says that the man is under the sofa, but as you can see the man is on the sofa.

For picture B, you should have circled True. The sentence says that the woman is on the sofa, and this is indeed the case.

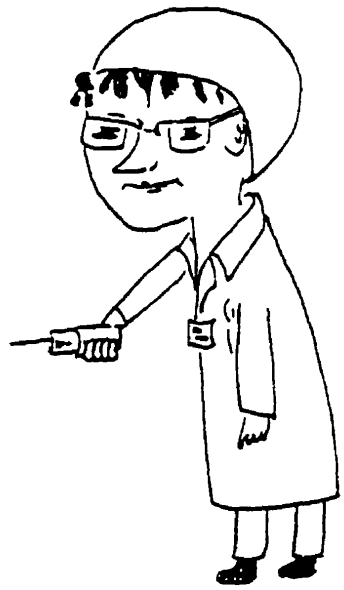
Please remember to answer only on the answer sheet. Do not go back to change your answers because we are interested in your initial response. Than you very much for your cooperation.

Now you are ready to begin.

Tom

Mary

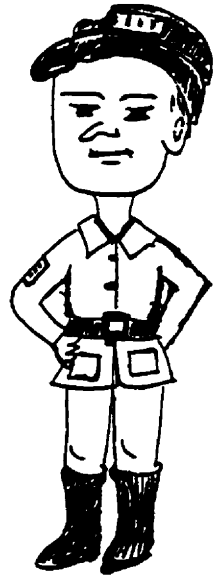
the fashion model



the doctor

the clown

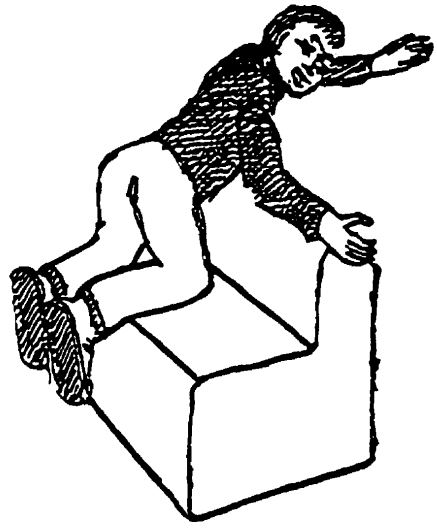
the musician



the policeman

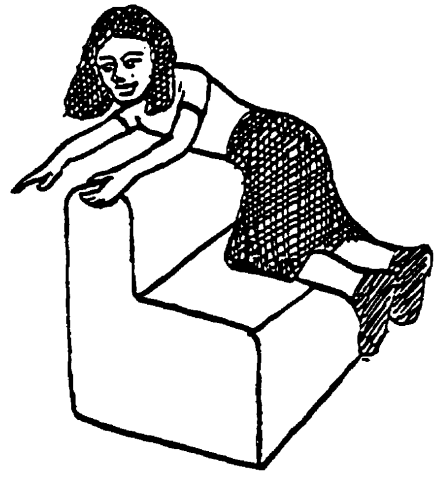
the math teacher

A



The man is under the sofa.

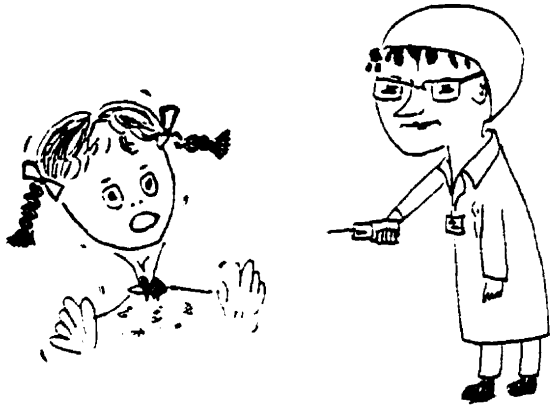
B



The woman is on the sofa.

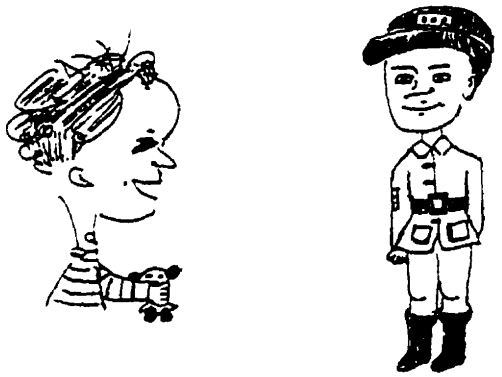
1. Tom lifts Mary.

2. Mary kicks Tom.



3. The doctor fears Mary.

4. Tom is chased by Mary.



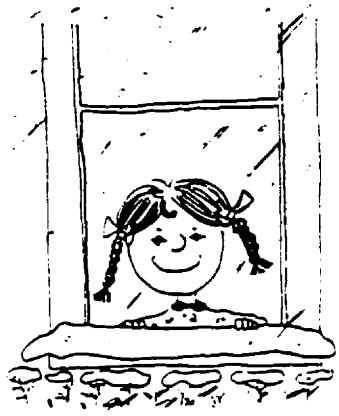
5. Tom annoys the policeman.

6. Mary hits Tom.

7. Mary is pushed by Tom.

8. Ice cream pleases Mary.

9. The model pleases Mary.



10. Mary fears the snowstorm.

11. Mary pulls Tom.

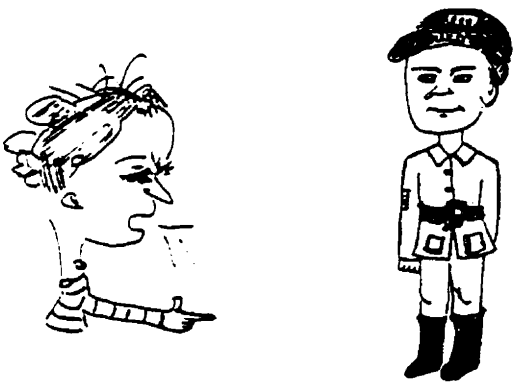
12. Mary fascinates the musician.

13. The clown enjoys Tom.

14. Mary is kicked by Tom.

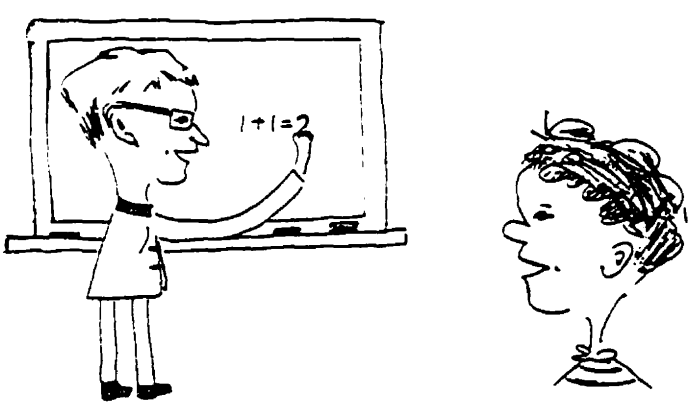
15. Mary likes the model.

16. Tom pulls Mary.



17. Tom blames the policeman.

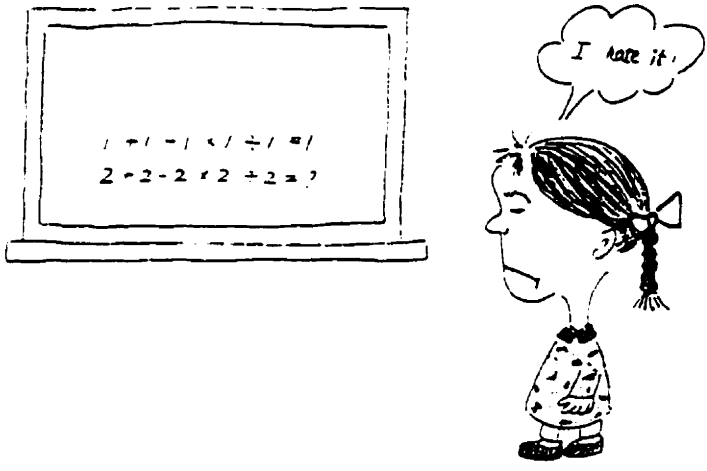
18. Tom is hit by Mary.



19. The math teacher dislikes Tom.

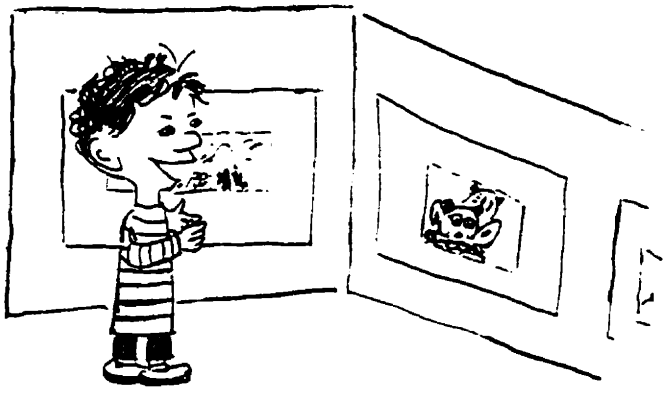
20. The book amuses Tom.

21. Tom blames the weather.

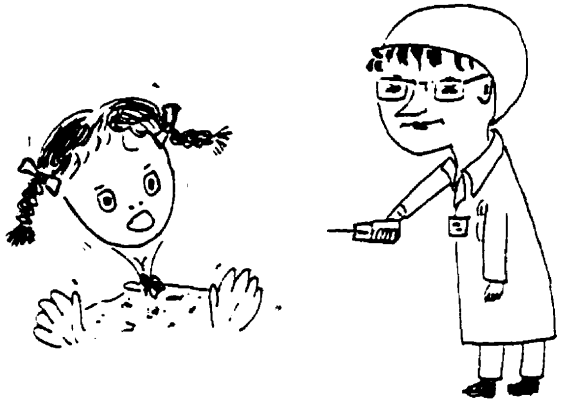


22. Mary dislikes math.

23. Mary is lifted by Tom.



24. Tom admires the painting.

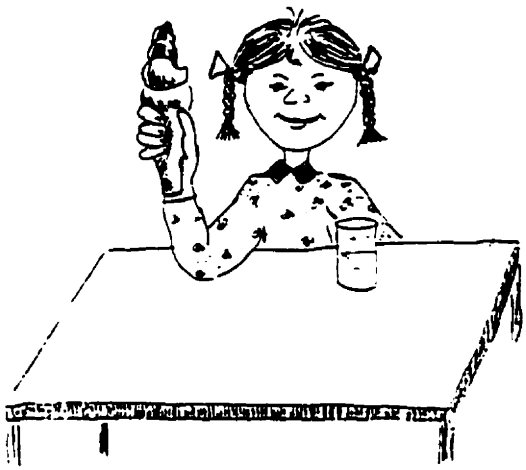


25. The doctor terrifies Mary.

26. Tom pushes Mary.

27. Mary fears the snowstorm.

28. Tom is kicked by Mary.

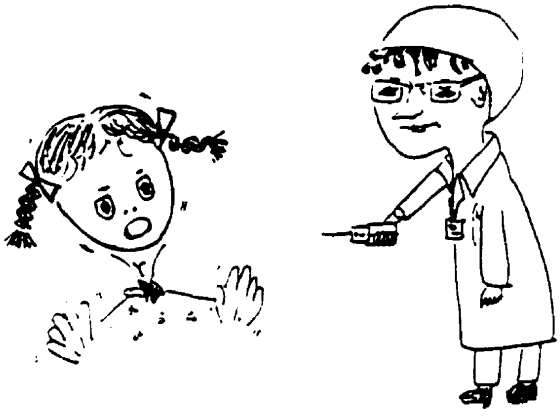


29. Mary likes ice cream.

30. Tom frustrates the math teacher.

31. Mary is pulled by Tom.

32. Tom enjoys the book.



33. Mary fears the doctor.

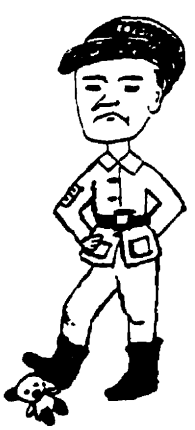
34. Mary chases Tom.

35. The model likes Mary.

36. Tom amuses the clown.

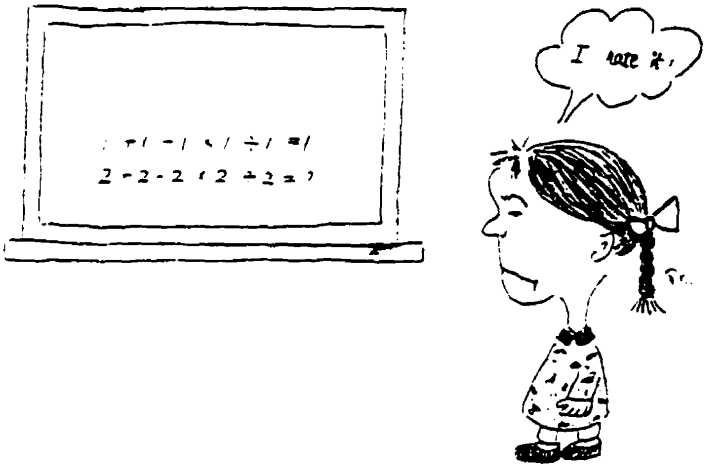
37. Tom blames the weather.

38. Tom is pushed by Mary.



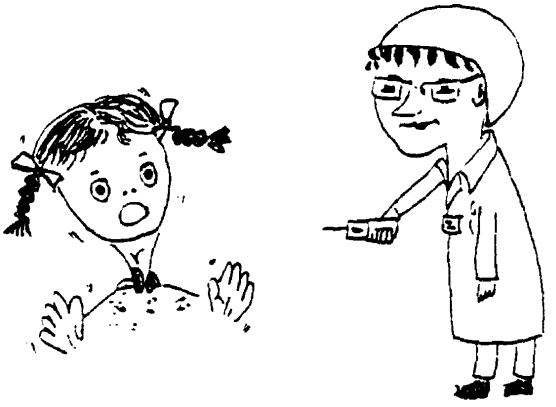
39. The policeman annoys Tom.

40. The musician admires Mary.



41. Math frustrates Mary.

42. Tom is lifted by Mary.

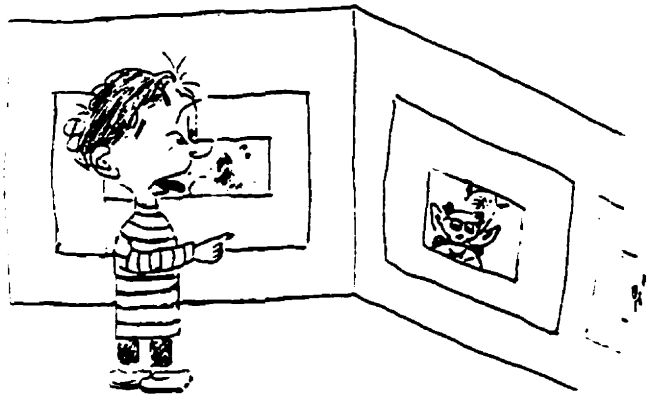


43. Mary terrifies the doctor.

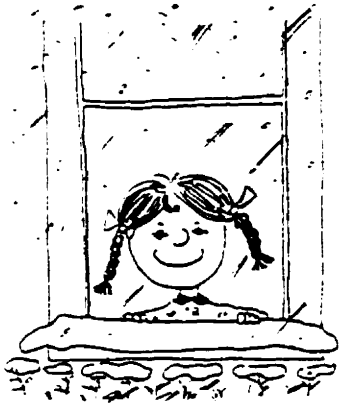
44. Tom is pulled by Mary.

45. The clown amuses Tom.

46. Tom hits Mary.



47. The painting fascinates Tom.

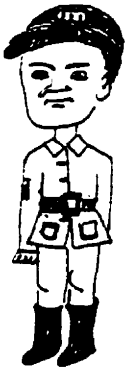


48. The snowstorm terrifies Mary.

49. Mary pushes Tom.

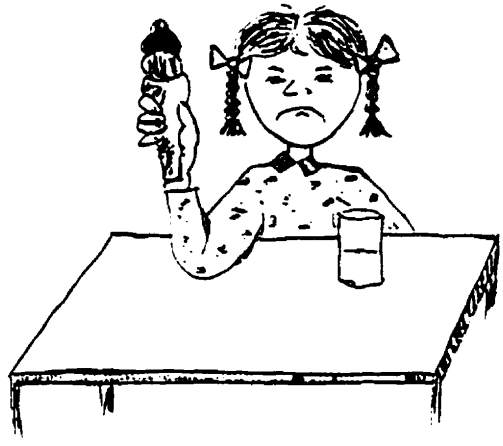
50. Tom kicks Mary.

51. Mary pleases the model.



52. The policeman blames Tom.

53. Tom enjoys the book.



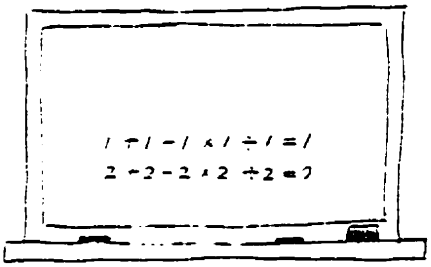
54. Mary likes ice cream.

55. Mary is hit by Tom.

56. Mary lifts Tom.

57. The weather annoys Tom.

58. The musician fascinates Mary.

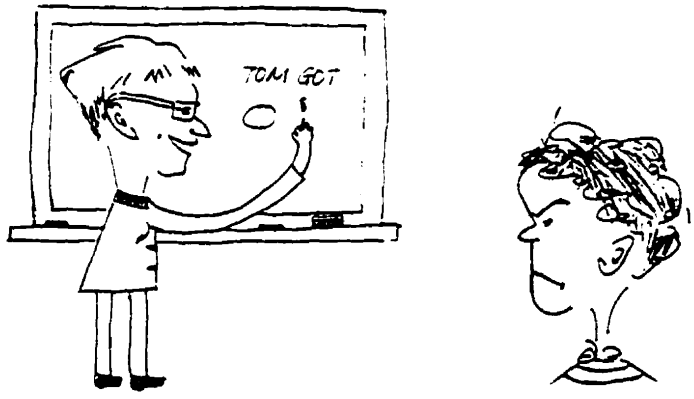


59. Mary dislikes math.

60. Tom enjoys the clown.

61. Tom chases Mary.

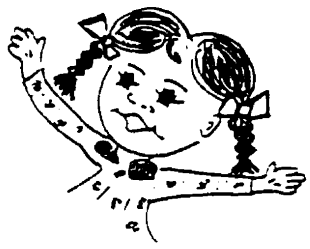
62. The painting fascinates Tom.



63. The math teacher frustrates Tom.

64. Mary is chased by Tom.

65. The snowstorm terrifies Mary.

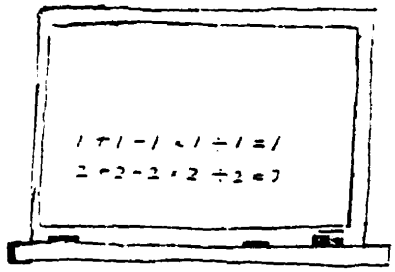


66. Mary admires the musician.

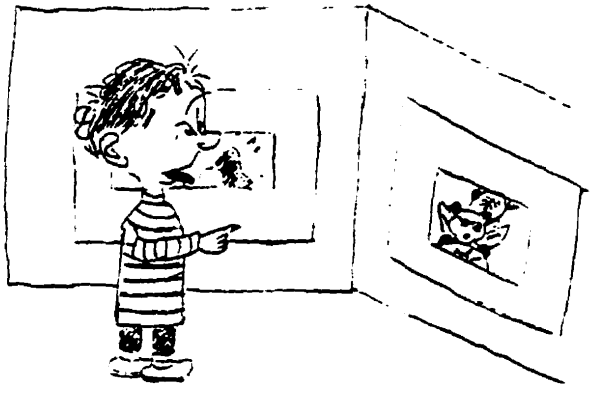
67. The weather annoys Tom.

68. Ice cream pleases Mary.

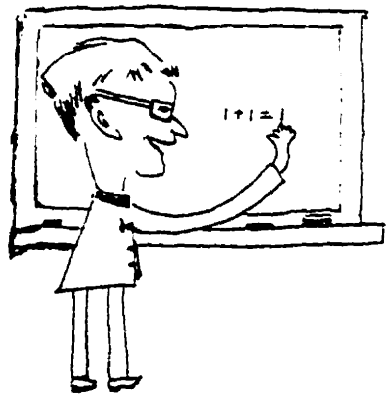
69. The book amuses Tom.



70. Math frustrates Mary.



71. Tom admires the painting.



72. Tom dislikes the math teacher.

APPENDIX C

Multiple Choice Task (Version A)

(Instructions)

In this test you are presented with a number of sentences. After each sentence there are three statements. Please read each sentence and the three statements, and circle the statement which you believe is the most appropriate one. Note that each sentence has only one correct answer. Begin with Examples A and B.

Example A. John is not as tall as Peter.

A. Peter is short, but John is not.
B. Peter is taller than John.
C. John is taller than Peter.

Example B. They decided to modify their story.

A. They decided to explain their story.
B. They decided to write their story.
C. They decided to change their story.

For example A, you should have circled "B". For example B, you should have circled "C".

Please remember to answer only on the answer sheet. Do not go back to change your answers because we are interested in your initial response. Thank you very much for your cooperation.

Now you are ready to begin.

1. **Ted finished the task nicely.**

A. The task was incomplete.

B. The task was nicely performed.

C. The task was nicely performing.

2. **The politician blamed the economy seriously.**

A. The politician always praised the economy.

B. The economy's annoyance of the politician was serious.

C. The politician's annoyance at the economy was serious.

3. **The boy turned the TV up and everyone had to leave the room.**

A. The boy was annoying.

B. The boy was nice.

C. The boy was annoyed.

4. **Mary no longer worries about her financial problems.**

A. The financial problems' frustration of Mary is over.

B. Mary's frustration with her financial problems is over.

C. Mary is still worrying about her financial problems.

5. **The girl at the accident spot was afraid.**

A. The girl was fearless.

B. The girl was terrified.

C. The girl was terrifying.

6. **John treated Cathy rudely.**

A. Cathy's treatment of John was rude.

B. Cathy treated John rudely.

C. John's treatment of Cathy was rude.

7. **The tourist was happy with the sights of Montreal.**

A. The tourist was unhappy.

B. The tourist was pleased.

C. The tourist was pleasing.

8. **The girl admired the magician very much.**

A. The girl's fascination with the magician was enormous.

B. The magician admired the girl very much.

C. The magician's fascination of the girl was enormous.

9. **The clown made the child laugh a lot.**

A. The clown's amusement of the child was tremendous.

B The child's amusement at the clown was tremendous.

C. The child made the clown laugh a lot.

10. **Alan rejected some important advice.**

A. The advice was refused.

B. The advice was refusing.

C The advice was trivial.

11. **People blame politicians a great deal.**

A. The people's annoyance at politicians is enormous.

B. Politicians blame people a great deal.

C. The politicians' annoyance of people is enormous.

12. **The opera of Romeo and Juliet was wonderful.**

A. The opera was fascinated.

B. The opera was fascinating.

C. The opera was unimpressive.

13. **Children really love whales.**

A. Children do not like whales.

B. Whales' pleasure of children is incredible.

C. Children's pleasure with whales is incredible.

14. **Jane successfully changed the program.**

A. Jane's improvement of the program was successful.

B. The program's improvement of Jane was successful.

C. Jane spoiled the program.

15. **The waiter provided good service and the customer was happy.**

A. The waiter was impatient.

B. The waiter was pleased.

C. The waiter was pleasing.

16. **The movie was excellent.**

A. The movie was very much enjoying.

B. The movie was very much enjoyed.

C. The movie was terrible.

17. **The speaker told many jokes and all the listeners laughed.**

A. The speaker was amused.

B. The speaker was dull.

C. The speaker was amusing.

18. **Susan bought ten of Mark's paintings.**

A. Susan's admiration of the paintings was obvious.

B. The paintings' admiration of Susan was obvious.

C. Susan did not have any interest in paintings.

19. **The student was sad because he failed one course.**

A. The student was glad.

B. The student was frustrated.

C. The student was frustrating.

20. **Bill admired the car exhibition greatly.**

A. Bill disliked the exhibition greatly.

B. The exhibition's fascination of Bill was great.

C. Bill's fascination with the exhibition was great.

21. **Jim suddenly rejected Helen.**

A. Jim's rejection of Helen was sudden.

B. Helen's rejection of Jim was sudden.

C. Helen suddenly rejected Jim.

22. **The boy had a lot of fun at the show.**

A. The boy did not enjoy the show.

B. The boy was amused.

C. The boy was amusing.

23. **The baby got a lot of hugs and kisses.**

A. The baby was loving.

B. The baby was loved.

C. The baby was ugly.

24. **The power failure in the building was a nuisance.**

A. The power failure was annoying.

B. The power failure was annoyed.

C. The power failure was wonderful.

25. **John enjoyed the movie very much.**

A. John's amusement at the movie was considerable.

B. The movie's amusement of John was considerable.

C. John did not like the movie at all.

26. **John respected Mary greatly.**

A. John's admiration of Mary was great.

B. Mary's admiration of John was great.

C. Mary respected John greatly.

27. **Bill played a serenade beautifully.**

A. Bill forgot the last part of the serenade.

B. The serenade's performance of Bill was wonderful.

C. Bill's performance of the serenade was wonderful.

28. **The boy cried as soon as the dentist brought out the drill.**

A. The dentist was pleasant.

B. The dentist was terrified.

C. The dentist was terrifying.

29. **The economic outlook is very pessimistic.**

A. The economic outlook is frustrated.

B. The economic outlook is frustrating.

C. The economic outlook is optimistic.

30. **Mary imitated Susan successfully.**

A. Mary's imitation of Susan was successful.

B. Susan's imitation of Mary was successful.

C. Susan imitated Mary successfully.

31. **The woman got a new job and she liked it very much.**

A. The woman disliked her new job

B. The job's enjoyment of the woman was great.

C. The woman's enjoyment of her job was great.

32. **Tom got a bad grade and his mother was angry.**

A. The mother was happy.

B. The mother was annoyed.

C. The mother was annoying.

33. **Jane especially liked the food at that French restaurant.**

A. Jane was sick of the food at that French restaurant.

B. Jane's pleasure with the food was great.

C. The food's pleasure of Jane was great.

34. **Ben reasonably declined a good offer.**

A. Ben accepted the offer.

B. Ben's refusal of the offer was reasonable.

C. The offer's refusal of Ben was reasonable.

35. **The Minister fears the war unnecessarily.**

A. The Minister's terror of the war is unnecessary.

B. The war's terror of the Minister is unnecessary.

C. The Minister does not care about the war.

36. **John's presentation at the conference was excellent.**

A. The presentation was pleasing.

B. The presentation was pleased.

C. The presentation was terrible.

37. **The singer sang so beautifully that the audience sang with him.**

A. The singer was bad.

B. The singer was fascinated.

C. The singer was fascinating.

38. **The couple loved their new-born baby very much.**

A. The baby's enjoyment of the couple was enormous.

B. The couple's enjoyment of the baby was enormous.

C. The baby loved the couple.

39. **The teacher's comments discouraged his students.**

A. The teacher was helpful.

B. The teacher was frustrated.

C. The teacher was frustrating.

40. **Thieves usually fear dogs.**

A. Dogs usually fear thieves.

B. Thieves' terror of dogs is typical.

C. Dogs' terror of thieves is typical.

41. **The movie about the clown was funny.**

A. The movie was amusing.

B. The movie was amused.

C. The movie was serious.

42. **Robert didn't promote Jenny as she had expected.**

A. Jenny didn't promote Robert as he had expected

B. Robert's frustration of Jenny was considerable.

C. Jenny's frustration with Robert was considerable.

43. **The storm last night was scary.**

A. The storm was terrifying.

B. The storm was terrified.

C. The storm was beautiful.

44. **John spent all his time on his garden.**

A. John never looked after his garden.

B. John's love of his garden was unbelievable.

C. The garden's love of John was unbelievable.

45. **Mark's paintings attracted a lot of visitors.**

A. Mark's paintings did not attract any visitors.

B. The paintings were very much admiring.

C. The paintings were very much admired.

46. **Peter shows great concern about his son's health.**

A. The son shows great concern about his father's health.

B. The son's love of Peter is obvious.

C. Peter's love of his son is obvious.

47. **The audience at the circus show was very attentive.**

A. The audience was fascinating.

B. The audience was indifferent.

C. The audience was fascinated.

48. **Linda rewrote the article and it was much better.**

A. The article was sloppy.

B. The article was considerably improving.

C. The article was considerably improved.

APPENDIX D

Grammaticality Judgment and Correction Task (Version A)

(Instructions)

In this test you are presented with a number of sentences. Please read each sentence and judge whether the sentence is good. Circle **G** (Grammatical) if you believe the sentence is acceptable, and **U** (Ungrammatical) if you believe it is not. With the ungrammatical sentence, please correct any mistakes in it. If the incorrect sentence is too difficult for you to correct, please circle the part which does not sound good to you. Begin with examples A and B.

Example A. Susan had a good job now. (G, U)
Example B. John is working very hard now. (G, U)

For example A, you should have circled **U**. Here the past tense verb "had" does not match the adverbial "now". Therefore, you may either change "had" into "has", or simply delete "now".

For example B, you should have circled **G**. The sentence is indeed good.

Please do not go back to change your answers because we are interested in your initial response. Thank you very much for your cooperation.

Now you are ready to begin.

1.	Women enjoy romantic movies.	(G, U)
2.	The clown drew a picture of himself.	(G, U)
3.	Children amuse circus shows.	(G, U)
4.	The needle is terrifying to the little boys of the nurse.	(G, U)
5.	Drivers blame snowstorms for accidents.	(G, U)
6.	The essay made the politicians annoyed with the author.	(G, U)
7.	The article about himself frustrated the professor.	(G, U)
8.	The French food pleased the tourist with his trip to Paris.	(G, U)
9.	The videotape of himself is amusing to the clown.	(G, U)
10.	A classmate of herself pulled Jane.	(G, U)
11.	The public's fascination with the exhibition is obvious.	(G, U)
12.	The joke about herself fascinated the musician.	(G, U)
13.	A friend of himself hit John.	(G, U)
14.	Men dislike house chores.	(G, U)
15.	Bad grades made the students frustrated with the teacher.	(G, U)
16.	The tourists are pleased with the French food.	(G, U)
17.	The article about himself is frustrating to the professor.	(G, U)
18.	Little boys terrify hospitals.	(G, U)
19.	The students' frustration with their bad grades is over.	(G, U)
20.	The politician wrote a book about himself.	(G, U)
21.	The story about herself pleased the dancer.	(G, U)
22.	The students frustrate their bad grades.	(G, U)
23.	The circus show made the children amused with the clown.	(G, U)
24.	The needle made the little boys terrified of the nurse.	(G, U)

25. The essay annoyed the politicians at the author. (G, U)

26. A roommate of herself kicked Mary. (G, U)

27. The children's amusement with the circus show is considerable. (G, U)

28. The public is fascinated with the painting exhibition. (G, U)

29. Politicians annoy political essays. (G, U)

30. A neighbor of himself chased Peter. (G, U)

31. Bad grades are frustrating to the students with the teacher. (G, U)

32. Girls admire movie stars. (G, U)

33. The professor criticized an article about himself. (G, U)

34. Tourists please French food. (G, U)

35. The circus show amused the children with the clown. (G, U)

36. The essay about himself annoyed the politician. (G, U)

37. The little boy's terror of the needle is enormous. (G, U)

38. The exhibition is fascinating to the public with the work of artists. (G, U)

39. The dancer told a story about herself. (G, U)

40. People fear wars. (G, U)

41. The tourists' pleasure with the French food is great. (G, U)

42. The videotape of himself amused the clown. (G, U)

43. The essay is annoying to the politicians at the author. (G, U)

44. A teacher of himself pushed Mark. (G, U)

45. The children are amused with the circus show. (G, U)

46. The essay about himself is annoying to the politician. (G, U)

47. Bad grades frustrated the students with the teacher. (G, U)

48. The musician composed a song about herself. (G, U)

49. The politician's annoyance with the political essay is considerable. (G, U)

50. The exhibition fascinated the public with the work of artists. (G, U)

51. The joke about herself is fascinating to the musician. (G, U)

52. The students are frustrated with their bad grades. (G, U)

53. The French food is pleasing to the tourist with his trip to Paris. (G, U)

54. The cartoon about herself is terrifying to the actress. (G, U)

55. The exhibition made the public fascinated with the work of artists. (G, U)

56. The needle terrified the little boys of the nurse. (G, U)

57. A colleague of herself lifted Susan. (G, U)

58. The politicians are annoyed with the political essay. (G, U)

59. The cartoon about herself terrified the actress. (G, U)

60. The French food made the tourist pleased with his trip to Paris. (G, U)

61. The story about herself is pleasing to the dancer. (G, U)

62. The little boys are terrified of the needle. (G, U)

63. The public fascinates the work of artists. (G, U)

64. The circus show is amusing to the children with the clown. (G, U)

65. The actress described a cartoon about herself. (G, U)

66. Boys like football players. (G, U)

APPENDIX E

Summaries of Results of Three Tasks in terms of Significant Differences

Table 1 : Performance on ES and EO Verbs in the PI Task between Groups

Types of Structures	Chinese vs. Controls	French vs. Controls	Chinese vs. French	Chinese vs. Chinese
ES + AO	LowChinese*	LowFrench*	LC, IC & HC better than LF	No difference
ES - AO	No difference	No difference	No difference	No difference
EO + AS	LowChinese* InterChinese*	No difference	No difference	HC better than LC
EO - AS	LowChinese *	No difference	No difference	HC better than LC

*: Significant different at ($p<.05$)

Table 2: Performance on 5 Types of Psych Structures in MC Task between Groups

Types of Structures	Chinese vs. Controls	French vs. Controls	Chinese vs. French	Chinese vs. Chinese
ing +AS	LowChinese*	LowFrench*	HC better than LF	HC better than LC
ing - AS	No difference	LowFrench*	IC & HC better than LF	No difference
- ed	No difference	LowFrench*	IC & HC better than LF	No difference
PsychN+AC	LowChinese *	LowFrench*	IC & HC better than LF	No difference
PsychN-AC	No difference	LowFrench*	LC, IC & HC better than LF	No difference

*:Significant at ($p<.05$)

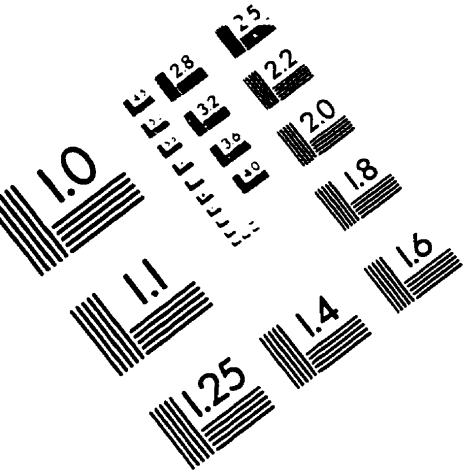
Table 3: Performance on 9 Types of Psych Structures in GJ Task between Groups

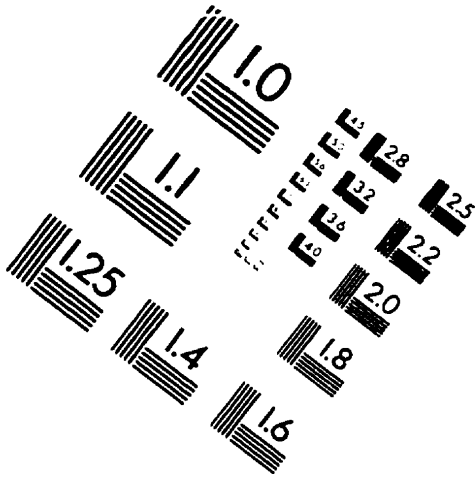
Types of Structures	Chinese vs. Controls	French vs. Controls	Chinese vs. French	Chinese vs. Chinese
ES	No difference	No difference	No difference	No difference
EO	LC *	LF*	IC & HC better than LF	IC & HC better than LC
EO-T/SM	LC* IC*	LF*	IF better than LC	HC better than LC
-ing-T/SM	LC* IC* HC*	LF*	IF better than LC	HC better than LC
-ed-T/SM	LC*	LF*	No difference	No difference
Noun-T/SM	No difference	No difference	No difference	No difference
Make-T/SM	LC *	No difference	No difference	HC better than LC
EO-BB	LC *	No difference	LF better than IC	No difference
A-BB	IC *	No difference	LF better than IC	No difference

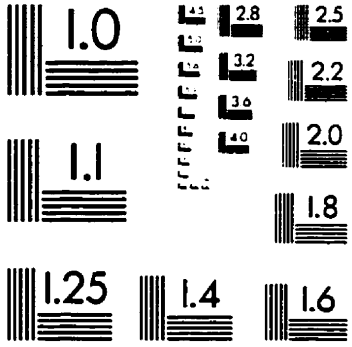
*:Significant at ($p<.05$)

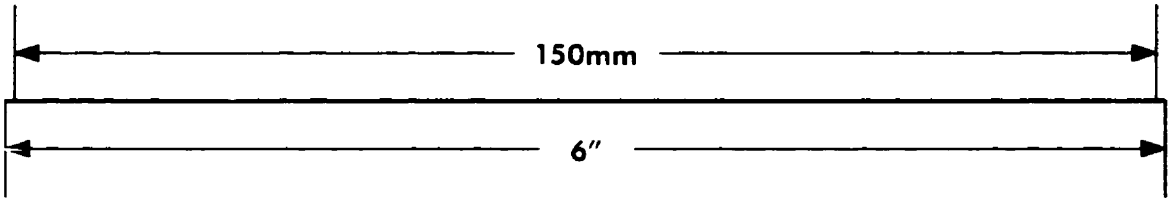
Note: LC=low level Chinese, IC=intermediate level Chinese, HC=high level Chinese
LF=low level French, IF=intermediate level French

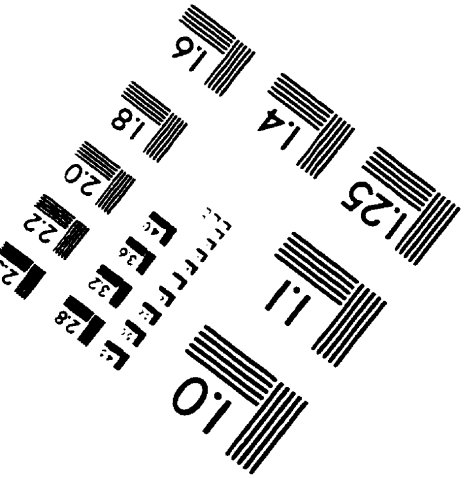
IMAGE EVALUATION
TEST TARGET (QA-3)

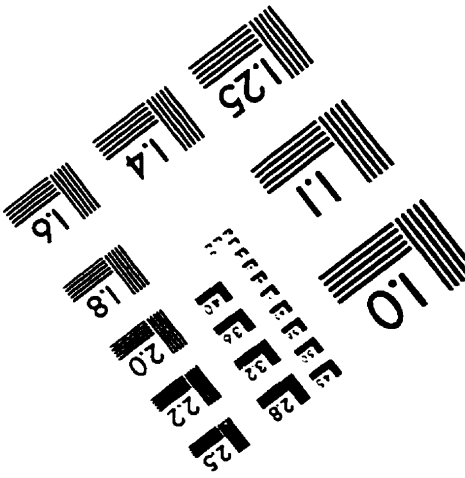












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