Second Language Acquisition of the English Interrogatives:

The Effect of Different Learning Contexts on the SLA of Three Groups of Chinese Learners of English

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DECLARATION

This thesis is my original work and of my own execution and authorship.

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ABSTRACT

This study is an attempt to investigate the interlanguage (IL) development of Cantonese learners of English whose exposure to the target language (TL) is mainly from the classroom context and with little or no informal exposure outside the classroom.

Second Language Acquisition (SLA) research to date suggests that naturalistic SL learners largely follow a universal route of development. The issue of concern of the present research is whether acquiring the TL in a classroom context involves the same or different processes of SLA and how the learning context shapes the qualitative development in terms of the degree of analyticity and automaticity of IL knowledge.

An equally important issue in relation to SLA in the classroom situation is the development of metalinguistic knowledge and in what principled way this type of knowledge assists or hinders the learner's development.

Within this framework of investigation, an empirical distinction is drawn between the learner's development of IL knowledge and the extent to which he is able to retrieve this knowledge in production.

In the present study, three groups of learners were identified. Two groups of subjects were sampled from the Hong Kong learning context, where English is regarded by and large as a second language. One of the two groups was chosen from the English medium environment, and the other was from the Chinese medium environment. The third group of subjects was drawn from Guangzhou, one of the southern provinces of China, where the medium of instruction is Chinese while English is treated as a foreign language. Although these three groups of subjects share the same L1 background, they are differentiated by the availability of informal exposure and the degree of explicitness of grammar teaching received. The English interrogatives were chosen as the target language structure for investigation because they represent one of the taught language items commonly found in the syllabus. Four elicitation tasks were administered: an oral elicitation task, a written dialogue completion task, a grammar correction task and a timed grammaticality judgment task.

From the perspective of the general theory of second language acquisition, the results suggest that the classroom learners as identified in the present study largely conformed to the universal 'sequence of development' and exhibited similarities in their orders of development. However, it was found that certain features of the learner's order of development at the level of knowledge did not necessarily coincide with that established in his production. Furthermore, an adequate explanation for IL development, as far as this study is concerned, needs to take into account the learner's L1 as well as the other types of knowledge at his disposal, as differences were found in the present study which may be traceable to these parameters.

In terms of the effect of learning context on second language development, the results suggest that (i) the different learning contexts as identified leads to certain differences in the subjects' IL development as well as the qualitative development of their IL knowledge, (ii) the provision of explicit instruction seems to be more beneficial for more advanced learners than beginners; and when informal exposure is not available in the learning context, and (iii) the availability of informal exposure of the kind found in the present study seems to promote initial IL development at a faster rate than that found in learning contexts in which informal exposure is not usually available.

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CHAPTER ONE
INTRODUCTION

1.1 Aims of the Study

The study of second language acquisition (referred to as **SLA** hereafter) has a fairly short history of about twenty years, during which research into the various aspects of SLA has been prolific.

Findings from this research paradigm have challenged the views of language teachers that the learner's second language (referred to as **SL** hereafter) development is guided by their conscious effort to impart the knowledge of the target language (referred to as **TL** hereafter) to their students. It has been found that the learner's development is the outcome of an autonomous, language specific system actively creating its own interlanguage (referred to as **IL** hereafter) subsystems; at the same time, manifesting external consistency over time towards the approximation of the TL. These studies have led to the advocacy of the existence of a 'natural order', universally found among learners of different first language (referred to as **L1** hereafter) backgrounds and independent of different language settings.

A review of these studies indicates that they were usually carried out in an environment in which the TL is precisely the language used in the wider community, thereby allowing learners some opportunity to expose themselves to the 'natural data'. Secondly, a majority of these studies were based on a set of oral data, be it spontaneous or elicited, which made no distinction between the development of knowledge and the retrieval of knowledge in production in various situations.

The present study serves a dual purpose. Firstly, it is an attempt to investigate whether there exists a universal 'route of development' (Ellis 1985a) for Cantonese learners of English whose exposure to English is largely or solely from the classroom, and whose L1 structures are in a number of significant respects different from English (see Chapter 5). It is a well-acknowledged fact that a significant proportion of the SL learner population are indeed classroom learners of a certain type,

systematically guided by a teacher who is also a non-native speaker of the TL. SLA research so far has not ascertained whether the same set of language processes is triggered or not, despite the diversity of the nature of input. Recently, an interesting issue has been raised regarding whether native and non-native speakers share the same underlying competence.

Secondly, based on a tentative framework of striking an empirical distinction between the development of IL knowledge and the retrieval of knowledge in production, it is possible to establish an order of development with respect to these two levels and investigate them systematically. The theoretical justification for this framework of investigation is the postulate that there might exist a bigger discrepancy between knowledge and performance for classroom learners and the sole reliance on oral data would generate a biased picture of their IL development.

1.2 Structure of the Thesis

This thesis consists of nine chapters. The following three chapters present a critical review of literature concerning SLA theories (Chapter two), the theories describing classroom SL development (Chapter three) and the relevant empirical studies (Chapter four). Chapter five is concerned with a grammatical description of the interrogative system of both the TL and the subjects' native language (referred to as **NL** hereafter). A summary of the relevant acquisition studies is also provided. The research framework as well as the major hypotheses to be tested can be found in Chapter 6, to be followed by a report of an analysis of the data collected (Chapter 7) and some interpretations put forward by the author (Chapter 8). The last chapter (Chapter 9) concerns certain pedagogical considerations derived from the results of the findings and some concluding remarks on the research methodology adopted in the present study.

CHAPTER TWO

DEVELOPMENT OF SLA THEORIES

2.0 Introduction

The past two decades have seen the evolution of a research paradigm of second language (hereafter referred to as **SL**) development, from a model which found its theoretical basis on Contrastive Analysis developed in the fifties, and which had, at that time, enormous bearing on SL pedagogy, to a host of alternative 'models'. These attempt to describe, or, if possible, to explain, not so much the overt 'behaviour' of the SL learner, as the internal processing of certain language- specific cognitive modules which make the acquisition of language possible. As a consequence, theories of SLA seem to have divorced themselves from theories of SL pedagogy, because later developments of SLA research, especially in the seventies and early eighties, indicate that there is no isomorphic relationship between language teaching and language learning.

In the following section, the history of the development of SLA theories is traced, providing the background to our understanding of the 'rift' between language teaching and SL learning.

2.1 Contrastive Analysis and Language Transfer

Contrastive Analysis is one of the earliest models which attempt to account for SL learning. Originally formulated by Charles Fries (1945) and later expounded by Lado (1957), the pedagogical applications of Contrastive Analysis involve a systematic comparison between the structural systems of two languages, i.e. the learner's first language (**L1**) and the target language (**TL**), so that points of divergence and convergence are derived and predictions made in relation to ease and difficulty of SL learning. Where the two structures match, learning is easy, and where they differ, difficulties arise and undesirable errors surface in the learner's production. To Lado, structural differences, the chief source of difficulty for the language learner, should form the focal concern for the preparation of teaching materials and language tests.

This theory of SL learning also has its theoretical underpinnings in Behaviourism as put forward by Skinner (1957) who views language learning as habit formation by means of imitation and reinforcement, whereby the learner has to identify the stimulus-response associations and to put them to practice for an automatic habit to be formed. This view of language learning behaviour is further developed under the notion of **'Language transfer'**, success in learning a SL was measured upon the success in overcoming old L1 language habits established previously. Structural similarity will lead to **positive transfer**, thus learning is easy, but structural dissimilarity will result in **negative transfer** and the resultant interference errors are linguistic forms attributable to the L1 used in the L2.

2.1.1 Strong and Weak Contrastive Analysis Hypotheses

Wardhaugh (1970) identifies two forms of **Contrastive Analysis Hypothesis.** The **strong form** of the hypothesis states that Contrastive Analysis can predict L2 learning phenomena in relation to L1 induced errors by identifying the differences between the native and the TL. As Lee (1968:180) notes, 'the prime cause, or even the sole cause, of difficulty and error in foreign language learning is "interference" coming from the learner's native language.' The strong hypothesis is more akin to the early formulation of Contrastive Analysis by Lado. The implication of it is that errors can be avoided since they can be predicted.

The **weak form** of the hypothesis claims to be useful in explaining known areas of difficulty, as opposed to predicting areas of difficulty. This hypothesis, thus derived, needs to be subsumed in the first place under Error Analysis as the tool of investigation; moreover, implicit in this hypothesis is that not all errors are due to interference, other sources are possible (Ellis 1985a).

2.1.2 Interim Discussion

This earlier model of SL learning theory which draws references from Contrastive Analysis has been called into question over the past decades. The strong form of it gains very few supporters because it fails in its power of predictability, at least

at the syntactic level, though researchers tend to agree that it may be more predictive at the level of phonology. Subsequent studies reveal that the L1 is not the sole source of grammatical errors, neither was the L2. Richards (1974b) quotes results from a number of studies showing that errors may be due to other sources such as over-generalisation, or false hypotheses set up by the learner. Lightbown and White (1988) argue that Contrastive Analysis, the prime interest of which involves the comparison of two 'competence' grammars, ignores the contribution of learners' language performance as the source of information. These two issues have been at the heart of the criticisms of Contrastive Analysis.

Dulay et. al. (1982) argue that the learner's L1 plays no significant role in the learning of L2 since genuine cases of 'interference errors' are few and far between in the corpus they have collected and most of the errors are developmental in nature (Dulay and Burt 1973, 1974a). They also point out the danger of relying on sociolinguistic behaviours, such as 'linguistic borrowing' and 'switching' in language contact situations, to explain psycholinguistic processes of L1 interference because the former presuppose the interaction of two full-fledged linguistic systems in bilingual situations while the latter assume that 'interference' is due to the lack of or unfamiliarity of L2 knowledge on the part of the learner.

Above all, the equation that linguistic divergence and learning difficulty are directly proportional to each other has been subject to serious criticisms. Stockwell et. al. (1965) claims that linguistic differences can be arranged in a hierarchy of learning difficulty. Subsequent SL studies prove that language acquisition is such a complex phenomenon that direct mapping of difference onto difficulty is far too simplistic in outlook, particularly when one associates second language acquisition (SLA) with a type of psycholinguistic process (Ellis 1985a). On the contrary, Wode (1984) claims that structural similarity between L1 and L2 renders L1 transfer more probable. Earlier studies also show that learning difficulty may not result in error but avoidance, as suggested by the results of Schachter's study (1974) in which her Chinese and Japanese learners of Eng-

lish avoid producing relative clauses because of the major syntactic differences between the L1 and the L2. Recent studies by Kellerman (1983, 1984) also suggest that his subjects would initially avoid using L1 semantic features which they perceive as more marked or L1 language specific, even though these features are acceptable in L2.

Zobl (1984) notes that Contrastive Analysis fails to take into account the dynamic nature of SL development as well as the inherent ease and difficulty of the L2 system. Moreover, it lacks sufficient quality to claim to be an acquisition theory if its assumption is one of transfer, a general-purpose learning mechanism.

Problems are also found even if a weak form of the hypothesis is adopted, one of them being the identification of the source of errors. Sometimes, it may be due to L1, but at another time, it can be 'doubly determined' by the learner's L1 and certain universal constraints, as suggested by the stage of pre-verbal negation ('no + verb') which is not only a stage of the universal sequence, but also a feature of Spanish subjects' L1 (Cazden et.al. 1975).

In general, Contrastive Analysis which attempts to account for learning difficulty and provide guidelines for SL pedagogy turns out to be not as helpful as was originally expected. It is a SL learning theory without the learner. Strevens (1970) argues that contrastive studies are of no use to SL pedagogy because a comprehensive analysis of two linguistic systems is a painstaking task for language teachers, who might as well rely on their experience in detecting learners' difficulty through their daily interactions.

In terms of SLA theories, we have seen that Contrastive Analysis is no longer taken to be a powerful tool in predicting learning difficulty. By comparing two 'competence' grammars, Contrastive Analysis assumes that the degree of difficulty is similar at any stage, or in any aspect, of the learner's development. This static view runs counter to subsequent theories of SLA in which learner variability is one of the central components. In other

words, Contrastive Analysis makes no provision for contextual or situation variables which may affect the likelihood of occurrence or non-occurrence of transfer (Ellis 1985a).

From a psycholinguistic perspective, Contrastive Analysis as a model of SL learning collapses both competence and performance since no distinction is made between them when it comes to analyse the learner's errors. Kellerman and Sharwood Smith (1986) note that transfer, or, in their terms, **cross-linguistic influence**, may occur when there are gaps in either the learner's declarative or procedural knowledge.

Despite its being inadequate in claiming to be an acquisition theory, Contrastive Analysis is not rejected out of hand on account of the valuable insights it provides as regards differences in the internal systems between languages, not only at the level of syntax, but also at the level of pragmatics. Also, SLA theories developed in the eighties also take into account contrastive analysis as one of the sources of information.

2.2 Error Analysis

During the heyday of Contrastive Analysis, Corder published an article in which he stressed the insights one could gain by looking into **learners' errors**. As he notes,

> 'A learner's errors...provide evidence of the system of the language that he is using (i.e. has learnt) at a particular point in the course....They are significant in three different ways. First to the teacher, in that they tell him..how far towards the goal the learner has progressed..Second, they provide to the researcher evidence of how language is learned or acquired, what strategies or procedures the learner is employing in his discovery of the language. Thirdly, they are indispensable to the learner himself, because we can regard the making of errors as a device the learner uses in order to learn. It is a way the learner has of testing his hypothesis about the nature of the language he is learning.'
>
> (Corder 1967 in 1981)

Corder's proposal of investigating learner's errors at that moment had wide implications in SL pedagogy, and SL learning theory as well as research methodology. Pedagogically, errors were no longer viewed as undesirable deviations from the norm or the result of the learner's failure to get over L1 habits,

instead, those errors systematically produced by the learner provide invaluable information for the teacher.

From the perspective of SL theory, errors made by the learner provide insights about the process and strategy of acquisition. Techniques and guidelines were developed to delineate the possible types of errors which would be described and explained (Corder 1972, 1973). Taxonomies of errors or sources of errors were subsequently set up by other interested researchers. Dulay et.al (1982) identify four types of errors: **developmental, interlingual, ambiguous,** and **other.** Based upon the IL data from studies about SL development of learners of different native language (NL) backgrounds, Richards (1974b) outlines various processes underlying the occurrence of, what he calls, '**intralingual**' and '**developmental**' errors in learners' production, viz: over-generalisation, ignorance of rule restrictions, incomplete application of rules, and false concepts hypothesized.

Dulay and Burt's framework of analysis is based on comparisons between the structures of IL errors and those of the TL, the learner's L1 or first language acquisition. In a sense, these errors are the linguistic types of errors, which are more or less a descriptive taxonomy; whereas the taxonomy used in Richards (1974b) is concerned more with the underlying psycholinguistic processes which cause the occurrence of the two types of errors he defines.

2.2.1 Error Analysis: An Appraisal

Developed in a climate in which SL researchers had become frustrated by the lack of predictability of Contrastive Analysis, Corder's proposal of **Error Analysis** is important, for it moves our attention from both the learner's NL and the TL to the learner's 'developing' language, which, according to Corder, provides a 'true' reflection of the systematic development of his 'transitional competence(s).' Apart from its values for SL pedagogy, the proposal of Error Analysis reorientates our perception as regards SLA phenomenon.

In fact, Corder's insights on SLA are drawn from longitudinal studies on first language acquisition such as McNeill (1966)

which attempts to show how regular occurrences of errors produced by the child could not be derived from sheer imitation but from the innate development of rules and generalisations. He proposes to adopt a working hypothesis that at least some of the errors and the underlying strategies adopted by SL learners, child or adult, were similar to a child acquiring his NL (Corder 1977).

Notwithstanding the contributions of Error Analysis to SLA theories, this approach has its limitations. This model of analysis is in principle based on performance; as mentioned previously, Schachter (1974) claims that the avoidance strategy adopted by SL learners as a result of perceived language distance or difficulty renders Error Analysis unworkable. Moreover, as Lightbown and White (1988) comment, its emphasis is target-orientated, not only at the level of formal linguistic structures, but also at the level of meaningful use. Ellis (1985a) notes that Error Analysis fails to capture the continuous process of SL development since it concentrates on synchronic description of a learner's transitional competence. Whilst agreeing with Ellis, McLaughlin (1987) notes further that specific errors may be prevalent at specific points in the developmental continuum and that there is evidence that interlingual errors appear primarily at the initial stages of development (Taylor 1975).

However, the thrust of the criticisms is aimed at the explanatory power of Error Analysis. Schachter and Celce-Murcia (1977) outline six weaknesses concerning Error Analysis, among them two are crucially related to SLA phenomenon: (a) Error Analysis can only produce a partial picture of the learner's transitional competences because it does not account for correct performance; (b) since transfer often operates over larger linguistic domains (e.g. omission of copular versus word order), biased frequency counts of obligatory contexts of grammatical morphemes underestimate the effects of transfer on IL development. The other weakness identified are more to do with the subjectivity of error identification and the arbitrary classification of errors.

Even researchers who make use of this approach acknowledge this problem. Dulay et.al.(1982) criticise the lack of precision and

specificity in the definition of terminologies to allow a fair comparison among the studies which adopt Error Analysis as the framework of analysis. They cite as an example **'intralingual'** errors, which are defined differently by different researchers. Richards (1974b) defines them as:

> 'those which reflect the general characteristics of rule learning, such as faulty overgeneralisation, incomplete application of rules and failure to learn conditions under which rules apply.'

At the same time, he defines 'developmental' errors as:

> '(those which) illustrate the learner attempting to build up hypotheses about the (target) language.'
> (Richards 1974b:174)

Lococo, on the other hand, states that:

> 'Intralingual errors occur when L1 does not have a rule which L2 has; the learner applies an L2 rule, producing an error.'
> (Lococo 1975:99)

These two definitions of 'intralingual errors' seem to be different from each other. Lococo postulates the occurrence of intralingual errors as the result of the absence of an equivalent L1 rule (in fact, subsequent studies show that intralingual errors can even occur independently of an equivalent L1 feature). Richards' definition makes no allowance for the L1 system. As for the distinction between intralingual and developmental errors, Richards' definitions seem to subsume developmental errors under intralingual errors, though they may be derived from different underlying processes. Dulay et.al. (op.cit) argues that most developmental errors are in fact intralingual.

Dulay et. al. (op.cit) propose that a clear distinction be made between describing the errors and inferring the sources of these errors. The error taxonomies which they adopt above reflect the product of acquisition; while the explanation of errors is related to the process of acquisition which consists of the interaction between the learner's internal processing and the

external environment. Contemporary practitioners of Error Analysis tend either to collapse the product and the process of acquisition together, or to impose a straightforward and over-simplistic mapping of the product onto the process of acquisition. Perhaps, there are no single sources for the occurrence of an error if we assume that language acquisition is an interactive phenomenon, both in terms of cognitive and cognitive plus environmental factors. The classification of errors according to a single, arbitrarily defined source is theoretically unsound.

Despite these limitations, Error Analysis changes our perception of SLA phenomena and methodology. Even though it does not stand up in due course as the ultimate model of SLA investigation, research to date still involves in one form of another an analysis of the learner's errors, depending on the different theoretical orientations these researchers adopt.

2.3 Interlanguage Hypothesis

Corder's proposal of treating learners' errors as a systematic object of investigation sparked off a series of discussions about the learner's language. Nemser (1971) refers to '**approximative systems**', the underlying assumptions of these systems are:

(a) the learner's speech is the pattern product of a linguistic system distinct from the native and the target language.

(b) the approximative systems at successive stages of learning form an evolving series until they merge with the TL.

(c) In a given learning situation, the system of the learners at the same stage of proficiency roughly coincide, and any major differences would be due to learning experiences.

Corder (1967,1973) uses '**idiosyncratic dialects**' or '**transitional competences**' to refer to a system of interim rules or a body of knowledge learners develop in the acquisition process; and Selinker (1969, 1972) introduces the term '**interlanguage**' (**IL**), which refers to a separable linguistic system based on the

observable learners' output in their attempt to produce a TL norm.

According to Selinker, SL learning is the reorganisation or restructuring of linguistic materials from an IL to identify with a particular TL. The learner's IL is the product of **five central cognitive processes:** Language Transfer (L1-like structure in L2 production), Transfer of Training (a result of identifiable instructional procedure), Strategies of Second Language Training (an identifiable approach by the learner to the language to be learned), Strategies of Second Language Communication (an identifiable approach by the learner when he attempts to communicate with speakers of the TL, and Over-generalisation of Target Language Linguistic Material (over-generalisation of TL rules and semantic features).

In a subsequent study which attempts to investigate child second language performance (Selinker et.al. 1975), an analysis of the corpus collected from child SL learners who undergo an immersion programme shows that they also utilise systematically three strategies in their attempt to express meaning: Language Transfer, Overgeneralisation, and Simplification. Bases on this result, Selinker extends the notion of IL, especially the use of similar strategies, to child SL development.

According to Selinker, these cognitive processes are responsible for **fossilization**, or 'stop learning' of rules and subsystems in the learner's IL development manifested in both the correct and incorrect forms he produces. Fossilisation in terms of 'falling short' of the TL norm has been regarded as a unique feature of adult SL learners. As Selinker (1972) notes, successful SL learners who can reach native competence constitute only 5% of the entire population. This phenomenon leads him to posit that adult L2 learners might be relying on some general learning mechanisms (i.e latent psychological structure) instead of the language specific 'latent language structure' defined by Lenneberg (1967 in Selinker 1972), though both are genetically determined structures. Nevertheless, he does not refute the possibility that successful adult learners may have somehow reactivated this 'latent language structure' during the course

of acquisition.

Therefore, for Selinker, IL refers to a single system or continuum derived from these different cognitive strategies. On the same line as Selinker, Corder (1977) also postulates that SL learners progress along the IL continuum via 'hypothesis-testing' and the errors they make are evidence of the wrong hypotheses being tested.

2.3.1 Interim Discussion

This early formulation of **Interlanguage** theory is of great significance in the development of SLA research because it provides some underlying working assumptions concerning the characteristic development of SL learners. As Ellis (1985a) notes, the terms which are used to describe a learner's language reflect two related but different concepts: first, 'interlanguage' refers to the linguistic system which the learner constructs at a given point in his development; second, the term refers to a series of overlapping systems which form a developmental continuum.

Subsequently, Adjemian (1976) summarises three fundamental characteristics of IL: first, it is **permeable** because its system(s) are open to change, and also to influence of other linguistic systems known to the learner, including his L1; second, it is **dynamic** because it continuously evolves in the direction of the L2; thirdly, interlanguage is considered as **rule-governed** behaviour, systematically guided by the underlying linguistic constraints. He further argues that both L1 acquisition and IL grammars are natural language systems obeying universal linguistic constraints and display the same kinds of internal consistency. Moreover, **fossilisation** is a unique feature of SLA for it never occurs in first language acquisition. Rutherford (1986) claims that this may perhaps be an 'additional "logical problem" of L2 acquisition'.

So far, the early IL theory as described by Selinker is viewed as a separate system undergoing constant restructuring of information as a result of the interaction between the learner's NL and the TL. This assumption has two implications: first, the

starting point of the 'restructuring ' continuum is the learner's L1, thus the theory does not reject L1 interference as one of the possible phenomena, and second, as Corder points out, the notion of 'restructuring' fails to acknowledge the fact that the IL continuum is developmental, having the property of progressive complexity and elaboration because the term itself implies that the interim systems are of equal complexity at any point of the continuum (Corder 1977).

In fact, Corder claims that SL learning process may be viewed as a 'mixture in varying proportions of restructuring and recreating' (Corder 1981:93) and the starting point of the learning continuum is a 'basic, possibly universal grammar to which all language learners have access' (Corder 1981:100). In other words, a SL learner is able to regress initially to an earlier grammar from which his IL elaborates.

Another aspect of this early Interlanguage Hypothesis is that it is a hypothesis whose underpinnings lie in the learner's performance, compared against a target norm, because the observable behaviour of SL learners is taken to be the data from which one infers their 'psychological infrastructure', perhaps different from that of a normal TL speaker, implying that IL is not a natural language, as suggested by Selinker (1972).

This issue of treating IL as the product of overt language behaviour is further criticised by Bialystok and Sharwood Smith (1985) for the confusion it introduces between the product and process of SL development. They note that unless certain IL systems (psychological processes) are specified, taking IL as a product is not going to be a useful concept. Bley-Vroman (1983:6) also says that this early IL hypothesis fails to take the structure of the IL on its own terms by relying on a comparison of the TL in order to study the structure of the IL.

To conclude, the formulation of interlanguage theory has had a major impact on our perception of the nature of SLA. As Ellis (1985a) remarks, the switch from a behaviourist to a mentalist framework provides a great insight into both L1 and SLA; one of facets of this mentalist operation can be found in the appear-

ance of errors, a sign of the incorrect hypotheses set up by the learner himself.

2.4 'Creative Construction' and the Morpheme Studies

The morpheme studies were inspired by the results of a series of research in first language acquisition. Brown (1973) found that his three child subjects learning English as a first language followed a common 'invariant' sequence in the acquisition of fourteen grammatical morphemes. Brown's finding was subsequently corroborated in a cross-sectional study of twenty four children (de Villiers and de Villiers 1973). The fact that the acquisition order established in these studies does not correspond to the nature of frequency of input of these grammatical morphemes leads Brown and others to argue that language acquisition is innate; in other words, a child is perceived as an active, creative contributor to the learning task through his interaction with the limited data he receives. This finding further supports Chomsky's view that first language acquisition is guided by certain innate principles of grammar structures which can account for the invariant acquisition order established in these studies (Chomsky 1969).

Based on the research methodological framework of Brown's (1973), SL researchers began to conduct a series of morpheme studies to investigate whether L2 learners followed the same order. Dulay and Burt (1973, 1974b) reported that L2 acquisition was largely similar to L1 acquisition and involved a cognitive process of **'creative construction'**. In fact, the underlying assumptions of these creative processes are similar to Chomsky's universal acquisition process. The term 'creative construction' refers to:

> 'the subconscious process by which language learners gradually organise the language they hear, according to rules that they construct to generate sentences. The form of the rules is determined by mental mechanisms responsible for human language acquisition and use. These mechanisms appear to be innate.'
>
> (Dulay et.al. 1982).

Subsequent studies following the same methodological framework were carried out, adopting either the same or different instruments (e.g. Bilingual Syntax Measure, SLOPE, written composi-

tion) and examining different variables such as age, L1 backgrounds, learning environments, or tasks (Burt and Dulay 1980).

To cite a few important studies, Bailey et.al. (1974) found that their 73 adults from 12 L1 backgrounds showed a highly consistent order of difficulty in the use of the eight grammatical morphemes with the child subjects in Dulay and Burt (1973). Rosansky (1976) used unstructured conversational techniques and found that her subjects at three different age levels yielded sequences which correlated highly with the orders found in the earlier studies. Krashen et.al. (1978) compared the sequence derived from the written mode with that of the oral mode established in Bailey et.al. (1974) and found that they were very similar to each other.

Taking the results of these studies together, Dulay and Burt claim that SL learners follow a principled way in their learning task and a predetermined sequence of acquisition (**'a natural order'**) of the grammatical morphemes regardless of age, L1 backgrounds, learning environments, types of elicitation tasks or method of analysis. A statement of this kind implies that L1 and L2 acquisition involve identical, if not similar, cognitive processes in this 'creative construction' of IL; in other words, SLA is taken to be a universal phenomenon because of its fundamental similarity to first language acquisition. This emphasis on the concept of universality of SLA underestimates the role played by the learner's L1 knowledge because it puts L1 influence in an awkwardly incompatible position within the 'universalist' framework of investigation.

Pedagogically, the 'infallible' doctrine that learners should take in what they are taught was beginning to become a 'legend' because the evidence from the morphemes studies and other concurrent developmental studies on word order such as negation and interrogation all pointed to the conclusion that naturalistic learners, at least, seemed to follow a universal **'sequence of development'** or **'route of development'** in Ellis's terms. Dulay et.al. (1982) suggest that the 'acquisition' order could serve as the guidelines for SL pedagogy, if this order reflects a psychological reality in SL learners. Krashen and Terral

(1983) advocate the 'natural approach', the emphasis is to provide comprehensible input to the learner and let the 'built-in' **Language Acquisition Device (LAD)** take care of the learning task.

2.4.1 Interim Discussion

The morpheme studies have been subject to serious criticisms with respect to the methodological techniques and the psychological reality of the so called '**natural order.**'

In effect, the acquisition order as established by the morpheme studies was criticised as an 'artefact' of the elicitation instrument, the Bilingual Syntax Measure (BSM), for the following reasons:

(a) Evidence from other SL studies reported contrasts with the order established by the BSM: The order established by Hakuta (1974) for his Japanese subject correlated weakly with the order established by Dulay and Burt (1973, 1974b). Cancino et.al. (1975) found a great deal of intra-subject variability in the appearance of some of the auxiliaries. Larsen-Freeman (1975) found that different tasks yielded different orders and only the elicited BSM order correlated significantly with that of Dulay and Burt's.

(b) Porter (1977) reported a lack of correlation between the order of 11 English speaking children established through the use of BSM and the orders reported in other first language acquisition studies which used spontaneous production.

(c) Subjects from the same L1 backgrounds correlated more strongly with each other than subjects of different L1s, suggesting language distance may be one of the factors influencing the strength of correlation (Borland 1984). Moreover, the order established by Dulay and Burt's Spanish and Chinese subjects did not correlate significantly with each other, despite using the same instrument (Tarone 1974).

(d) The adoption of 90% correct performance in just obligatory contexts to refer to a feature being 'acquired' is an arbitrary decision and target-orientated. It makes no provision for any learning phenomenon below 90% (Hatch 1983).

(e) The heavy reliance on correlational analysis, especially the Spearman Rank Order Correlation, which is calculated on 'group means', tends to obscure some divergences in the data. Findings of statistically significant commonalities in rank orders tend to

> over-estimate the actual similarity. This method of analysis needs to be complemented with other methods to enable a better understanding of the learning process, not just the rank orders. (Rosansky 1976, Long and Sato 1984).

Apart from the methodological problems discussed above, the morpheme studies were criticised as lacking in '**psychological reality**' since the order established is more an '**accuracy order**' than an '**acquisition order**'. Lightbown and White (1988) comment that 'creative construction' or the 'Language Acquisition Device' as suggested by Dulay et. al. (1982), which attempts to explain universal acquisition phenomena, is lacking in specifications in its content. It is not clear whether it is referring to a set of processes, or strategies, or linguistic universals.

Wode (1981a) criticises the methodological framework adopted by the morpheme studies as an inadequate tool to capture the crucial pre-target developments such as reliance on L1, overgeneralisations in contexts of use, and individual variation preceding the final acquisition of the target structure. Furthermore, the underestimation of the role of L1 in SLA is strongly objected to by Wode who regards L1 knowledge as an integral part of the learner's developing IL competence. He proposes to study instead learners' '**developmental sequence**' in which both target-like and pre-target-like regularities can be incorporated in the analysis.

Meisel et.al. (1981) share the same view with Wode as they reject Brown's figure of 90% successful performance in 5 obligatory contexts as the criterion for establishing a stage of development in the sequence. They assert that an interpretation of acquisition as a linear process based on TL achievement makes no allowance for the analysis of variability in IL development.

Similarly, Huebner (1979) argues that the dynamic and variable nature of IL development cannot be handled by a methodological framework as put forward by the morpheme studies. To him, the application of a rule in different target and non-target contexts defined according to some possible 'universal semantic features' rather than the target-like categories provides the best window to tap the learner's underlying linguistic system.

Despite these pitfalls, the morpheme studies have inspired a lot of interesting research on SLA, with issues including the relationship between input and SLA, developmental studies, universality of language acquisition, IL communication..etc. Recently, a revival of interest in 'cross-linguistic influence' (a term first introduced by Sharwood Smith 1983), perhaps a reaction against the strong L1=L2 hypothesis as posited by Dulay and Burt and the meagre 3% of 'interlingual errors.'

2.5 Universal Hypothesis

One of the suggestions from the morpheme studies is the idea that language acquisition, first or second, is dependent upon a separate linguistic faculty which is innate; and it is this language specific cognitive faculty that is responsible for the similarities in the acquisition order established in these studies. As a consequence, the pursuit of identifying 'universals' of some kind became one of the major preoccupations among the researchers in SLA. Of interest at that moment were two types of universals: psychological and linguistic.

2.5.1 Processing Universals

Selinker (1972, 1984) and Seliger (1984) suggest that at least some of the strategies are common to first and second language learners. Seliger makes a distinction between strategies and tactics. **Strategies** are universal, age and context-independent, and when engaged must be assumed to lead to long-term acquisition. **Tactics** are variable, dependent upon environment and individual factors and are responsible for individual variation. Similar to Selinker's view, Seliger notes that one form of strategy is hypothesis-testing, subsumed under which are over-generalisation, language transfer, and simplification (Seliger 1984). Ellis (1985a) suggests that Slobin's **Operating Principles** accounting for first language acquisition may also be utilised by SL learners to process the linguistic input, though he casts some doubt upon whether SL learners use all the available principles, and how their L1 affects the working of these in L2 acquisition. For instance, principles such as 'Pay attention to the ends of words' seem to contradict SL findings that

free morphemes are acquired before the bound ones (Wode 1981a, 1984).

2.5.2 Linguistic Universals

The second type of 'universal', as mentioned previously, is more linguistic-orientated, with its aim to determine the role of linguistic universals in SLA. Within this framework, two approaches are identified: the **Greenbergian** approach, a data-driven approach whose aim is to uncover from a wide range of human languages the underlying common principles; and the **Chomskyan** approach, a theory-driven approach which attempts to delineate through an in depth examination of the general properties of language a set of possible principles that constrain human languages.

2.5.2.1 Greenbergian Approach

The universals as proposed by Greenberg are **typologically** defined, some of which are absolute, true of all languages, and some are tendencies, that is, true but there are exceptions. An additional parameter to classify universals is by way of implicational statement '**if P, then Q**'. For instance, 'if a language has VSO as its basic word order, it has prepositions', is, according to Greenberg, an absolute implicational universal. By contrast, 'if a language has SOV as its basic word order, it will have postpositions' is an implicational tendency, because Chinese is SOV but with both pre- and post-positions, or Persian is SOV with prepositions rather than postpositions.

This fundamental principle of implicational relationships between categories of a language provides a framework for establishing '**markedness conditions**', or '**typological markedness**'. Eckman (1977) proposes the adoption in SL research of this framework, which is defined as:

> 'A phenomenon A in some language is more marked than B if the presence of A in a language implies the presence of B; but the presence of B does not imply the presence of A.'
>
> (Eckman 1977:320)

Three hierarchies have been adopted to investigate universal SLA phenomena:

(a) Frawley (1981) found that his subjects used more sentential complements in clause-final positions than in clause-initial positions which in turn were more frequently used than in clause-internal positions. This ordering corresponds to the **Complement Hierarchy** established by Dryer (1980):

Clause final > Clause initial > Clause internal

where he notes that clause final complements are more likely to occur in the world's languages and least likely for clause internal complement.

(b) Gass (1984) found that her subjects followed a **Universal Topicality Hierarchy** for the selection of elements as topics in sentences cross-linguistically established as Givon (1976):

human > animate >inanimate

For sentences like :

'The boy told the table to go.'

Gass found that the less proficient subjects preferred to choose the boy' rather than 'the table'. It is only at a more advanced level of proficiency were the subjects able to separate out the dominant role of syntax in English sentences like the one above.

(c) Of special interest to SL research under the implicational hierarchy framework is the adoption of the **Accessibility Hierarchy** for relativisation proposed by Keenan and Comrie (1977):

SU > DO > IO > OBL > GEN > O COMP

This hierarchy is an example of implicational universals: if a language can relativise on the indirect object (**IO**), as defined in the subordinate clause, then it can relativise any of the noun phrases positioned down the hierarchy. Comrie (1984) further suggests that this hierarchy also entails a hierar-

> chy of degrees of markedness, that is, the relativisation of the indirect object (**IO**) is more marked than that of the direct object (**DO**) which in turn is more marked than the subject (**SU**).

From the perspective of SLA, added to this implicational assumption of markedness is the degree of difficulty a learner may encounter in that relativising a noun phrase like **IO** is considered more difficult for the learner and is therefore acquired later than **DO** and **SU**. Based on these assumptions, hypotheses are set up to account for the developmental sequence in relation to the acquisition of relative clauses:

(a) If IL is considered as a natural language, it is subject to universal constraints as specified above.

(b) The less marked properties of the TL, as defined according to the universal hierarchy, are acquired before the more marked features.

(c) The developmental sequence is predictable and therefore empirically testable.

Various studies are reported in which the Accessibility Hierarchy is adopted to predict universal L2 development. Gass (1979) and Gass and Ard (1984) reported that their learners of different L1 backgrounds have more correct responses to subject (**SU**) relative than direct (**DO**) relative and so forth, in other words, the SL acquisition of their adult L2 learners is largely governed by universal constraints regardless of the positions on which their own L1s are able to relativise. However, Gass and Ard also report that there are language specific influences, in relation both to the learner's L1 and to the TL, which seem to counterbalance the influence of the universal constraints. For instance, different L1 influence is found in pronoun retention in the performance between subjects whose L1 is either with or without pronominal copies in relative clauses. However, this significantly different performance in pronoun retention is only found in the higher positions in the hierarchy.

2.5.2.2 Chomskyan Approach

Another approach which attempts to explain universal acquisition phenomenon finds its theoretical basis in Chomsky's notion of

Universal Grammar and **Parameter-Setting.** Universal Grammar (**UG**), according to Chomsky, may be regarded as 'a characterisation of genetically determined language faculty...that yield a particular language through interaction with presented experience' (Chomsky 1986:3). UG consists of 'various subsystems of principles...Many of these principles are associated with parameters that must be fixed by experience..Once the values of the parameters are set, the whole system is operative' (Chomsky 1986:146). Moreover, a **core** language is 'a system determined by fixing values for the parameters of UG, and the **periphery** is whatever is added on in the system actually represented in the mind/brain of a speaker-hearer' (Chomsky 1986:147).

SL research using this paradigm focuses upon the issue of '**learnability**', that is, like L1 learners, L2 learners are able to work out the complex properties of the TL despite degeneracy in input data and they do not hypothesise ungrammatical sentences which violate universal principles such as '**structure dependency**' (White 1985b). One postulate thus derived is that, as in L1 acquisition, UG constrains the range of possible hypotheses about the L2 to be tested, in other words, this theory rejects the hypothesis testing model as suggested in early IL and information processing theories which regard language acquisition as a process of hypothesis testing and information restructuring. Moreover, learners are thought to not to pay attention to the necessary 'negative input' with which to reject incorrect hypothesis.

Therefore, SLA theories within this framework are seen as <u>setting or resetting of parameter values</u> depending on whether the L1 and L2 values are similar or different; or UG can revert to the null setting, thereby circumventing any L1 effect. Studies within this framework include the learning of Pro-drop parameter. White (1985a,1986) reports that Spanish learners of English, whose L1 is +pro drop, find it more difficult than the French learners of English, whose L1 is -pro drop, in acquiring -Pro drop in English, since they could only rely on indirect negative evidence in the input data, which is, in effect, the absence of +pro drop in the TL.

Flynn (1984, 1987) and Flynn and Espinal (1985) suggest a **parameter setting model** of L2 acquisition from the results of her investigation of the **Principle Branching Direction** in the form of head and initial-head final parameter. In these studies, they find that SL learners like Japanese and Chinese whose L1 is head final perform poorly in their experiments when the TL, English, is head-initial, and the difference between the L1 and L2 can affect the length of time required for emergence in IL of perceived L2 anaphoric relations across complex sentences which involve embedding.

A current issue under debate is whether UG is still available in L2 acquisition (Cook 1988, Schachter 1988). In effect, three positions are posited:

(a) L2 learners may **take recourse to UG** and set the parameter without any reference to L1 (Mazurkewich 1984).

(b) L2 learners may **take the L1 instantiation of UG** as a means to utilise the principles and parameters in the same way in the new language (studies mentioned above do suggest this possibility);

(c) L2 learners **may not have access to UG** and the language is acquired via other non-language specific faculty. Researchers who adopt this position draw support from Lenneberg's Critical Period Hypothesis which states that the language faculty atrophies upon puberty (Lenneberg 1967). Recently, some studies such as Bley-Vroman et.al. (1988) suggest that some of the results are not explainable in terms of UG effects, and adults have differential accessibility to UG.

Schachter (1988) outlines four major differences in the conditions between L1 and L2 acquisition:

(a) **Completeness**: Whereas children can attain a state of complete mastery, SL learners display variable ultimate achievement and whether SL learners can ever achieve a mental state similar to that of a native speaker is currently called into question(Coppieters 1987).

(b) **Equipotentiality**: Whereas child learners are able to achieve target competence in approximately similar amount of time, adults SL learners are not equipotential for natural languages.

(c) **Previous Knowledge**: Unlike L1 learners, L2 learners bring to the learning task a set of parameterised values of the first language which may exert some influence on the learning task.

(d) **Fossilisation**: SL learners find it more difficult than children to access more recently gained knowledge, thereby showing lapses in their performance. (Schachter's view on fossilisation is different from Selinker's in the sense that L1 learners have access to the knowledge of former stages in their development and do revert or 'backslide' to earlier stages under similar conditions as adults').

2.5.3 Interim Discussion

The models presented above demonstrate three different approaches in our attempt to explain as far as possible, the universal phenomenon in SLA. Among them, the processing model has received less attention, probably because of the difficulty in probing into the 'black box' of SL learners, to identify which strategy is universal and which is L2 specific. Therefore, the explanations offered are usually based upon speculation. Common techniques adopted by interested researchers are introspection, and immediate or delayed retrospection based on 'self report' on the part of the learner.

However, as Cohen (1987) points out, these self-reports are limited to that subset of learning strategies that the learner is conscious of. Seliger (1983a) cautions against the use of these techniques since much of language learning takes place at an unconscious level and is therefore inaccessible to mental probes. He sees verbal reports as at best a source of information on how learners use what they have learned, not as a means to describing internalised systems. This debate to some extent reflects one major stumbling block in identifying SL learning strategies.

As regards the Greenbergian approach, Mclaughlin (1987) claims that this approach which is based on universals derived from sampled human languages may not be universals at all if the sample is not sufficiently large and varied enough. Even if this problem is solved, the stress on comparing world languages leads to the debate on how these externally assessed properties of the sampled languages can have effects on internal SLA proce-

sses. The adoption of typological markedness conditions makes no allowance for perceptual, articulatory, cognitive and other factors which operate singly or in combination to result in the implicational series (Ferguson 1984). SL data from Gass (1979) show that the relativisation of 'genitive' does not conform to the prediction that it is more difficult than direct object because of its higher position in the Hierarchy. Gass attributes this finding to the grammatical saliency of this structure in English, that is, the relative marker WHOSE is restricted to genitive which in turn allows no other marker. This salient regularity in the TL may be detected by the learner earlier than the other structures.

The Chomskyan approach, where knowledge of universals and markedness follow properties of the human mind (i.e. 'built-in' UG), might offer insights into L1 and L2 acquisition. One advantage of this approach is that these researchers use current linguistic theory to make specific claims about SLA, thereby avoiding the speculative statements one usually finds in the literature that 'there are universal principles or processes involved in SLA'. In this respect, these researchers claim to achieve a certain level of explanatory adequacy.

Nevertheless, this model is not without problem. If UG is said to be able to explain SLA phenomenon, what it fails to explain at the present state of research is the **'partial outcome'** (Davies 1984: xii) characteristic of L2 acquisition . Suggestions have been put forward by Felix (1987) who claims that it is UG in competition with late-developed general problem strategies. Clahsen (1985) claims that it is only first language acquisition that is guided by UG principles and adult L2 learning is the result of general information processing and problem solving strategies.

Debate of this kind bears some significance on the validity of adopting UG as the framework of explanation. Felix's suggestions require a statement within this framework that UG is not the only possible explanation for SLA; and for Clahsen's position, UG has no place at all as far as the explanation of adult SLA is concerned. However, as Rutherford (1986) notes, discard-

ing UG as an explanation for SLA would not help to solve the logical problem as regards 'poverty of stimulus' factor in SLA.

Another problem is the reliance of this model on linguistic theory in determining markedness conditions, which sometimes results in inconsistency in interpretation. Treating +pro drop as marked, as in Spanish, makes White (1985a) claim that Spanish learners of English do initially transfer the marked value of the parameter in acquiring L2. On the other hand, we also find Hyams (1986) who claims that +pro drop is unmarked because evidence was found in first language learners whose L1 is -pro drop to drop the subjects initially.

Both Ellis (1985a) and McLaughlin (1984) regard the '**poverty of stimulus**' argument as empirically unproven. Recent research in input studies on '**motherese**' (Snow and Ferguson 1977, Sachs 1977), '**foreigner talk**' (Long 1981b, 1983a), and '**teacher talk**' (Long and Sato 1983) all suggest that the messages imparted to the learner reveal some form of interactional and formal linguistic adjustments on the part of the addressor to make the messages understandable, which suggests that environmental factors may play a bigger role in first or second language acquisition than Chomsky has acknowledged.

Recently, the issue of **negative feedback** has been brought into the limelight even among researchers who work under the UG framework, who suggest that, in some cases, negative input may be necessary if no positive evidence is available in the input data to disconfirm an incorrect hypothesis. White (1987a) suggests that, in cases where French learners of English acquiring the principle of adjacency of case assignment (Stowell 1981), some form of negative input is necessary in order to disconfirm the incorrect hypothesis that English is a strict adjacency language because the input data does not explicitly show that -adjacency is not permissible in English.

To conclude, we have seen that current research has attempted to explain the universal phenomenon in SLA by resorting to postulations about universal processing strategies, or linguistic universals. Although these two broad approaches represent two

different perspectives in SL development, it seems that an adequate theory of SLA should take into account not just the universal linguistic phenomenon which may have an effect on the developmental sequence, but also the psycholinguistic aspect of language processing, which involves the learner extracting both meaning and form from the input based on his current hypothesis about the TL. At any rate, it is the learner who has to take in whatever makes sense to him in the input data in the first place for the innate knowledge to become operative.

Another issue is how one can reconcile the different perceptions of universal as advocated by the typological and UG approaches. Mc aughlin (1987) points out that by positing a core and periphery grammar, one may wonder whether they in fact constitute a continuum of accessibility. If they did form a continuum, it would be interesting to see if the UG-derived continuum coincides with the one which is derived typologically.

Nevertheless, it is interesting to find that despite advocating a universalist approach to the study of SLA, some researchers from both camps discover from their studies that these SLA phenomena sometimes cannot be explained strictly by universal constraints. As mentioned previously, structural saliency in the TL may counterbalance the universal effect, thereby resulting in the non-hierarchical ordering of the genitive relative in Gass (1979). Another example is preposition stranding (e.g. **Who did Allan lend a dollar to?**), though defined as marked in the UG framework, as a result of its salience in contemporary English usage, is found to be acquired before the unmarked pied-piping (**To whom did Allan lend a dollar?**) (Bardovi-Harlig 1987). These two findings reveal that salience in perception or recognition on the part of the learner is one of the contributing factors to SLA internal processing.

2.6 Transfer Revisited

As mentioned in Section 2.4.1., the phenomenon of transfer in SLA is underestimated by the **strong L1=L2 Hypothesis** and the **'creative construction'** model put forward by some researchers in the morpheme studies. However, this 'provocative' statement did not reach common consensus and evidence of L1 influence was

still documented by a lot of studies.

Among them, Zobl (1980b, 1980c, 1982) argues that transfer and developmental influences are not incompatible but interacting. The result of this interaction may be manifested in the delayed effect in the emergence of an IL rule because greater restructuring is required. For instance, Spanish learner of English appear to have a relatively longer stage of preverbal negation (i.e. ***I no use television**) because this developmental stage overlaps with the learner' L1 structure. This claim is corroborated in Schumann (1982).

Wode (1978, 1981a) also suggests that transfer can take place as a result of structural similarity between the L1 and the L2. Zobl (1983) and Rutherford (1983) also demonstrate that transfer does not occur only at the syntactic level, but also at the level of discourse; namely, learners of Spanish, Japanese, Korean and Chinese, whose L1 is based on a **pragmatic word order** (Li and Thompson 1976) do transfer this discourse strategy in their organisation of information unit in their L2 syntax. Rutherford further claims discourse-based transfer is more prominent than syntactic-based transfer. In other words, transfer can also be viewed as a process by which the learner utilises first language knowledge as well as other knowledge known to him in the creation of a learner language.

Recently, the resurgence of interest in transfer studies has brought with it two new perspectives: (a) transfer as a cognitive phenomenon not restricted to performance, as assumed previously, but also competence; and (b) transfer as an integral part of IL development which can be captured by a theory of markedness.

Following the lead by Corder (1983) in which he calls for a change of terminology with respect to '**transfer**' and '**interference**' which are associated more with mechanical learning habits, Sharwood Smith and Kellerman (1986) have introduced '**cross-linguistic Influence**' as a superordinate term which allows one to subsume under this heading phenomena such as 'transfer', 'interference', 'borrowing', 'avoidance' or even 'language loss'. In

this way, cross-linguistic influence may be viewed either as a uni- or bidirectional phenomenon, not restricted to L1 influence on L2, but also vice versa; as such, it incorporates the socio-linguistic phenomenon of two languages in a contact situation in a speech community, which was seriously challenged by Dulay et.al. (1982).

A concomitant development under this new framework is a redefinition of transfer phenomenon. Transfer is no longer regarded as a mere production strategy, showing incapability of the learner to overcome previous routines; rather, transfer may develop at both levels of competence and performance, or '**knowledge**' and '**control**' as used by Sharwood Smith and Kellerman (1986). The earlier notion of transfer is aligned with the second tier of transfer phenomenon (i.e. a control phenomenon) in which the learner for various reasons relies on previously highly automatised routines in production, i.e. '**automatic transfer**' as referred to by Faerch and Kasper (1986), which is different from '**strategic transfer**' in which the learner is consciously aware of his 'planning problem' in IL production, but in both cases, it reveals a lack of procedural knowledge with respect to IL rule automatisation.

The first tier of transfer phenomenon may be viewed as transfer of competence, or of previous knowledge, which includes not only the learner's L1, but also other languages known as well as the previously acquired IL knowledge, or even metalinguistic knowledge. In other words, L1 is seen as one of the factors constraining the development of IL competence; it is part of the learning process in which 'transfer supports the learner's selection and remodelling of input structure as he progresses in the development of IL knowledge' (Kohn 1986:22).

SL research to date has concentrated on one type of the learner's previous knowledge, that is, the learner's L1, one stream of research of which is carried out under the notion of '**markedness**'. Both universal approaches to SLA discussed above show some degree of agreement, even though their criterion of defining markedness stems from two different approaches of linguistic research (Eckman 1984, Hyltenstam 1984, Mazurkewich 1984). In

effect, unmarked structures are acquired before marked structures, and unmarked L1 structures are subject to transfer more than marked L1 structures.

Within the UG model, in first language acquisition, marked structures are defined as those departing from core grammar and requiring specific positive evidence during the course of acquisition. Core grammar rules are unmarked because they are predetermined by UG principles. Therefore, markedness, according to White (1987b), is different from the traditional concept of markedness in which it is a relative notion depending on linguistic complexity, or frequency of distribution. However, this view on markedness in SLA research seems to be different in that those supporting the 'back to UG' position maintain that the unmarked precedes the marked, whereas those who view SLA in relation to parametric variation suggests that it can work both ways (White 1985a 1987b, Liceras 1985).

On the other hand, markedness, within the Greenbergian approach, assumes an implicational relationship, whereby the unmarked member of a pair of structures is the one whose presence cannot imply the other and this implicational relationship is built upon frequency of distribution among the world's languages. Moreover, the unmarked feature would appear before the marked feature in the learner's IL development. Moreover, Eckman (1981) puts forward the **Markedness Differential Hypothesis** which states that the areas of the TL which will be difficult are those areas which are both different from the L1 and relatively more marked.

A third kind of markedness has been put forward by Kellerman (1983) who also argues that transfer is not mechanical borrowing of L1 structures, but a cognitive process of decision making on the part of the learner based on his continual changing perception of the distance between his L1 and L2 as well as the degrees of markedness of his L1 (i.e.**psychotypology**). In his studies on transferability of semantic properties of idioms and some lexical items, Kellerman finds that learners have their own perception of these semantic properties which according to them are either language neutral and language specific and it is the

language specific semantic properties that are not transferred to the IL, despite the fact that they may be accepted in the TL. Kellerman's approach to markedness in this respect is different from that previously mentioned as it is derived from the learner's own perception and not from criteria defined independently from universal linguistic facts. However, it should be noted that Kellerman is dealing with semantic transfer whereas the other two approaches are mainly concerned with syntactic trans-fer. It could be the case that transfer phenomenon is activated differently in different domains of the language system.

2.7 Conclusion

In this chapter, the 'history' of SLA theories is traced and at various points its relation with SL pedagogy is discussed. The emergence of the creative construction model and the subsequent universal hypothesis further widens the gap between SLA theories and SL pedagogy, because the learner (from Kellerman's view-point) and/or the 'black-box' of the learner (the creative con-struction or universalist view) is seen as an active contributor to the learning task. As a consequence, the study of learner language is considered first and foremost for its invaluable in-sights for SL pedagogy. Unfortunately SL research to date, as in the development of the learner's IL, is still in a state of flux, and the 'rift' between learning and teaching remains to be bridged. Nevertheless, a growing concern for investigating classroom learning phenomenon has been expressed, especially when one recognises that the type of input given to the learner is somehow different from that found in a naturalistic setting. In the following two chapters, this aspect of SL learning, both in terms of the related theoretical models and empirical eviden-ce will be discussed in detail.

CHAPTER THREE

THEORIES RELATING TO CLASSROOM SL DEVELOPMENT

3.0 Introduction

In the last chapter, we discussed the general SLA theories since the fifties, and we have also seen that the gap of the relationship between teaching and learning has widened since earlier research evidence indicated that input and intake may not be directly related to each other.

Nevertheless, researchers who are interested in classroom learning phenomenon have proposed a series of models and recommendations which attempt to incorporate the effect of the classroom learning situation, and of pedagogical input in particular, on the development of the underlying competence of SL learners. Some of these theories, like the strong form of the Monitor model, claim that Learning and Acquisition involve independent processes without interaction of any kind, on the other hand, some others attempt to link Learning and Acquisition together in one way or another, yet some others seem to be unwilling to align themselves with this dichotomous stance, thereby putting forward models which attempt to portray the variable competence(s) of SL learners.

In the following section, each of these theories is discussed and evaluated. Some of these theories are more concerned with the properties and functions of the resultant competence(s) brought about by the processes; whereas some are more interested in describing the nature of the processes themselves. In the last section, the recognition of a distinction between the development of IL competence and the ability to retrieve it in language performance is discussed and is put forward as an alternative framework in our investigation of classroom SL development.

3.1 Krashen's Acquisition-Learning Distinction

The **Acquisition-Learning** distinction states that adult learners have two distinct and independent channels to develop their IL competence. **Acquisition** is a subconscious process, similar to that by which children develop ability in their first language (L1). The criterion for language acquisition to occur is that

the learner focuses on meaning in natural communication which provides the basis of comprehensible input. The importance of this type of input is expressed quite explicitly in the '**Input Hypothesis**' (Krashen 1985), which postulates that:

> 'humans acquire language in only one way - by understanding messages, or by receiving "comprehensible input" ....We move from **i**, our current level, to **i+1**, the next level along the natural order, by understanding input containing **i+1**.'
> (Krashen 1985:2)

The result of this process is the learner's subconscious, acquired knowledge which develops into the learner's 'feel' for grammaticality of the target language (TL), even if he does not know consciously what rules are involved. Acquisition is associated with 'implicit learning', 'informal learning', 'natural learning', or simply 'picking up' a language and it accounts for the 'natural order' established especially in the morpheme studies (Krashen 1982).

Learning, on the other hand, is <u>conscious</u>, in terms of process and product. Its product, '**Learned knowledge**', represents conscious knowledge of the TL, knowing the rules, being aware of them, and being able to talk about them. Learned knowledge is knowledge about the language or 'metalinguistic knowledge'. Learning, in this context, is associated with 'formal learning' or 'explicit learning', the emphasis is one which is based on explicit rule presentation, error detection and correction.

To Krashen, these two types of knowledge assume different functions in the learner's performance. **Acquired knowledge** initiates utterances and is responsible for fluency. The sole and restrictive function of learned knowledge is to monitor one's output initiated by acquired knowledge. Besides, for the monitor to be effective, three conditions have to be met:

(a) <u>**Time**</u>: Sufficient time is necessary in order to use the conscious rules effectively. (Krashen 1985 has left out this condition.)

(b) <u>**Focus on Form**</u> : Besides given time, the performer must also focus his attention on form.

(c) <u>**Knowledge of the Rule**</u> : Knowledge of the rule is a necessary condition for the monitor operation.

Krashen argues that these two types of knowledge are entirely separate and in no way can learned knowledge be directly converted to acquired knowledge.

Nevertheless, Krashen accepts what he calls 'a weaker interface' (Krashen 1985:41) position in which Learning can indirectly aid Acquisition in three ways:

(a) The learner's consciously monitored output will count as comprehensible input for Acquisition to occur only if the structure involved happens to be at the learner's current **i+1**. This option, according to Krashen, appears to be limited, unless the learner's output contains **i+1**.

(b) Conscious rule knowledge may make input comprehensible, even if the conscious rule that helps to do this is not at **i+1** and is not itself the object of Acquisition. Its function is to add to the context and aid in the acquisition of some other rules.

(c) Learning of conscious rules may lower the '**affective filter**' for certain learners who are curious about the structure of the language (Krashen 1985).

3.1.1 Evaluation

Based on the **Monitor model** and the subsequent **Input Hypothesis**, Krashen appeals for a change in SL teaching methodology in that the SL classroom should not emphasise rule-learning but natural communication by way of negotiation of meaning and some 'rough' but not 'fine' tuning is necessary in order that the input contains the learner's **i+1**, which can be comprehended by the learner with the help of contextual and pragmatic cues. This appeal lends support to the currently developing communicative language teaching methodology which stresses student-centred, meaningful task-based classroom activities. It encourages language learning for the benefit of communication, and not just for understanding the formal system of the TL.

Despite this, Krashen's Acquisition-Learning distinction has been subjected to serious criticisms in various aspects:

(a) **Non-interaction of the Two Knowledge Sources**

This position has been challenged on the assumption that, practice, be it formal or informal, has its function of automatising and internalising learned knowledge, and turning it into acquired knowledge; in other words, 'Learning' provides an indirect route to Acquisition (Bialystok 1978a, Stevick 1980, Spolsky 1985, Gregg 1984).

By the same token, subconsciously acquired knowledge can be brought to consciousness (Sharwood Smith 1981, Faerch et. al. 1984). Others argue that 'Learning' may precede and cause 'Acquisition' (McLaughlin 1978), or the same input may address itself to both the learned and acquired system (Bialystok 1978a, Gregg 1984).

Nevertheless, as both Gregg (1984) and McLaughlin (1987) notes, this model is untestable because there is no way of knowing whether the learner is relying on 'rule' or 'feel' in his performance.

(b) **The Lack of Concrete Theoretical and Empirical Basis**

If there is a relationship between input addressed to the learner and how he parses the input to convert it to intake, what this model fails to specify is the cognitive processes by which the two knowledge sources are formed. While Krashen has associated 'Acquisition' loosely with Chomsky's Language Acquisition Device, and the selection of input depends on the level of the socio-psychological 'affective filter' of the learner, no explicit description of the processes of 'Learning' is expressed, other than its alliance with Piaget's concept of the development of formal operations at the age of puberty which enhances the development of the Monitor.

White (1987a) criticises that, while borrowing some notions of Chomsky's innateness hypothesis, Krashen fails to specify the content and the processes involved. Furthermore, she argues that 'simplified input' or 'rough tuning' may not contain the necessary **i+1**; instead, it is **incomprehensible input** which

triggers the mismatch perceived by the learner between his current **i** and the necessary **1** and forces him to reanalyse his current grammar, so that he can make sense of the input. In other words, the learner's current IL knowledge may also act as a filter on the input, and determines intake. Besides, this process may also form the basis of refuting incorrectly formed hypotheses, i.e. eliminating non-target intermediate forms.

(c) **The Content of Learned Knowledge**

As Gregg (1984) notes, Krashen wrongly equates 'rules' of learned knowledge with the rules discussed by the linguist or grammarian. An earlier study by Seliger (1979) demonstrates that different learners may have different mental representations of the same pedagogical rules which are not stored directly as the internalised grammar of the learner. What is stored in the internal grammar is the product of the learner's own inductive process and subsequent hypothesis testing; as such, their own idiosyncratic rules may not correspond to those of the linguist. In this respect, it can be argued that most of the rules with which language learners operate may be informal rules of a certain kind and may be of 'imperfect' validity. Dulany et.al. (1984) argue that these informal rules that were once conscious may continue to control performance at an unconscious level.

(d) **The Restrictive Functions of the Knowledge Sources**

McLaughlin (1978) and Gregg (1984) criticise this model as developed only for production rather than comprehension. It is reasonable to assume that learned knowledge is also available for comprehension. Moreover, monitoring is not a strategy restricted to grammar, it occurs in all types of communication, contexts, or at different linguistic levels such as 'dialect switching' (Sajavaara 1978), or pronunciation, lexis and discourse (Morrison and Low 1983). Hulstijn and Hulstijn (1984) further

suggest that focus on form as a condition for monitoring to take place is more crucial than sufficient time.

Above all, as far as SL learners are concerned, assuming that monitoring or focus on form will result in accurate or grammatically well-formed output is far too straightforward. Both Beebe (1980) and Tarone (1983) claim that a careful style derived from tasks such as grammaticality judgments which focus on form is less stable than those which do not because focusing on form allows the 'intrusion' of the learner's L1 knowledge or his 'preferred' IL norm. In fact, whether it is conscious or not, monitoring may also be taken as a process of hypothesis testing.

Despite all these criticisms, it is important to point out that Krashen's Acquisition-Learning distinction arouses our awareness of the complex phenomenon of classroom language learning which differs in some respects from first language acquisition and acquisition in a naturalistic environment.

3.2 Lamendella's Neurofunctional Theory

Another model which suggests little interaction between knowledge sources is found in Lamendella's Neurofunctional Theory. To start with , he identifies two basic types of language development: (i) **Primary Acquisition** (PLA), and (ii) **Non-primary Language Acquisition** (Lamendella 1977).

PLA refers to 'the child's acquisition of one or more native languages (**NL**) taking place from approximately 2-5 years of age' (Lamendella 1979:7). PLA is characterised by a genetically or biologically based series of developmental stages and it is difficult to achieve once the 'critical' period ends at approximately 9-13 years of age.

Non-PLA refers to the acquisition of a non-native language after the period of PLA. It is characterised by a progression of interlanguages (**ILs**) and becomes more difficult to achieve when the 'sensitive' period ends at approximately 13 years of

age.

Indeed, PLA draws references from Lenneberg's Critical Period Hypothesis (Lenneberg 1967), which states that when the brain lateralisation process is complete at the age of puberty, language acquisition is no longer possible. At the same time, Non-PLA posits that earlier exposure to the second language may sensitise the learner to the various linguistic and extra-linguistic aspects of the TL.

Within the framework of the Neurofunctional Theory, the **Communicative Hierarchy** and **Cognitive Hierarchy** are posited to be non-interactive. The **'Executive Component'** bears the responsibility of analysing the input and eventually assigning it to either communicative or cognitive functioning. Once information is despatched to either of these hierarchies, it cannot be redirected to the other. Grammar tasks in traditional language class such as 'pattern practice drills', which trigger the operation of the cognitive hierarchy are neurofunctionally unrelated to communicative language uses (Lamendella 1979).

These neurofunctional processes characterise different types of language acquisition processes: Primary Acquisition is related to the functioning of the communicative hierarchy. Non-Primary Acquisition, on the other hand, may involve different functioning of these hierarchies:

(a) Foreign Language Learning : this Non-PLA process is marked by the learner's (i) constant recourse to the cognitive hierarchy as the basis for learning and speech performance, (ii) frequent conscious attention to TL speech, and (iii) use of **'translation buffer'** to map between the NL and the TL.

(b) Second Language Acquisition : It is marked by the learner's (i) application of the communicative hierarchy of the neurofunctional systems, (ii) use of the IL for internal representational coding features, (iii) absence of the 'translation buffer', and (iv) automatic access to IL grammar and knowledge without the need for conscious direction. However,

it should be noted that this type of acquisition may be applied to both PLA and Non-PLA.

3.2.1 Evaluation

The communicative and cognitive hierarchy are similar to Krashen's acquisition and learning, and, as with Krashen, Lamendella ascribes primacy to the communicative hierarchy as the basis on which meaningful communication and fluency is made possible. In other words, the communicative hierarchy provides the optimal basis for 'acquired competence'.

Tollefson et.al.(1983:11) claim that Lamendella's work 'elaborates precisely those areas in which the Monitor Theory is weakest: the internal neurofunctional capacities responsible for the formation of acquired and learned knowledge.' Even if the Monitor Theory and the Neurofunctional Theory complement each other as models of language acquisition and learning, and it is intuitively reasonable to assume that SL learners do take recourse to their cognitive problem-solving strategies in performing language tasks. It is also possible that both hierarchies are involved in processing the same input.

Above all, the responsibility of the 'translation buffer', derived most probably from the cognitive problem solving systems in foreign language learning may have been overemphasised. It is the only component which connects the two hierarchies and whose function involves the foreign language learner's consciously comparing the TL and the native language (NL), or testing his hypothesis of the TL before production. (Lamendella 1977:177). This conscious testing appears to be the result of the learner's awareness of some difference between his NL and TL which he derives from his previous 'contrastive analysis'. In this respect, it neglects the importance of the learner's ability to set up hypotheses creatively or subconsciously based on his own developing IL systems. At any rate, this theory offers an interesting account of how different types of input and classroom exercise may be processed on line; but in offers little explanation of how language acquisition takes place.

3.3 Felix's Competition Model

Felix (1981a, 1985a) argues that one possible explanation which may help to explain the lack of ultimate achievement among adult SL learners is that, in adult SLA, there are two cognitive modules competing to operate on the input data:

(a) **Language Specific Cognitive System** : It comprises innate principles specifically geared towards the acquisition of language, as in child language acquisition. This system will only process language related input (i.e. information relating to the formal properties of language) while non-language data is by default rejected.

(b) **Problem Solving Cognitive System** : It is an autonomous system devoid of those linguistic principles as defined by the language specific system, and whose main function is problem-solving, therefore, it is ineffective for language acquisition. This system is also sensitive to individual and environmental factors, and accounts for potentially varied ultimate attainment.

In adult language acquisition, or SLA after the onset of puberty, the problem-solving cognitive system is 'inappropriately transferred onto the domain of language acquisition without the possibility of excluding it either consciously or unconsciously from operating on the relevant input data' (Felix 1985a: 50).

This model is built upon two assumptions:

(a) **Modularity of the Human Mind** : Felix agrees with Chomsky's notion of modularity (Chomsky 1981, Fodor 1983). It is claimed that the human mind is made up of a set of independent (though interacting) cognitive systems, one of which is the language specific module composed of abstract linguistic principles akin to those described in linguistic theory.

(b) **The Onset of Formal Operations as defined by Piaget's Theory of Cognitive Development** : At the period of formal operations around the age of puberty, a child

> begins to be able to perform mental operations on a purely abstract level of representations, ignoring possible references to concrete objects around him.

Felix (1987) argues that under classroom conditions, the teacher's explicit explanations about the language system may lead to the student's subsequent internalisation of rule-knowledge in the problem-solving system, which, according to Felix, is not automatically transferrable or available to the language specific system for normal language use. On the other hand, the tacit knowledge derived from the language specific system does not entail the ability to state this knowledge explicitly.

Up to this point, Felix's postulate of the two cognitive systems is very much in essence a non-interface model. As he notes, 'the linguistic knowledge generated by the problem-solving system seems to be by and large independent of the knowledge generated by the language specific system under standard acquisition conditions' (Felix 1987:159). Nevertheless, he allows a possible though indirect interface between these two systems: the student's hypothesis-testing procedure may serve to internalise the knowledge that is already stored in the problem-solving system into the language specific system. In other words, SL learners under classroom conditions may need to acquire the same knowledge twice, once through the teacher's explanations and once through their own self-discovery.

3.3.1 Evaluation

Felix's **Competition Model** is the first model which attempts to answer the lack of ultimate attainment among SL learners, especially those who need to acquire the TL under traditional language classroom. Assuming that man's linguistic and cognitive development are in some way related, the greater or more sophisticated cognitive potentials of SL learners will exert their influence in one way or another on their L2 development.

Nevertheless, it may be too early in view of the present state of research to emphasise this negative effect of the problem solving system in language acquisition. What Felix seems to

reject is the utility of the kind of linguistic knowledge generated by the problem-solving system, which he seems to refer to metalinguistic knowledge, though he does not address it explicitly. In fact, negative input in the form of explicit correction, though in theory it appeals to the problem-solving system, however limited and ineffective in its scope, may help to select the relevant data from the input or to eliminate incorrect hypotheses. On the other hand, if the language specific system as described can efficiently select the language related data, the internalisation of knowledge from the problem-solving system onto the language specific system through hypothesis testing may be entirely unnecessary and a waste of effort.

3.4 Seliger's Opinions about Conscious Rules

Seliger (1979) accepts the argument that internalisation of rules ('Acquisition',in Krashen's term) is a different process from that involved in learning pedagogical rules in a formal setting. As a consequence, these 'learned' rules do not describe the internalised knowledge called upon in natural communication. This explains why the subjects in his study, while being able to provide the correct indefinite articles in the performance test, are unable to articulate the appropriate underlying rules involved.

However, this type of rule knowledge is not rejected out of hand by Seliger, who suggests that most learning depends on the inductive abilities of the learner, and pedagogical rules can serve as '**acquisition facilitators**', by focusing the learner's attention on the 'criterial attributes of the real language concept that must be induced' (Seliger 1979:368). Therefore, pedagogical or conscious rules make the inductive hypothesis testing process more efficient, on the condition that the learner is cognitively 'ready' to undertake this process. Moreover, Seliger also suggests that these pedagogical rules may serve as a mnemonic device to retrieve features of an internalised rule which are rarely used.

Although Seliger asserts a more positive role of pedagogical rules in learning under formal environment, he does not support the view that learned knowledge can be converted to acquired

knowledge, on the assumption that knowledge of a language is far too complex to learn, especially when the learner is not cognitively ready for it. Moreover, he maintains that pedagogical rules presented to the learner can be memorised and become part of the metalinguistic knowledge as distinguished from the internalised linguistic knowledge of the learner. Nevertheless, his view appears to run counter to the neurofunctional explanation he advances later on in that existing knowledge of the language in one neurofunctional system can be transferred to or analysed by another, thus implying that there is some form of interaction between the systems.

Seliger (1982) suggests that the right hemisphere, apart from storing and processing formulaic speech, may also be responsible for initial 'primitive' hypotheses set up through pattern practice drills. These hypotheses can then be analysed in the left hemisphere which is associated with analytic syntactic and semantic processing and creative language use. Until analysis in the left hemisphere takes place, the learner will not be able to utilise the language forms taught or drilled previously in the classroom in the construction of spontaneous, creative and meaningful speech.

Seliger offers an interesting neurolinguistic account of the interactive functioning of the right and left hemisphere on different types of knowledge. Be it 'gestalt' knowledge of formulaic speech or primitive metalinguistic knowledge, at some stage it can be transferred and subject to further analysis. In other words, there is some way of internalising pedagogically derived knowledge into the internal linguistic knowledge of the learner, which can then be put to creative use.

3.5 Interim Conclusion

The four theories discussed above ascribe primacy to language acquisition in a subconscious mode via focus on meaningful communication. Moreover, they also adhere to a strong non-interface position between the various knowledge sources available to the learner. Knowledge derived from either conscious learning of pedagogical rules, or conscious learning in conjunction with the problem-solving strategies, is regarded as inadequate

and ineffective, if not undesirable for language acquisition and spontaneous language production.

However, as we shall see, some researchers do not necessarily share this view and they argue succinctly that these language modules are not entirely independent of each other and that language acquisition phenomena to some extent demonstrate some interaction between them. In the following sections, each of these views will be discussed in detail.

3.6 Bialystok's Implicit and Explicit Knowledge

This earlier version of the **Implicit-Explicit** dichotomy is similar to Krashen's acquired and learned knowledge. **Explicit Knowledge** contains 'all the conscious facts the learner has about the language and the criterion for admission to this category is the ability to articulate those facts' (Bialystok 1978a:72). The four functions of explicit knowledge are:

(a) It acts as a buffer for new information about the language,

(b) It acts as a store of information which can be explicated,

(c) It acts as an 'explicit articulatory system', i.e. information that is represented in the implicit knowledge store may be made conscious or explicit, and

(d) It acts as a monitor.

Implicit Knowledge is the product of acquisition. It is defined as 'an intuitive information upon which the language learner operates in order to produce responses in the TL. Whatever information is automatic and is used spontaneously in language tasks is represented in implicit knowledge' (Bialystok 1978a: 72). In other words, a bigger store of implicit knowledge will lead to greater fluency.

3.6.1 Evaluation

As mentioned in the beginning of this section, this earlier model of Bialystok bears a great deal of resemblance with Krashen's Acquisition and Learning model. The **similarities** between Bialystok and Krashen's model are as follows:

(a) The direct outcome of formal learning is explicit or learned knowledge and that of natural acquisition is Implicit or acquired knowledge.
(b) Simple rules are stored in explicit/learned system while complex rules are stored in implicit/acquired knowledge.
(c) Implicit/acquired knowledge is for initiating speech and explicit/learned knowledge acts as a monitor.
(d) Implicit/acquired knowledge is similar to NL competence, and explicit/learned knowledge is associated with prescriptive rules.

The major **differences** are:

(a) In Bialystok's model, the two knowledge sources are interrelated. 'Formal practicing strategies' can lead to the internalisation of explicit knowledge to implicit knowledge; and 'inferencing strategies' can bring implicit knowledge to a conscious level. This position is in contradiction with Krashen's position. According to Bialystok (1979), while there would be no means of separating the operations of implicit knowledge from the intervention of explicit knowledge, there are three factors which serve as predictors for such intervention in a task:

(1) the amount of grammatical details required of the task,

(2) the length of time allowed to respond, and

(3) the specific linguistic structure contained in the response.

(b) While Krashen's model emphasises the role of the acquired/learned knowledge in production, the model provided by Bialystok encompasses production as well as comprehension.
(c) While Krashen claims that language is either directly acquired or directly learned, Bialystok offers an additional route to acquisition, i.e. language may

> be indirectly acquired via formal practice. In her model, language exposure is said to contribute to either or both of these two knowledge sources.

The drawback of Bialystok and Krashen's models is that they do not allow for significant differences in the way explicit/learned knowledge is represented by the learner and the way language structures are prescribed by linguists. Nevertheless, one can see a change of position in Bialystok's subsequent paper, in which she sees no reason to believe that our understanding of linguistic structure is isomorphic to the linguistic descriptions (Bialystok 1981a). In fact, there is no conceivable reason why these 'explicit' rules cannot take many forms. Gregg (1984) suggests that the explicit knowledge employed by learners only weakly approximates rules formulated by linguists.

Richards (1986) suggests that pedagogical rules tend to be simple because they are utilitarian: the better matched they are to the needs of the learner, the more effective they are. Therefore, the demands of simplicity may lead to an explicit knowledge system possibly less accurate and less complete than any found in pedagogical grammars, ie. what is stored in explicit knowledge may be an 'approximative subsystem'.

Another aspect as regards explicit knowledge is whether it is characterised primarily by the conscious knowledge of form but not function. Both Bialystok and Krashen believe that explicit knowledge makes little contribution to communicative competence. Bialystok (1981a) claims that the greater the conceptual demands of the communicative situations are, the less there is need for explicit knowledge.

Odlin (1986) argues that metalinguistic knowledge can have communicative functions and there is no reliable way to dichotomise metalinguistic knowledge of forms and knowledge of functions; or to dichotomise knowledge into that which is 'acquired' and that which is 'learned'. Therefore, a better way to understand the different uses of explicit knowledge is to recognise 'the relationship between the accessibility of a form and the communicative value of that form' (Odlin 1986: 131). In other

words, a form which has greater functional utility is easier to access than a form with less functional utility. The **Communicative Utility Principle** by Odlin posits that 'the most universal explicit knowledge is that which makes the most important contributions to communicative competence' (Odlin 1986:132).

All in all, it may be a mistake to assume that explicit knowledge as described by Krashen and Bialystok is incomplete; rather, Odlin is trying to expand the territory of explicit knowledge by incorporating 'metacommunicative awareness' into the knowledge store, distinguishing it from the 'formal' metalinguistic awareness revealed by formal/adult SL learners. Nevertheless, one significant modification of explicit knowledge is that it may not be the type of knowledge prescribed by the linguist.

3.7 Sharwood Smith's Consciousness Raising

Consciousness Raising is defined as the 'deliberate attempt to draw the attention of the learner specifically to the formal properties of the TL' (Rutherford and Sharwood Smith 1985:274). It is an attempt to foster SL learners' IL development but not the cause of SLA. It rests on two assumptions:

(a) Learning via relatively more explicit pedagogical input, including the teacher's 'rules of thumb', may afford a shorter and effective way of mastering a structure. This is the underlying principle of the **Pedagogical Grammar Hypothesis**, which is meant to support the view that formal learners may acquire the TL at a faster rate than informal learners.

(b) Consciousness raising as a teaching strategy can vary in terms of the degrees of <u>elaboration</u> and <u>explicitness</u>. This manipulation of pedagogical input is an attempt to guide the learner's self-discovery of the regularities of the TL structures; in this respect, Consciousness-Raising is an aid but not the cause of language acquisition.

(c) Consciousness-Raising should not be equated with verbalisation of language rules, the ability of which is derived from a different, specialised form of knowledge. Nevertheless, learners who cannot

articulate rules may still have access to the relevant information in explicit knowledge.

(d) Consciousness-Raising is less effective in child SL learners than adult SL learners who can exploit a greater variety of cognitive resources in SLA.

Sharwood Smith (1979) demonstrates how systematic feedback i.e. directing learners' attention to the errors they made by a sequence of error correction procedures, optimalises learner's IL development. Moreover, Sharwood Smith (1981a) has ascribed a more positive role of explicit knowledge to language development. An additional responsibility of explicit knowledge is to initiate output, which can provide feedback to implicit knowledge, i.e. the learner's output can become his own input.

Rutherford and Sharwood Smith (1985) suggest that Consciousness Raising may be beneficial to learners if the values of a parameter of his NL are different from those of the TL. Consciousness Raising for the learning of English by Spanish speakers may be 'explicit' to reset the already activated +pro-drop value to -pro-drop. On the other hand, Consciousness Raising for the learning of Spanish by English speakers may be 'implicit' because of the availability of positive evidence in the input data. This idea lends support to the possibility of converting explicit knowledge to implicit knowledge via practice. Although Sharwood Smith claims that Consciousness Raising is a 'potential facilitator' for the acquisition of linguistic competence, it has nothing directly to do with the use of that competence for achieving specific communicative objectives or with the achievement of fluency---automatic control of the structure. In other words, Consciousness Raising has its effects only in the domain of IL competence and has the potential of speeding up the rate of acquisition at that level only.

3.7.1 Evaluation

Sharwood Smith has offered a very interesting pedagogical variable in the acquisition of the formal properties of the TL. As we have seen, his notion of explicit knowledge is much wider in scope than that specified by either Krashen (1976) and Bialystok (1978a) in the sense that this knowledge is not equivalent to

the rule knowledge of the linguist or in grammar reference books; rather, it is the learner's conscious understanding of the internal regularity of the L2 (which may be incorrect when compared to the target norm). Seen in this light, retrieving it in production is highly conceivable because one has to perform on the basis of some knowledge and explicit knowledge is also one form of knowledge at his disposal.

Consciousness-Raising, as presented by its proponent, is by and large a teaching strategy, not a learning strategy. One needs to make a distinction between Consciousness Raising as a teaching strategy and Consciousness Raising as a learning process and any direct mapping of the teaching process onto the learning process, or onto the resultant knowledge needs to be treated with caution. Explicit teaching does not necessarily lead to conscious attention of the learner on the taught structure and explicit knowledge. One can also postulate that explicit teaching may directly effect a change in the IL competence without the consciousness of the learner.

Moreover, classroom learning and teaching is such a complex phenomenon that any decision to vary the two instructional variables--explicitness and elaboration--will have to be made with great care. If the development of IL is not static, but continuously evolving in the direction of the TL, the level of elaboration and explicitness needs to be duly adjusted in order to achieve the best learning effect. As a consequence, it brings us back to a problem similar to that faced by Krashen, that is, how can one identify the level of explicitness and elaboration which best suits the learner? In fact, it seems that it is the learner who decides for himself the level of explicitness and elaboration and any mismatch between the perception of the teacher and the learner may lead to the setting up of incorrect hypotheses or the learner failing to lose the non-target intermediate structures.

3.8 McLaughlin's Information Processing Model

Another theory which suggests a strong interaction between sets of information (which may be equated roughly with knowledge) is found in McLaughlin's model of **Information Processing.** However,

as we shall see, this strong interface stance stems not so much from the relationship between the types of knowledge, but the processes or routines which mediate between them.

In reaction against a dichotomy between Acquisition and Learning that rests on whether the learning process is conscious or subconscious, McLaughlin (1978) proposes an information processing approach in the analysis of SL development. From the information processing perspective, SL learning involves the development of two types of cognitive operations:

(a) **Controlled Processes** involves a temporary activation of nodes of information in short term memory. This activation is usually under focal attention of the learner, so it requires more processing capacities and time.

(b) **Automatic Processes** do not require a lot of processing capacity. It is a learned response because it involves the consistent mapping of the same sequence of nodes of information. When the processes become automatic through an 'appreciable amount of training' (McLaughlin 1987), controlled processes are bypassed, and information is accessed from long term memory store.

Unlike Krashen, the controlled-automatic distinction is not based on conscious experience. Both types of processes can in principle be either conscious or not. Even if learning at a particular level is routinised and automatic, whether the learner pays attention to the formal properties of the language or not depends on the demands of the task or situation.

Within this framework, SL learning is regarded as learning a complex skill which involves the integration of a set of subskills accumulated gradually as automatic processes in long term memory (McLaughlin et.al.1983). According to Krashen, it means 'Learning precedes Acquisition' (Krashen 1979).

3.8.1 Evaluation

McLaughlin's Information Processing model, as its name suggests, is not so much a model about the internalised linguistic system, but of the transfer of information in SL learning; as degree of success is measured upon how efficient or fast the learner is in processing information in production as well as in comprehension. Various studies (McLeod et.al. 1986, Nation & McLaughlin 1986) have demonstrated that bilingual, multilingual or more proficient learners spend shorter time in information processing than monolinguals or less proficient learners, suggesting that automatic processes of the former groups of subjects develop faster than that of the latter. Therefore, it is more about the development of 'procedural knowledge' rather than 'declarative knowledge' because the former accounts for how learners accumulate and automatise rules and how they restructure their internal mental representations in the direction of the L2. This model cannot account for how new features emerges, but only how they are operated on by the processing mechanisms.

In fact, the lack of linguistic content in this model is recognised by McLaughlin (1987), as he notes,

> 'By itself...the cognitive perspective cannot explain such linguistic constraints as are implied in markedness theory or that may result from linguistic universals. These specifically linguistic considerations are not addressed by an approach that sees learning a second language merely in terms of the acquisition of a complex cognitive skill.'
>
> (McLaughlin 1987:150)

Another criticism is found in this earlier formulation of the model which assumes that learning is a continuous linear development from controlled to automatic via practice and such progress can be measured by reaction time in real time processing. The possibility that more proficient learners take a shorter time because of their developing 'shortcuts' in processing information has been largely ignored. This earlier formulation has been criticised by Cheng (1985) who argues that improvement in performance is not simply to achieve automaticity, but also a result of the **restructuring** of information so that it can be coordinated, integrated, or reorganised into new units, thereby allowing the old procedures to be replaced by the new procedures

with a new internal structure of the information. In other words, restructuring may result in new procedures for retrieving information or a new organisation of information already stored. This criticism has been accepted by McLaughlin, as the later model includes, alongside automaticity, restructuring as the two central components to this cognitive theory of language learning. McLaughlin (1987) also suggests that the second process, restructuring, is responsible for variability in IL development. Lastly, it may be misleading to equate Acquisition and Learning with Automatic and Controlled processes. Acquisition and Learning refer to the general process of second language development over time whereas Automatic and Controlled processes refer to the learner's ability to process information in real time, though allusions are made to the frequent repetitions of certain routines so as to achieve automatic status. Despite that, a learner having acquired a structure can have recourse to controlled processes again if the task demands a great deal of analysed information about the structure. On the other hand, a learner may process input according to the most automatic procedures available, but will have to revert to controlled processes when automatic routines fail.

3.9 Interim Discussion

The debate put forward by the supporters of either the interface or non-interface position is centred upon the relative utility of learning in a classroom setting. Most of them assume that as long as acquisition takes place, the learner will follow an order of development similar to that of learners in a naturalistic environment. While the supporters of the interface position assert a positive role for classroom learning in the acquisition process, they differ in their views regarding the mental representations of 'learned' knowledge. Like Krashen, Bialystok associates explicit knowledge with some form of metalinguistic/articulated knowledge; Sharwood Smith seems to suggest that explicit knowledge may be composed of different levels of explicitness, and, as such, it may not be articulated knowledge. Both Seliger and Sharwood Smith suggest that learners may have knowledge about the language, but to articulate it is beyond the

ability of some learners since it involves a higher form of cognitive capacity. This debate leads to some consequences:

(a) **The Usefulness of Positing an Acquisition-Learning Dichotomy** : Whichever position one adopts, it is empirically difficult to set up an experimental condition which can tease apart these two variables and study the effect each variable has on the learner's SL development (Tarone 1988). On the other hand, we cannot ignore the possible effect of learned knowledge on SL development, especially for those who have no choice but to acquire the TL in a traditional classroom. To claim that they are not acquiring but learning a language out of context has oversimplified the complex phenomenon of SLA, and ignored the fact that many successful learners do originate from traditional classrooms.
The different opinions put forward by the proponents above have indicated that it may be inappropriate to draw such a dichotomy between Acquired Competence and Learned Competence. Instead, they can be seen as constituting two ends of a continuum, the content of which may be described in terms of relative degrees of explicitness. While learned knowledge represents the highest degree of explicitness, less explicit representations or intuitions can be found in situations where the individual feels that some part of the utterance is wrong, but is unable to provide a reason for it.

(b) **The Utility of Explicit Knowledge in Performance** : Another issue under debate is whether explicit knowledge can be retrieved to initiate utterances. It seems that Krashen and Sharwood Smith are discussing explicit knowledge on two different planes. When this is associated with articulated knowledge, as is done by Krashen, it is reasonable to assume that it cannot be used to initiate utterances; no linguist would communicate on the basis of his meta-knowledge of language, that is, even with linguists, it is

usually taken to be the topic but not the means of discussion.

On the contrary, when associated with the learner's general understanding, or 'degree of analyticity', as some researchers might like to call it, of the internal structures of the target system, it is highly probable that this type of knowledge can be retrieved to initiate utterances during the planning and execution stage which involve the coordination and organisation of different propositional contents, be they form or meaning. As mentioned in Section 3.6., explicit knowledge of some structures which carry more communicative values may be more accessible than those which carry less.

To conclude, we have seen a product as well as a process approach in the description of SL learners' competence, all of which argue for or against the dichotomy between Acquired and Learned competence. In the following section, we will examine the learner's competence from a variability perspective. Some models find their support from psycholinguistic processes while others prefer to align themselves with sociolinguistic theories.

3.10 Bialystok's Analysed Knowledge and Cognitive Control

This later model of Bialystok's indicates a departure from the earlier dichotomous stance. In this model, IL development is regarded as the movement along two **continua of analyticity and automaticity**. Proficiency of adult SL learners, as Bialystok claims, involves:

(a) the growing analysed knowledge of the TL, and

(b) the ability to retrieve the internalized knowledge with some degree of efficiency.

The **Analysed Knowledge** continuum is a reformulation of Bialystok's previous dichotomous implicit/explicit knowledge. In the present model, analysed knowledge is defined as 'the types of mental representation assigned to the information and this representation indicates the degree of control over that information' (Bialystok 1981a:4). The properties of analysed

knowledge are:

(a) the knowledge is organised and represented as propositions. The propositional structure indicates the relationship between the linguistic forms and functions. Development along this continuum is in terms of the learner's increasing analysis and reanalysis of this structure.

(b) Awareness of the propositional content is just a product of developing analysed knowledge, not its criterion. At any point on the continuum, the content may be the same, but as analysis of the structural properties of the content increases, the learner becomes increasingly aware of the structure of the propositional content.

(c) Metalinguistic or articulated knowledge is 'the ability to attend to forms of the language independently of meaning' (1981b:38). It is a form of specialised knowledge made possible by analysed knowledge and is marked by some degree of accessibility to and some amount of consciousness about the learner's knowledge about the language. It is responsible for literacy or grammatical analysis.

Bialystok and Sharwood Smith (1985:109) outline four phenomena in their discussion of analysed knowledge:

(a) Extent of analysis in the grammar is not the only factor in the development of knowledge. A learner's knowledge differ not only in qualitative terms, but also quantitatively from that of a native speaker.

(b) Increasing sophistication in the analysis of mental representations involves development from unanalysed to analysed knowledge.

(c) The learner's reanalysis of IL grammar during the course of development does not necessarily imply an increase in complexity; it may refer to the depth of analysis of the IL grammars.

(d) Increasing competence or increasing analysis does not imply an increase in the conscious awareness of

structure on the part of the learner.

The **Cognitive Control** continuum is defined as 'the ease with which information may be accessed by the learner irrespective of its extent of analysis' (Bialystok 1981α:10). Its major responsibilities include (Bialystok and Ryan 1983):

(a) Knowing and selecting which information is required,

(b) retrieving it, and,

(c) coordinating and solving the task within time constraint.

Individual learner's retrieval procedures may vary according to:

(1) the demands of the language situation,

(2) how detailed the information is required,

(3) individual's control over the information, i.e. how accessible the structure of the propositional content is to the learner.

According to Bialystok and Sharwood Smith (1985), the underlying knowledge of these procedures is similar to Chomsky's pragmatic competence, i.e. ability to use the procedural knowledge along with analysed knowledge to fulfil certain task requirements. In other words, knowing the procedures predetermines the speed and efficiency with which the retrieval procedures may be put into operation by the learner. This efficiency or automaticity is the criterion with which we assess the learner's fluency.

3.10.1 Relationship between Analysed Knowledge and Cognitive Control

The two dimensions are considered to be independent of each other but interrelated in the sense that improvement in one will typically promote the development of the other. Bialystok and Ryan (1983) claim that there is an ordering between them which ascribes primacy to the dimension for analysed knowledge. In this respect, development of cognitive control is contingent upon adequate levels of analysed knowledge.

3.10.2 Second language development

Since analysed knowledge can only evolve from non-analysed knowledge, all learners enter the system in the region for which information is unmarked for both factors, IL development is described in terms of development from 'unmarked' to 'marked' of the two dimensions. The analysed and automatic end of the continuum contains all the information and features of the less analysed and less automatic (Bialystok 1981a).

Based on this model, Bialystok (1981b) explains the inadequacy of Krashen's Acquisition-Learning distinction, which is characterised by the conflation of non-analysed and automatic ends of the two dimensions. Learning is represented as +analysed -automatic and Acquisition as -analysed +automatic. Therefore, two aspects of language learning phenomena are excluded:

(a) The early stages of language learning which are characterised by -analysed -automatic; because knowledge is -analysed, access to it will be so difficult that it is barely adequate as 'utterance initiator'.

(a) Advanced learners may be able to handle sophisticated uses of language characterised by the combination of +analysed, +automatic.

IL variability, within this framework, may be described (Bialystok 1983) in terms of :

(a) the changes in the amount, nativeness and analysis of the linguistic knowledge.

(b) the changes in the learner's ability to cope with the processing constraints that operate on the learner's knowledge of that system.

As a consequence, the SL learner's interim grammars can be assessed through his ability to meet the demands of the language situations which require different degrees of analysis of his IL competence and ability of retrieval; that is, if we assume that the use of language in different situations inherently demands greater or lesser degree of analysed knowledge and automatic Control, the learner will only be able to function in those situations where the demands are met by the learner's competence along these two dimensions.

Bialystok and Sharwood Smith (1985) suggest that the learner's linguistic and pragmatic competence may affect the retrieval procedures. Analysis of control variability needs to distinguish whether the new form in competence has been established or not. A learner may hover between an old form and a developing new form because he does not know which form is appropriate; or the new form has already been established but the learner has not quite developed adequate control over it.

3.10.3 Evaluation

Bialystok's model provides a framework with which we can analyse the IL development of SL learners from two perspectives, analysed knowledge and cognitive control. It is an attempt to distinguish abstract knowledge and application of it in different task situations. Moreover, this model also tries to incorporate both linguistic and psycholinguistic phenomena in language development. Language acquisition is seen as a complex interaction between the development of linguistic knowledge and the development of cognitive procedures involved in information processing. Since both aspects provide important information in explaining second language development, Bialystok maintains that they should be kept empirically distinct.

Moreover, this model also attempts to capture the dynamic nature of IL development. It is seen as progression along either or both of these two dimensions in different combinations, revealing quantitative as well as qualitative differences in the development of IL competence, and systematic variability in IL performance.

Despite these advantages, there are certain ambiguities embedded in the model, which are related to:

(a) the definition of analysed and unanalysed knowledge,

(b) the qualitative and quantitative development of the two dimensions, with particular regard to the classification of learner types by this model, and,

(c) automaticity in IL language development.

With regard to (a), while avoiding the Acquisition/Learning dichotomy, and emphasising the growing analysis of knowledge in SL development, Bialystok's definition of unanalysed and analysed knowledge is rather ambiguous. Sorace (1984) identifies three referents for unanalysed knowledge:

(1) unanalysed knowledge of the initial stages of the learning process, both in naturalistic acquisition and guided learning. This type of knowledge is characterised by -analysed -automatic.

(2) spontaneously acquired knowledge, i.e. Krashen's acquired knowledge and Bialystok's implicit knowledge, which is characterised by -analysed +automatic.

(3) rules internalized via explicit knowledge, which was once characterised by +analysed +automatic.

In other words, the SL development of an ideal naturalistic learner or the competence of a native speaker is characterised by (1) and (2) whereas that of the formal learners is (1), (2) and (3). These definitions of unanalysed knowledge put forward by Sorace (1984) help to explain the qualitative differences in the resultant competence between native or natural acquirers and formal learners.

Whereas unanalysed knowledge can be equated with the above three types of knowledge, analysed knowledge, according to Bialystok, cannot be equated with 'metalinguistic knowledge' or 'articulated knowledge' which are specialised forms of knowledge made possible by the increasing degree of analysis of the target systems. In fact, it might be more appropriate to conceive of analysed knowledge as the depth of one's understanding of the internal structure of the TL rather than knowledge which is analysed. In other words, analysed knowledge can only be measured by its relative degrees of analysis such as that shown by learners who progress from external to internal negation. As far as classroom learners are concerned, the resultant quality may be a result of two processes:

(1) rules internalised from explicit knowledge, and,

(2) reanalysis of spontaneously acquired knowledge in the classroom.

In this respect, SL development of formal learners may be conceived of as undergoing continuous processes of (1) and (2), and the interaction between them.

With regard to (b), the postulated development along the two continua by different types of learners leads to a confusion concerning the quantitative and qualitative differences between different types of learners classified according to the different combinations of these two dimensions. The ambiguity thus derived is due to the difficulty of representing both qualitative and quantitative aspect of knowledge by the same continuum (Sorace 1984). Qualitatively speaking, the continuum is closed on both ends, which is similar to Tarone's Capability Continuum (Tarone 1983). Quantitatively, the continuum is open at the starting point of the development. Presenting these two aspects at the same time on the same continuum leads to the conclusion that there is parallel or proportional development between the quantitative and the qualitative aspects of IL knowledge. However, the knowledge of naturalistic SL learners, may be qualitatively functional and unanalysed, but quantitatively greater than that of formal learners whose knowledge is analysed but functionally limited.

As for (c), if one criterion determining success in acquisition is the learner's ability to retrieve his internalized knowledge with a fair degree of automaticity, the analysis of the knowledge dimension needs to make a distinction between the product and the process. The product refers to the content of knowledge while the process is the actual mechanisms operating on knowledge in real time. Knowledge derived from rule internalisation via explicit knowledge is analysed in content; in application, the learner need not revert to this aspect any more in performance. Nevertheless, this analysed quality is latent and is accessible by the learner depending on the amount of analysed information the task requires. On the other hand, spontaneously acquired knowledge is unanalysed both in content and in application, so is the use of prefabricated patterns by beginners.

Despite this drawback in the various definitions, Bialystok's model introduces a useful framework in our investigation of IL

development by drawing an empirical distinction, as far as possible, between the development of internalised IL knowledge and retrieval of knowledge in both production and comprehension.

3.11 Tarone's Capability Continuum

At the outset, Tarone (1983) assumes that IL is a natural language, thereby conforming to the constraints of linguistic regularities. As such, IL production would show systematic variability similar to that demonstrated to exist in the speech of native speakers. For Tarone, unlike Chomsky, IL composes of a set of styles, or competences, the application of which is subject to contextual constraints which are defined by the amount of attention paid to speech. She introduces the **'Capability Continuum'** which is made up of a set of different styles, with the vernacular style on one end and careful style of the other end of the continuum. The continuum depicts a number of IL phenomena:

(a) the outcome of differential attention to speech, which is the cause of IL variability, is a switch of styles in the learner's performance,

(b) the careful style which requires the most attention is the most permeable to other norms, TL norms or the learner's NL norms. On the other hand, the vernacular style which require less attention is the most systematic because the learner is prone to IL norms.

(c) New forms can enter the continuum on either end but will gradually spread into other styles over time.

(d) IL is systematic and is predictable in terms of a set of variable and categorical rules because it has internal consistency. Along with style-shifting, certain categorical rules might become variable and vice versa.

3.11.1 Evaluation

Within Tarone's model, classroom learners may exhibit a set of formal styles which will gradually blend or be internalised into the vernacular styles. This, according to Ellis (1985a), explains why formal instruction does not affect the route of deve-

lopment because it is based on the data collected from the vernacular style. However, he points out that formal instruction may serve a dual purpose: (a) it encourages the development of careful styles on the one hand, and (b) classroom interaction, or even the teacher's input, may serve as input to the learner's vernacular style. If these speculations hold true, classroom learners may outperform naturalistic learners because formal instruction provides more opportunity to develop more styles.

From a theoretical perspective, Tarone's model has its theoretical underpinnings from Labov (1969) in which he argues that any linguistic system must be viewed as consisting of a continuum of styles. Such a direct correspondence with the Labovian framework which draws evidence mainly from native speakers who have already developed a full-fledged competence seems to suggest that different levels of complexity of underlying competence is not a crucial variable in determining sets of styles between the native and the IL speakers. While attention to speech may be a crucial variable in determining different styles of native speakers, it may be inappropriate for our analysis of SL learners, especially naturalistic beginners because the careful style may not exist in the first place and attention to speech would probably lead to the IL or NL norms more than the TL norm, the only forms available to the learner.

The terms, 'careful' or 'vernacular', are ambiguous in themselves in describing IL performance because they make no provision for the necessary amount of linguistic details required to perform a task. An untimed grammaticality judgment task may be described as tapping a more careful style than timed grammaticality judgments in terms of the amount of focal attention allowed to evaluate grammaticality of sentences. On the other hand, a timed grammaticality judgment task which involves correction of errors would require not just a great deal more attention from the learner but also a certain amount of linguistic details to locate and correct the errors. Bialystok and Sharwood Smith (1985) criticise Tarone's model as having collapsed both analytic as well as control variability in describing SL learner development. They argue that variability occurs not only between styles, but also within styles.

Nevertheless, Tarone's Capability Continuum offers a useful theoretical framework in our analysis of IL variability, especially variability as a result of constraints like linguistic contexts, task demands or even the relationship between form and meaning. Current research on variability does attempt to take into account these parameters in their investigation and Tarone in one of her recent studies has discovered that the discourse variable can also be another factor leading to variability in IL performance (Tarone 1985).

3.12 Ellis Variable Competence Model

Ellis (1985b) proposes the **Variable Competence Model** which takes into account both the product and the process of language use. As he notes, the **Product** of language use,

> 'comprises a continuum of discourse types ranged from entirely unplanned to entirely planned.. Unplanned discourse is discourse that lacks forethought and preparation. It is associated with spontaneous communication. Planned discourse is discourse that is thought out prior to expression. It requires conscious thought and the opportunity to work out content and expression.'
>
> (Ellis 1985b: 266)

The **Process** of language use, on the other hand, is seen in terms of:

> 'the distinction between linguistic knowledge (or rules) and the ability to make use of this knowledge (procedures).'
>
> (Ellis 1985b:267)

The underlying assumptions of this model are:

(a) there is a single competence containing a set of variable IL rules defined according to how automatic and analysed the rules are,

(b) the learner possesses a capacity for language use (defined by Widdowson 1984 as 'the language user's ability to create meaning by exploiting the potential inherent in the language). In Ellis's model, this 'capacity' entails a series of procedures, primary processes for unplanned discourse and secondary processes for planned discourse.

(c) Variable L2 performance is seen as a result of how a language user makes use of his capacity to operate on rules, unanalysed and analysed, in different discourse modes.

(d) Acquisition is seen as the learner actualises his existing linguistic knowledge by means of the processes in various discourse and situational domains, thereby creating new linguistic rules in these contexts.

3.12.1 Evaluation

Ellis's model offers an interesting account of SLA in terms of the interaction of the various psycholinguistic procedures and discoursal constraints in L2 performance. An important contribution of this model to SLA theory is the recognition that acquisition can also be seen as an outcome of the interaction between the learner's linguistic knowledge and his capacity to achieve the best expressive effect by exploiting this knowledge as well as the potential inherent in the discourse in which he engages.

In other words, it enlarges the scope of current SLA research which appears to have been biased towards viewing acquisition as an internally derived process. Ellis has no objection to this view, but he also suggests that the discourse domains in which the learner frequently engages have a role of shaping the types of psycholinguistic processes and the quality of knowledge of SL learners, which leads to variability in IL performance. To expand this notion a bit further, it can be said that learning environments are characterised by a set of discourse modes which may have certain effects on SL development, both in terms of the order or the rate of development, as put forward by Ellis (1985a).

Nevertheless, the model, as it now stands, needs to provide a clearer definition of the relation between automaticity of L2 knowledge and the psycholinguistic processes, both primary and secondary. At this stage, it should be noted that Ellis's model has drawn some reference from Bialystok's distinction between the two qualitative aspects of IL knowledge, automaticity and

analyticity. However, it seems that Bialystok in her definition of automaticity always wavers between automaticity as the result of increasing pragmatic competence (defined by Chomsky 1980:59) and of improving cognitive control over information processing, though she indicates a preference for the second definition in most of her articles.

Ellis's model seems to reveal the same ambiguity in ascribing a linguistic content to automaticity, at the same time positing that there are other retrieval processes. It might be reasonable to argue that the retrieval processes are guided by procedural knowledge, but we have to make a distinction between procedural knowledge and the learner's linguistic knowledge because the former may be devoid of any linguistic content but a set of conceptual knowledge which govern the efficacy of the retrieval processes.

3.13 Discussion

In the sections above, we have discussed the relevant models and theories which attempt to discuss classroom learning in terms of: (a) the utility of pedagogical ingredients such as rule presentation and practice, or classroom interaction, and (b) the effect of classroom learning on the development of underlying competence and retrieval processes. Within the empirical framework of (b), an alternative definition of IL Competence and Performance is considered necessary.

3.13.1 Competence and Performance: A Definition

Chomsky (1965) offers the following definitions of **Competence** and **Performance:**

> 'We thus make a fundamental distinction between *competence* (the speaker's knowledge of the language) and *performance*, the actual use of language in concrete situations'
>
> (Chomsky 1965:4)

Later, he refers to 'intrinsic tacit knowledge or competence' (1976:40). These definitions of Competence and Performance, which strike a distinction between knowledge on the one hand and use of knowledge on the other, as we shall see, has been adopted in current SLA research.

In fact, recent IL research recognise that there is no direct equivalence between input and intake, and between intake and output because at each stage, it involves a whole host of complex psycholinguistic processes (for a detailed description, see Gass 1985). Studies relying on spontaneous production data have also been scrutinised for reflecting a biased picture of the learner's interim grammars (Kohn 1982, Sharwood Smith 1986).

Sharwood Smith (1980) defines Performance as 'overt behaviour' which reflects the degree of control of the retrieval procedures, and Competence as:

(a) **LK1** : underlying knowledge of the language, it is propositional, 'acquired' knowledge, but it does not have to conform to TL norms; and
(b) **LK2** : cognitive knowledge of information processing. It is associated with fluency, with presumably different processing mechanisms involved in production and comprehension.

This distinction is further elaborated by Faerch and Kasper's (1986) distinction between **Declarative Knowledge** and **Procedural Knowledge**. Declarative Knowledge is the learner's underlying knowledge of the linguistic structures of the TL and Procedural Knowledge is the knowledge about the procedures of speech production and comprehension. Declarative Knowledge cannot be employed immediately and can only be activated through procedures in speech reception and production. Procedural Knowledge, on the other hand, is free from linguistic content, its function is to select and combine rules and elements from different linguistic levels or language systems of the Declarative Knowledge in performance.

According to Sharwood Smith (1986) , LK1 and LK2 are separate but related. LK2 provides a baseline for describing processing operations for a potential structure because they have to conform to the relationship of the structures captured in LK1. Unlike Faerch and Kasper (1986), acquisition at LK1 level brings with it the ability to use the acquired structure immediately, albeit an observable hesitancy and inconsistency at the initial

stages. Moreover, Sharwood Smith also suggests that IL development may be described as **Competence Change** and **Control Change**, with the assumption that these two changes do not necessarily coincide.

In fact, this distinction is not new. Bialystok in her model also incorporates this distinction in her description of IL competence. Seen in this light, Sorace (1984) suggests that competence should be defined according to the following aspects:

(a) Quantitative aspect i.e. 0 ------- 1

(b) Qualitative aspect i.e. -analysed ------ +analysed
-automatic ----- +automatic

The different combinations of the three aspects define the evolutionary stages of development as well as the quality and functions of IL knowledge.

To put this Competence/Performance distinction into the perspective of our investigation of classroom SL development, four possibilities are posited:

(a) the mastery of formal linguistic features and the application of them in various situations should be independent, i.e. structural accuracy achieved in one situation cannot predict the correct use of these features in all situations. Within Bialystok's framework, the development of procedural knowledge may lag behind the development of analysed knowledge, and inconsistency is found between the learner knowing and using the TL structures.

(b) Classroom learners are able to perform a range of grammar tasks, and to make their knowledge explicit. Growing analyticity of the internalised linguistic systems may progress from:

(1) being able to give implicit judgement on grammaticality,

(2) being able to locate and correct errors, and,

(3) being able to articulate their grammatical knowledge.

(c) If the learning context and experience determine the extent of analyticity and automaticity of IL development, classroom learners from different contexts would reveal different combinations of the degree of analyticity and automaticity of IL knowledge, which are reflected in the range of tasks the demands of which the learners can meet.

(d) Systematicity of IL performance is seen as gradual improvement on the part of the learner in his application of the internalised TL structures in a growing number of language situations.

3.14 Conclusion

In this chapter, we have attempted to examine the various theories concerning the underlying competence(s) of SL classroom learners. In the last part of this chapter, we have also outlined current SLA research methodology which attempts to draw an empirical distinction between Competence and Performance in our investigation of IL development. This proposal takes into account the possible discrepancy between development of IL competence and performance. In the following chapter, we will review the studies which attempt to examine the role of formal instruction on SLA. However, it will be seen that research to date has not yet reached a common consensus concerning the role of formal instruction on SL development.

CHAPTER FOUR

THE EFFECT OF LEARNING CONTEXT/INSTRUCTION ON SLA A REVIEW OF EMPIRICAL STUDIES

4.0 Introduction

Most of the SL learning theories discussed in the last chapter are attempts to characterise the underlying processes involved in different learning situations and speculations have been made in that there may be differences with respect to the underlying competence as well as the processes of language learning.

In this chapter, an analysis of the two different learning situations is presented, to be followed by an empirical account of the effect of learning environment, and of the conscious effort to teach 'rules', on SL learning, evidence from which, though scanty, suggests that instruction may have its effect on SL development in subtle ways.

4.1 A Definition of Learning Context

4.1.1 Naturalistic Learning Context

Following Krashen, **naturalistic context** triggers 'Acquisition' rather than 'Learning'. As Klein puts it, it is the acquisition of a second language 'in everyday communication, in a natural fashion, and free from systematic guidance' (1986: 16). Acquisition in this environment assumes the importance of communication, being able to express oneself and to comprehend incoming messages.

Ringbom (1980) suggests that input evidence from the TL is extracted from daily communications since the target language (TL) is also a language spoken in the immediate environment of the learner. It is rich, varied and encoded in a variety of meaningful contexts. It is in this respect that processes of L2 naturalistic acquisition are said to be similar to L1 acquisition (Dulay et al. 1982).

4.1.2 Foreign Language Learning Context

In a **foreign language context**, the TL is not normally in use in the social milieu, and the main source of input is provided through formal instruction. The TL, when acquired, is not normally used by the learner in daily communications. Inherent in this type of learning environment is a set of discourse features pertaining to the characteristics of a classroom context. As a result, it raises the issue of whether these classroom discourse characteristics affect SL development.

4.1.2.1 The Social Context of Classroom Learning

In a **classroom context**, both the teacher and learners assume a participant role in the generation of a classroom discourse. As Allwright (1984) notes, classroom discourse is unique in the sense that there is the presence of a 'teacher' who assumes the responsibility of:

(a) initiating a discourse, soliciting responses from the learner(s) and providing feedback,

(b) controlling the types of input and taking deliberate and planned procedures to draw the learner's attention to the TL structures, and providing practice opportunities.

Embedded also in this classroom discourse is the teaching approach adopted by the teacher, which somehow reflects his belief concerning the goal of learning and the most effective means to achieve this goal. As such, the nature of instruction varies along three parameters: (1) the frequency and explicitness of instruction, (2) the sequence of presenting the TL structures, and (3) the opportunity for communicative interactions in the TL. As a consequence, it is reasonable to assume that the adoption of any teaching approach would have some influence on the nature and the general characteristics of a classroom discourse. For instance, the amount of opportunity for the '**negotiation of meaning**' among the participants in the classroom, which is claimed to be facilitative for language acquisition to take place (Long and Sato 1983), may be more prominent in a communicative language teaching situation than one which emphasises structural practice and relatively more explicit explanations about the language system.

4.1.2.2 Pedagogical Input

The term '**pedagogical input**' is used to denote the manner and content of presentation of the TL structures. In a classroom context, the TL structures are screened, graded, and discretely presented according to their intuitively assessed degree of difficulty. This paradoxically presupposes that we know how the human language learning capacity operates in its natural form. Sometimes, they may be shrouded by a set of rules, or the teacher's simplified '**rules of thumb**' (Faerch 1986). Following this '**meta-talk**' are language exercises, ranging from mechanical and structural (such as pattern drills) to relatively more meaningful and communicative activities (such as unguided writing practice, role plays or language games).

Krashen and Seliger (1975) summarise the general attributes of formal input into eight categories: (1) + discrete point, (2) ± deductive, (3) ± explicit statement of rules, (4) sequenced presentation of structures, (5) single versus multi-performance channel, (6) focus on versus focus away exercise types, (7) extent of control over learner's performance, and (8) feedback on errors.

Pedagogical input is usually embedded in what Faerch calls '**meta-talk**' discourse, a common feature of foreign language classrooms. Under this learning situation, both the teacher and students contribute to the construction of 'metalinguistic scaffolding' in which both can objectify a language, discuss and analyse it in ways they do not naturally do in daily communications outside the classroom (Faerch 1985). In other words, 'meta-talk' is a characteristic of classroom discourse which manifests itself in what Schachter (1986) refers to as '**metalinguistic input**', covering **explicit corrections, clarification and confirmation checks** as well as **signals of a failure of understanding.** Moreover, as Ellis (1987a) points out, normative pressure present in a foreign language classroom can also be characterised as 'pedagogic' and it is the driving force of IL development because the doctrine of 'grammatical accuracy' is usually upheld by the teacher, or even the learner, so long as he is open to such pressure.

4.1.3 Implications for Second Language Development

The analysis above concerning naturalistic and classroom learning environments seems to suggest that these two types of learning contexts bear little in common. In fact, it would be wrong if this binary distinction was over-emphasised because in both environments, the types of input and interactions can overlap to some extent (Krashen 1976). Ellis (1985a) suggests that instead of treating them as opposites, it would be more appropriate to see them as providing the same discourse types in different degrees. Nevertheless, it is still reasonable to assume that some discourse characteristics such as rule presentation and discussion, or feedback, both positive and negative, are uniquely frequent in classroom discourse, which may trigger different learning processes (linguistic or cognitive) of L2 learners, or perhaps, different degrees of preference for the same process, thereby resulting in quantitative as well as qualitative differences in their IL development. Accepting this assumption, we have a case for examining whether these characteristics have any effect on SL development.

4.1.3.1 The Role of Pedagogical Input in Classroom SL Development

In the last chapter, we have seen a difference in the researchers' opinions concerning the utility of pedagogical input and its possible effect on the nature of the learner's underlying competence. The bones of contention are: (1) whether there is a relationship between pedagogical input and second language acquisition (SLA), and (2) assuming that there is such a relationship, in what principled way pedagogical input exerts its effect on SLA.

As for (1), the heart of the argument lies in whether SL learners make use of pedagogical input to formulate a corresponding set of hypotheses about the TL; or, in fact, hypothesis formation and testing is an internally driven process. Supporters of the latter approach are Dulay and Burt (1973) and Krashen (1982). Felix (1981b) and Felix and Hahn (1985) also suggest that at least some of the processes such as 'decomposition' (introduced by Wode (1981b) to refer to acquiring a free morpheme not in a wholesale fashion but by gradually taking in the

individual semantic features entailed) operating in naturalistic L2 and L1 acquisition are also found in tutored L2 acquisition. To these researchers, it is the internally driven language learning processes that are responsible for a lot of striking similarities between L1 and L2 naturalistic acquisition. Seen in this light, the underlying language acquisition processes are 'immune' to external situational variables and classroom input should be as 'natural' as possible (Krashen and Terrell 1983); otherwise 'teaching efforts are doomed to failure when they are in conflict with naturalistic language acquisition principles' (Felix and Hahn 1985).

Despite these pronouncements on the universality of language acquisition, there has been a debate on whether classroom learning, or pedagogical input in particular, facilities SL development. According to Faerch (1985), the fact that many people acquire a L2 in a naturalistic context does not imply that the types of communication found in such context provide the ideal environment for foreign language learners. As a matter of fact, these learners may experience minimal contact with the TL outside the classroom. Moreover, he further argues that pedagogical rules may be used to support foreign language learning despite being simplified 'rules of thumb' provided by the teacher (Faerch 1986).

Ringbom (1980) suggests that pedagogical input may relieve the learner of the burden of hypothesis formation about the TL structures which are provided 'ready-made' in the classroom. True as it may be to some extent, such an assumption may run into the danger of assuming an isomorphic relationship between teaching and learning strategies. It is too early at this stage to ascertain the utility of this 'metalinguistic' input in classroom SL development.

Recently, some researchers like White (1987a) or Schachter (1986) have suggested that pedagogical input may be useful for certain aspects of grammar which cannot be 'comprehended' with the help of contextual meaning, or for which direct positive evidence is not available in the input data.
As for the second issue, i.e. in what principled way pedagogical

input affects SLA, there are three possible influences:

(a) Pedagogical input may exert some influence on the order of development of SL learners.

(b) It may influence the rate of development by either speeding up or slowing down SL development.

(c) It may lead to qualitative differences in IL knowledge, as defined by Bialystok (1981b) in terms of the development of automaticity and analyticity of SL learners.

A body of research has been accumulated as regards (a) and (b). As for (c), which has been researched under the framework of IL variability in knowledge and use, few studies address directly to the question of the effect of instruction on IL variability.

4.2 The Effect of Instruction on SLA: an Empirical Account

Studies to date which attempt to investigate the effect of different learning contexts on SL development are not many. As Ellis has rightly pointed out, it is difficult to do a comparative study since a lot of situational variables do overlap despite differences (Ellis 1984b). The inconclusive evidence from some of the comparative studies may be due to their failure to tease out the variable of instruction in the SL 'naturalistic' studies (Long 1983d).

4.2.1 The Order of Second Language Development

The studies which come under this category attempt to compare the 'order of acquisition' of grammatical morphemes or some grammatical structures such as negation, interrogation and relative clauses with and without formal instruction. In the following, they are subdivided as far as possible into whether the TL is acquired in a second or foreign language environment.

4.2.1.1 The Morpheme Studies

4.2.1.1.1 Second Language Environment

Fathman (1975) compared the morpheme orders of two groups of learners of diverse L1 backgrounds. One group was receiving instruction in English and the other was attending normal classes. Despite this difference, a high correlation between the morpheme orders of the two groups was found. Another study by

Krashen et. al. (1976) also found no significant difference in the rank order of morpheme accuracy between formal and informal ESL learners. Turner (1978) investigated the relations between the teaching order and the order of acquisition of the grammatical morphemes and found they did not correlate significantly.

While the above studies claim that formal instruction does not affect the order of acquisition of the grammatical morphemes, Perkins and Larsen Freeman (1975) and Lightbown et.al.(1980) offer some counter-evidence. Perkins and Larsen Freeman gave a translation test and an oral description test to a group of university students before and after two months of instruction. Although the morpheme orders established in the oral description task showed no significant difference, the orders established from the translation test differed significantly. They concluded that formal instruction did not affect the order of acquisition where spontaneous speech was concerned, but instruction might result in improved performance in terms of the frequency and accuracy of morpheme usage.

Lightbown et. al. (1980) found that formal instruction influenced the order of plural '-s' and progressive '-ing', whereas the other grammatical morphemes remained similar to the natural order. In another study, Lightbown found a 'disturbed order' which, according to her, is ascribable to intensive instruction (Lightbown 1983). In her study, frequency of classroom input, e.g. the teaching of '-ing', would only lead to 'pseudo-acquisition' and the over-extension of the taught structure to inappropriate contexts. She found that the accuracy rate of this morpheme dropped when instruction was over.

In Lightbown's opinion, though these patterns of errors and the order of acquisition are different from those exhibited by learners from naturalistic environment, such 'disturbed order' is short-lived. In fact, she suggests that formal instruction cannot subvert the order of acquisition, rather it 'upsets' the learner's development because of the 'too early insistence on correct production of certain language forms which would be expected to come later in a "natural sequence"'(Lightbown 1983:103).

4.2.1.1.2 Foreign Language Environment

Fathman (1978) compared the morpheme orders between EFL learners residing in Germany and ESL learners residing in the U.S. and reported a positive correlation. However, the morpheme ranking for the EFL subjects were slightly higher than those of the ESL subjects for articles, comparatives and superlatives. Pica (1983b), on the other hand, argues that the subjects in Fathman's study may not be comparable because the EFL learners were all German speaking and the difference in the rank order could be the result of L1 influence.

Makino (1979) also found significant correlation in the morpheme order established by 777 Japanese learners of English with the 'natural order', despite the fact that they had ample time to draw on their 'learned knowledge' in the written test. This results is interesting since it implies that the order derived from 'learned knowledge' also resembles the 'natural order'.

However, conflicting results were found in Sajavaara's study (1981) in which he used the Bilingual Syntax Measure for his Finnish speaking subjects and found a significantly lower rank for the article and -ing in the order he established.

Pica (1983a) compared the morpheme orders of Spanish learners of English who were classified as instruction only, naturalistic, and mixed learners, and found a significant correlation among them and with Krashen's 'natural order' (Krashen 1976). Despite these similarities, she found that the instruction only group scored one or two ranks higher on plural -s and performed better on third person singular -s than did the mixed and naturalistic groups. Pica (1985) suggests that instruction has a selective impact on certain morphemes that have transparent form-function relationships. Moreover, the instruction only group significantly oversupplied certain morphemes in non-obligatory contexts and inhibited the use of ungrammatical constructions, while the naturalistic as well as mixed learners showed signs of pidginisation. In sum, Pica notes that 'differing conditions of L2 exposure appear to affect acquirers' hypotheses about the TL and their strategies for using it' (Pica 1983a: 495). Although Pica cautions that no conclusions can be made

about the rate of acquisition or the level of ultimate SL attainment from her findings, Long (1988) suggests that the tendencies of the instructed only group which distinguished them from the uninstructed group can signal long-term, even permanent differences between the two types of learners.

4.2.1.2 Developmental Sequence Studies

4.2.1.2.1 Second Language Environment

Ellis (1984b) investigated two L2 learners who received instruction in a full-time withdrawal situation (ie without any exposure to native speaking children). He examined the acquisition of negation, interrogation, and a number of verb phrase morphemes. All these structures were formally taught at one time or another during the nine months. He collected data from spontaneous communicative utterances produced by the learners in the classroom, which displayed a pattern of development more or less similar to that observed in naturalistic SLA. However, he found that some transitional patterns like uninverted YES-NO questions were prolonged and some other structures were slow to emerge (e.g. past tense forms). Ellis ascribes these results to the nature of the classroom discourse to which the learners were exposed. For instance, he argues that it is due to the predominance of present temporal reference in classroom discourse that results in the slow emergence of past tense forms.

4.2.1.2.2 Foreign Language Environment

In the Passau project, Felix (1981b) observed the developmental sequence of negation, interrogation, sentence types, and pronouns for 34 German learners of English in an EFL environment. Parallel developments were found with these learners when compared with those who acquired the TL in a naturalistic setting. What he reports as striking was the use of uninverted intonation questions by the learners when these types of 'samples' were neither found in classroom instruction nor in the teacher's questions. At the same time, the learners did not resort to their German L1 which requires inversion in the main clause. Based on these results, he suggests that both naturalistic and instructed learners are adopting some similar natural processing strategies, irrespective of their learning context.

Al-Jumaily (1982) studied the development of negation and copula in sixty Arabic speaking learners. He traced their development across four time conditions and the sequence established resembles that of naturalistic L2 learners who speak the same L1. He concludes that neither the learning environment nor the teaching order influences the developmental sequence.

Pavesi (1986) compared the developmental order of relative clause formation between instructed learners in Italy and naturalistic acquirers residing in Edinburgh. The results from the elicited oral data suggest that language setting does not seem to influence the order with which the different noun phrases are relativised. Furthermore, formal learners were reported to relativise, more accurately, the less marked noun phrases and to attempt more marked noun phrases on the Accessibility Hierarchy than informal learners did.

4.2.1.3 Interim Discussion

Taking these studies together, it is clear that a majority of them indicate that formal instruction does not alter the 'natural order' of the grammatical morphemes when the learner is engaging in spontaneous communication where the focus is on meaning. Nevertheless, both Ellis (1985a) and Pica (1983b) have pointed out that one of the problems with some of the studies conducted in an ESL context is that the subjects are neither purely 'naturalistic' nor 'tutored'; instead they are more apt to be called 'mixed' subjects for their benefits from both instruction and exposure from the wider context. As a result, it is difficult to know whether it is instruction or exposure per se that influences the order of development.

Despite these similarities, formal instruction was shown to have some effect on second language development. Perkins and Larsen-Freeman (1975), Lightbown (1985), Pica (1983a) and Pavesi (1986) reported improved performance in terms of accuracy and frequency of usage. In interpreting Felix's results in relation to the subject's more accurate production on the negatives, Pica (1983b) claims that while formal instruction may not suppress certain naturalistic tendencies of classroom learners, it may eliminate certain stages such as preverbal negation of their

developmental sequence. She seems to suggest that the process of SLA in the classroom may involve fewer stages and hypotheses than those that are found in a naturalistic setting.

On the other hand, negative effect of instruction was reported by Lightbown (1983) who claims that formal instruction may 'disturb' the 'natural order'. Nevertheless, the fluctuation of '-ing' as a result of instruction may be interpreted in terms of U-shaped learning behaviour (Kellerman 1985). Instruction has raised the consciousness of the learners' use of '-ing', leading to the frequent use of this structure in appropriate as well as inappropriate contexts. The decline in performance and its later re-emergence with more accurate usage suggest that some interim restructuring process has taken place.

The over-suppliance of taught structures in inappropriate contexts was reported by Pica (1985) and Lightbown et.al. (1980). It looks as if it is a negative effect brought about by instruction; nevertheless, it may be that the learners, being aware of this structure, attempt to apply it to a wider range of what they consider as possible linguistic contexts. If classroom learning is said to offer a better opportunity for negative feedback, this 'active' learning strategy supplemented by negative feedback may result in a faster rate of development along the developmental sequence.

4.2.2 Absolute Effects of Formal Instruction on the Rate of Development

Many studies which investigate the effect of formal instruction on the rate of development concentrate on the overall proficiency of SL learners. Long (1983d) provides a thorough review of eleven studies and concludes that instruction has a positive effect. The following section includes studies which examine the effect of providing deliberate instruction on the rate of development. Implicit in most of these studies is the assumption that there is a universal sequence of development and instruction may either speed up or provide a 'short cut' along this sequence.

Schumann (1978) attempted to teach negation to an adult L2 learner. Before instruction took place, the learner's utterances were primarily of the 'No + V' type. The seven months of instruction on negation only led to the target-like use of it in test-like situations while his spontaneous communication remained unaffected.

Gass (1982) tried to teach a group of L2 learners how to relativise the object of preposition, a noun phrase position which is considered to be more difficult to relativise than the subject, the object and the indirect object according to the Accessibility Hierarchy established by Keenan and Comrie (1977). She hypothesised that by gaining control of relativising the object of preposition, the learners would be able to generalise it to other less difficult NP positions in the Hierarchy. Her hypothesis was borne out in the experiment and the control group who followed a normal syllabus were not able to generalise instruction from the less marked noun phrase positions to those which were more marked.

Gass's study suggests that even though instruction has no effect on the order of acquisition, it may be possible to speed up the learning process. However, Gass's elicitation tasks are essentially grammaticality judgments and sentence combining, which involve untimed focus on form; therefore, instruction may enhance accuracy of usage only. It still remains to be seen whether the learners are able to use these structures in spontaneous communication.

In the literature, there are two studies which deliberately test Krashen's **Acquisition-Learning** distinction and **Input Hypothesis.** van Baalen (1983) in his year long project analysed the development of three groups of subjects each exposed to a different kind of instruction: (1) explicit rule explanations mainly in Dutch, (2) implicit teaching by presenting sentence patterns without explanations, and (3) a compromise which included the presentation of rules and patterns in 'blocks'. The four grammatical structures under investigation were third person -s, SVO order initiated by adverb, -ing, and do-support in negation. The results from a written story-retell and an oral picture

description tasks, which were claimed to tap 'Acquisition', revealed that the 'explicit' group excelled in their performance on SVO and third person -s and did just as well as the 'implicit group' in the other two structures. In the light of the results above, van Baalen argues that, for the 'explicit' subjects at least, two 'learned' rules have been internalised and efficiently retrieved in spontaneous production.

In response to Krashen's Input Hypotheses, Ioup (1984) hypothesised that if a learner was at the relevant i + 1 level, instruction which aimed at focusing the student's attention directly on the structure, in this case, non-finite sentential complements, would become comprehensible input and acquisition would take place. Her results showed that instruction had no effect at all on the learning of the taught structure. However, it is rather difficult to interpret the results since the study is hampered by the difficulty in establishing whether the experimental group has reached the appropriate level i, and in deciding which feature is going to be '1'. In this respect, relying on Krashen's theory is not very helpful because no concrete definitions have been made about what constitutes i or 1.

Ellis (1984a) investigated whether SL learners would acquire the inversion rule after three hours of 'audio-lingual' instruction on this structure. He found no significant improvement in their ability to produce inverted Wh-questions. Moreover, the order of the four WH-pronouns, WHO, WHAT, WHERE and WHEN, followed the developmental order established in the earlier longitudinal studies, despite a difference in the teaching sequence. Nevertheless, he suggests that instruction may influence individual learners because he finds that those who reveal maximal development were the ones who were given the least opportunity to interact with other participants in the classroom.

Zobl (1985) reported his experiments on the teaching of two forms of English possessive adjective to two randomly selected groups of French-speaking university students in Canada. His previous study has established that (1) HIS is the unmarked member of the HIS/HER pair, and (2) rules governing gender marking of possessed non-human/inanimate entities (e.g. her car) are

unmarked; and marked for animate/human entities (e.g. his mother). The results from an oral question-answer test indicated that students who received instruction on the marked structure improved in both domains, whereas students who received instruction on the unmarked structure showed no improvement in the marked structure and did not outperform the other group even with the unmarked structure. Zobl also notes a tendency for the students receiving unmarked input to show a higher incidence of rule simplification (e.g. overuse of the unmarked determiner HIS), whereas exposure to marked input leads to rule complexification.

The notion of markedness has always held some appeal for some SL researchers. Recently, Eckman et.al. (1988) replicated Gass's study with a more refined design. In their study, four experimental groups were formed, each receiving instruction on either subject, object or object of preposition, and the fourth group acted as control and was not given instruction on relative clause formation. The post-test results from a sentence-combining task showed that the group who received instruction on object of preposition outperformed the other three groups in all types of relative clause formation selected for the study. Based on these results, Eckman et.al. claim that 'the structure from which one will obtain maximal generalisation is the relatively more marked structure rather than the less marked structure. Thus, if one were forced to choose only one relative structure to teach, that structure should be relativised objects of a preposition' (Eckman et.al. 1988).

Contrary to the previous claim that it is possible to speed up the learner's development by teaching marked features, Pienemann (1984) argues that the teachability of an L2 structure is governed by certain psycholinguistic processing constraints and instruction can only promote language acquisition when the learner is ready for it (Pienemann refers to the processing prerequisites necessary to acquire the next structure of the developmental sequence). In his study concerning the acquisition of German word order, he found that the teaching of inversion was ineffective to those learners who were two stages below inversion and therefore had not yet developed the processing

prerequisites for that structure. However, where the learners had developed the processing prerequisites for inversion, instruction was found to be facilitative in three ways; it could:

(a) speed up the acquisition process,

(b) foster a wider application of the rule in obligatory linguistic contexts, and,

(c) increase the frequency of rule application.

He concludes that instruction of German word order should follow the sequence of the processing constraints and any attempt to subvert or circumvent such sequence is bound to be fruitless.

4.2.2.1 Interim Discussion

The results from the studies reviewed above are rather inconclusive, particularly with respect to whether the developmental sequence can be manipulated through instruction. Gass, Zobl and Eckman et. al. suggest that instruction on a more difficult structure may enable the learner to generalise it to the less marked ones, thereby speeding up the rate of development. Other researchers are more inclined to the view that instruction has no effect on acquisition if the learner has not reached the 'zone of maximal development' (Ellis 1984a, Pienemann 1984). In this case, instruction is beneficial only within a particular stage of development; as such, Pienemann argues strongly that the developmental sequence is beyond manipulation, so teaching and syllabus planning must strictly adhere to the natural sequence.

In fact, these diverse opinions as regards the effect of formal instruction on classroom SL development are not completely incompatible if we take a closer analysis of the types of elicitation tasks used in these studies.

Most of the studies which are claimed to show no effect on the order of development rely on spontaneous to elicited oral data; but a different order is found in Perkins and Larsen-Freeman (1975) when an alternative translation task is adopted. As far as the experimental studies are concerned, researchers who rely on written or grammar tests such as sentence combining in Gass

(1982) and Eckman et.al. (1988), written story-retelling (van Baalen 1983), or a discrete-point test in Schumann (1978), all reported a better learning effect; whereas those who make use of oral data seem to suggest that the effect is limited. With these findings, one may wonder whether there are differential effects of formal instruction on classroom SL development, that is, formal instruction may lead to a better effect on the development of competence rather than performance, based on the distinction presented in Section 3.13.1. in the last chapter. Nevertheless, some of the studies seem to suggest that the effect of instruction is also directly reflected in the learner's oral performance (van Baalen 1983, Zobl 1985).

4.2.3 Variability of IL Knowledge and Use

As mentioned previously, there are not many studies which tackle the effect of formal instruction on the learner's development of their IL knowledge on the one hand, and their ability to use this knowledge in different language situations on the other. The scarcity of research in this area is the result of the difficulty in distinguishing empirically between knowledge and performance, which requires an elicitation task that can tease out the performance variable. Recently, there has been a growing interest in the use of grammaticality judgments, with the claim that they provide at least an indirect access to one's underlying knowledge of the TL.

4.2.3.1 Grammaticality Judgement in IL Research

Contrary to Selinker's (1972) explicit statement that production data from meaningful performance situations is the only useful observable data for IL analysis, Corder (1981) argues that any study of the learner's language must attempt to describe the autonomous competence of the learner's language. As he notes,

> 'If what we are describing, following Chomsky, in his (the learner's) grammatical competence, then we must also accept that he will have "intuitions" about the grammaticality of his language which are potentially investigatable....We need therefore in the investigation of the learner's language to supplement textual data by intuitional data and devise systematic methods of investigating these.'
>
> (Corder 1981:59)

If a learner is a native speaker of his own autonomous IL, the elicitation of intuitional data via grammaticality judgments reveals not only the learner's knowledge of L2, but more importantly, his own IL grammars and the ways in which they are organised (Gass 1983).

Nevertheless, the adoption of grammaticality judgments as a reliable elicitation technique is controversial and concern has been raised with respect to some methodological considerations, especially the time condition, and the appropriateness of the different kinds of judgment scales (Chaudron 1983, Sorace 1986).

4.2.3.2 IL Knowledge and Use : An Empirical Account

Bialystok (1982) compared a group of advanced learners' performance on a grammaticality judgement task with an oral communication task and a written correction task in order to compare the use of analysed and unanalysed knowledge along the cognitive control dimension. Grammaticality judgments were elicited in an aural and written mode, each of which was also broken down into three subtests according to the level of grammatical details required (i.e. providing judgments, locating and correcting errors). In general, significant correlations were found among tasks which required analysed knowledge, but tasks presumably based on unanalysed knowledge acted independently since they were found not to correlate with tasks which required analysed knowledge. Moreover, she found that the syntactic accuracy and contextual appropriate scores of the oral communication task did not correlate with any of the grammatical judgment tasks.

Hulstijn and Hulstijn (1984) investigated the effect of time pressure, attention to form, and metalinguistic knowledge on the accuracy with which inversion and verb-end were performed in L2 Dutch, keeping the discourse (story retelling) constant. Results showed that time pressure had no effect on grammatical accuracy whereas attention to form led to greater accuracy with which the two rules were realised. Results from a rule verbalisation test indicated that subjects with explicit knowledge performed better than those without in each of the four task conditions (i.e. ± time, ± attention to form) but no significant

differences were found when the condition was -time and +attention to form between subjects with and without explicit knowledge, suggesting that learners without explicit knowledge did not benefit less than those with explicit knowledge in this condition.

Tarone (1985) hypothesises that as attention to form increases, so does the level of accuracy of the forms achieved by the learner. In her experiment, she asked the subjects to make grammaticality judgments on four grammatical forms, the results of which were compared with those from an informal interview, a picture description task and a picture narration task. Her hypothesis was not entirely confirmed. She found that SL learners treated different grammatical forms differently under identical style-shifting conditions. Plural morpheme -s showed similar accuracy in all task conditions, but third person singular was found to improve with attention to form. Quite surprisingly, the accuracy scores of articles and direct object pronoun 'it' significantly decreased in tasks which required the most attention, as in grammaticality judgments, but increased in the oral narration task. These findings are important for our investigation of IL variability, that is, attention to speech may not be the sole causal variable in IL style-shifting. Discourse characteristics may also influence the subjects' performance on these forms, especially those which bear high function-form relationships.

Griggs (1986) also attempted to study the effect of rule knowledge, task and time on the subjects' performance on three structures: plural-s, articles, and relative pronoun markers. Five tasks were administered: an oral imitation task with and without repetition of stimulus, a dictation, a grammar correction task and a rule verbalisation task. From the results, he found that time is a significant factor in determining the degree of success in the two imitation tasks. Explicit rule knowledge did not bear any significance in the subjects' performance in other task situations, nor did the grammar correction task. Similar to the results of Tarone (1985), the accuracy scores of articles and relative pronoun markers were the lowest with the grammar correction task but the highest with plural -s. How-

ever, Griggs attributes this difference to the ease and difficulty of these three structures under investigation. As he says,'different types of processing for different rules may work in unison with task to exhibit variability' (Griggs 1986).

Sorace (1985) is the only study which takes into account the effect of acquiring a SL (Italian) in a foreign language environment on IL variability of knowledge and use. In her study, she traced the evolution of the learner's metalinguistic knowledge on six grammatical structures of Italian, and how it bore on his production in an oral picture description task and an informal conversation. Contrary to the findings mentioned above, she found a significant and positive correlation between the non-beginners' performance on the judgement test and the two oral tasks; whereas a non-significant but negative correlation was found with beginners. In other words, there is a growing consistency between the development of metalinguistic knowledge and performance; and this consistency is directly proportional to the development of IL competence.

4.2.3.3 Interim Discussion

Viewed from the perspective of variability in terms of the development of IL competence and performance, results from the handful of studies presented above are rather inconclusive; partly due to the lack of comparability between studies, but more importantly, it is the problem of defining a task which taps learners' underlying competence that leads to the difficulty of drawing an adequate and plausible conclusion on this issue.

All studies mentioned above rely on written grammaticality judgments, or simply rule verbalisation, as the source of information in determining the state of the learner's IL competence; with the exception of Bialystok (1982) in which aural grammaticality judgments were also included to counterbalance the effect of the difference in modality on performance, i.e. aural as against written. As a consequence, the metalinguistic knowledge thus elicited represents a diverse range of explicitness and those studies which rely mainly on articulated knowledge have to be treated with caution, if we accept Bialystok's argument that articulated knowledge is a late attainment, representing

a specialised form of knowledge made possible only by a greater awareness of analysed knowledge.

Griggs' study is difficult to interpret because the nature of the production tasks he used (imitation and dictation) is rather ambiguous, since they essentially require reproduction of comprehended strings of sentences, perhaps requiring also a greater degree of memory capacity. As a result, it is difficult to compare the subjects' performance on rule knowledge (articulated knowledge in his sense of the term) with these tasks. Tarone's study is not strictly about the relationship between IL knowledge and use (for one of the tenets of her thesis is that knowledge and use are almost inseparable and performance directly reflects competence); rather, it is about how different task conditions influence the accuracy rates of different grammatical morphemes. She argues ultimately that at least for articles and direct object pronoun 'it', there is no direct relationship between grammatical knowledge and use of it in certain discourse modes. She comes close to suggesting that grammaticality judgments may not be an appropriate technique to tap the learner's underlying competence.

The study reported by Hulstijn and Hulstijn relies on articulated knowledge as the source of information for the learner's competence, but it is interesting to discover that subjects with or without articulated knowledge performed just as well when they paid attention to form in their performance.

Sorace is the only study in which a correlation between metalinguistic knowledge and performance was reported. However, the metalinguistic index presented in her study combines three kinds of scores: judgment, location and correction of errors, and explanation. As a result of the way in which it was designed, it is difficult to compare her results with those mentioned above. Nevertheless, they provide some indications concerning the relationship between metalinguistic knowledge and IL performance at least with foreign language learners. If foreign language learners show a better development of metalinguistic knowledge and rely on it for better performance, there might be a greater chance for metalinguistic knowledge to get internalis-

ed, which can then be retrieved with some degree of automaticity in tasks which demand efficient access to knowledge. Sorace's results suggest that there is such a possibility.

Bialystok's study is complicated, both in design and interpretation. In terms of design, her classification of tasks according to the two qualitative aspects looks confusing. It is difficult to understand why ± automatic were assigned to grammatical accuracy and contextual appropriateness respectively when both aspects were scored within the same oral communication task. Moreover, it was found that correcting errors was easier than locating errors though the latter demands a greater depth of analysis of the TL structures than the former. Despite these problems, this study provides a useful framework in our analysis of IL knowledge and use. Tentative results were put forward whereby transferability of knowledge in IL performance was found when it involved the analysed aspect of IL knowledge, and especially under -automatic condition.

Notwithstanding the rather inconclusive results from these studies, some tentative statements can be made:

(a) Articulated knowledge appears to be independent of language use.

(b) Attention to form is a crucial factor in promoting accuracy in performance.

(c) Tasks requiring analysed knowledge correlated with each other but not with those requiring unanalysed knowledge, suggesting that transferability of knowledge may occur only under specific conditions.

4.3 Integration of the Previous Research into this Study

Based on the review presented so far, we have a case for investigating classroom SL development under two paradigms:

(a) **The Sequence of Development in Classroom Learning Environment** : The empirical review concerning the order of development seems to suggest that the developmental sequence is largely impervious to external environmental influence. At the same time, we have also seen that the order can be manipulated indir-

ectly through instruction, though within limited bounds. Moreover, it is not yet clear whether formal instruction has its effect mainly on the classroom learner's development at the level of knowledge or at the level of use, due to the lack of distinction in previous research between these two dimensions. A corollary issue is whether different classroom learning contexts which signify different characteristics pertaining to that environment would also lead to differences in the developmental sequence on the one hand, and, the variability of IL knowledge and use on the other. Within this framework of investigation, the research questions are:

(1) Do classroom learners display an order of development different from naturalistic learners?

(2) If we made a distinction between competence and performance, would these two orders be the same or different?

(3) If IL variability between knowledge and use is said to be systematic, how does it manifest itself in classroom learners? Would there be a greater discrepancy between knowledge and use with classroom learners? Would the rate of development be faster at the level of knowledge than at the level of use?

(4) Would different classroom learning experiences result in differences in (1), (2) and (3) mentioned above? A related question is whether different learning experiences result in quantitative as well as qualitative differences in IL development, as defined by Bialystok (cf. Chapter three).

(b) **The Effect of Pedagogical Input** : If classroom learning environment is said to promote the development of metalinguistic knowledge, it is important to uncover the effect of it on IL development, particularly when certain classroom context stresses the importance of explicit grammar teaching while others do not.

The research questions within this framework of investigation are:

(1) Are the universal principles as described in Chapter two in operation even though the classroom input is so restricted and yet so 'pure'?

(2) Assuming that the universal principles are operating regardless of differenct learning environments, would metalinguistic knowledge counterbalance the effect of these principles?

(3) What is the relationship between metalinguistic knowledge and other types of knowledge, such as the learner's L1 knowledge, which are also at his disposal in the hypothesis formation process? Would it assist the learner in setting up correct hypotheses, thereby helping him 'skip' some stages in his development of the TL structures, at least at the level of competence? On the contrary, would metalinguistic knowledge hinder IL development to the extent that it slows down the development altogether?

4.3.1 Rationale for the Present Study

4.3.1.1. Drawing an Empirical Distinction between Competence and Performance

For most of the studies discussed in Section 4.2., the reliance on oral data as the sole source of information may only reveal a partial picture of the acquisition process, i.e. acquisition in practice. The discrepancy between knowing and using the TL structures for naturalistic learners may be minimal since they have a greater amount of exposure and practice with the TL. However, the same assumption may not be granted for formal learners, especially for those who do not see the need to use the TL in the wider community. It appears that there may exist a bigger gap between knowing and using the TL in these learners than those who acquire the TL in a naturalistic setting.

Controlling for the mechanisms necessary for production such as using recognition tasks, or adopting production tasks which do not require automatic routines, classroom learners would be able to demonstrate their knowledge more adequately. In other words, we are able to find out to what extent the TL is acquired not only in principle, but also in practice, when they have to demonstrate their knowledge under different task conditions. The production of target-like structures in certain task situa-

tions, though restricted, do reveal that the learner is aware of these structures. It also indicates that he is able to draw on different types of knowledge when faced with the different demands of the tasks.

Bialystok (1981a) hypothesises that learning in a formal environment may result in qualitative differences in L2 competence in that it may be relatively more analysed than that of naturalistic learners as the result of the emphasis on grammatical accuracy in this kind of learning environment. Given that the IL competence of formal learners is more analysed, one may question whether this qualitative aspect promotes SL development.

Bialystok and Sharwood Smith (1985) claim that increasing analyticity does not necessarily imply increasing approximation to the target norms; what is more important, is to allow the learner to apply this knowledge to new contexts of use, or for the development of literacy. In fact, in a formal learning context, literacy skills such as writing and reading abilities may be more adequately developed than speaking abilities. Moreover, development along this dimension may serve as the basis for the development of fluency, by serving as mnemonics during the retrieval process, or to monitor one's performance by 'feel'.

Furthermore, the opportunity to practise with the TL, to produce comprehensible output, is, according to Swain (1985) and Gass (1986), what pushes language development and provides analytic refinement. Following this argument, while the development of analyticity is independent of the automaticity dimension, the availability of practice or language use allows interaction of both dimensions in SL development. In this respect, automaticity may be affected by:

(a) inadequate internalized knowledge - it may be due to the lack of knowledge or the competition between the old and the new forms, as suggested by Bialystok and Sharwood Smith (1985).

(b) inadequate procedural knowledge - certain performance routines have not been developed for L2 production.

In broad pedagogical terms, if 'fluency' and 'accuracy' are regarded as two independent but related components of SL proficiency, acquisition of any TL structures should be measured with respect to these two dimensions.

4.3.1.2 The Controversy over the Role of Metalinguistic Input and Metalinguistic Knowledge in SL Development

As mentioned previously, this controversy stems from a confusion in the definition of metalinguistic knowledge. Some researchers like Adjemian (1976) regard metalinguistic knowledge as one's intuitions about his homogeneous competence; on the contrary, Krashen associates metalinguistic knowledge with articulated knowledge of very restricted functions.

This contradiction can be solved and explained in terms of 'level of explicitness'. Sinclair et.al. (1978: 8) suggest that there are different ways of 'classifying phenomena of metalinguistic awareness. Some metalinguistic phenomena 'are at the border of awareness, whereas others are clearly the result of very explicit reflection on language .... The ultimate form of explicitness is what linguists regale us with when they formulate their intuitions concerning the 'structure of grammaticality of sentences in the forms of rules.' Adjemian's and Krashen's definition of metalinguistic knowledge represent two diverse levels of explicitness, consciousness and accessibility, perhaps stored in different forms, and the most explicit form of metalinguistic knowledge would be articulated knowledge, as defined by Bialystok.

Another issue frequently addressed to by SL researchers is whether metalinguistic input in a formal setting has any effective impact on SL development. As we have seen, it is difficult at the present stage to draw a conclusion about this issue. Whether it is facilitative or not, it appears that, to be facilitative, metalinguistic input has to meet certain constraints:

(a) The learner has to be at a sufficient level of cognitive maturity in order to analyse the explicit information about the language structures. It may explain why adults are better learners than children in a formal language class; and,

(b) the learner has to acquire a certain amount of knowledge in order to accept the statements about the target structures and to perceive the underlying regularities. As Bialystok suggests, rarely do learners accept the language statements and convert them into analysed knowledge simultaneously. This process rarely occurs, and if it does, it is possible only for very advanced learners.

The assumption of the above argument is that there may exist a relationship between metalinguistic input and SL development. As we have seen, an increasing number of researchers have begun to speculate the role of metalinguistic input as 'acquisition facilitator' (White 1987a, Rutherford and Sharwood Smith 1985, Sharwood Smith 1981a). Schachter (1986) even overtly pronounces the importance of metalinguistic input. The example she gives is the difference between *'**I made him to go**' and '**I want him to go**'. She argues that unless the input contains metalinguistic information about the difference between these two constructions, the learner would face the dilemma of trying to figure out which inaccurate sentence cannot occur.

4.4 Conclusion

In this chapter, an empirical account with respect to the role of formal instruction on the various aspects of SLA is presented and an alternative framework is proposed in our investigation of classroom SL development. In the last section, the research aims as well as their rationale have been outlined, which provides a framework for the experiment carried out in three different classroom environments identified for the present study. In the following two chapters, the rationale of selecting the target structures is presented, to be followed by a description of the learners' native language as well as the previous research on these structures.

CHAPTER FIVE

THE ENGLISH INTERROGATIVES: THE STRUCTURE TO BE INVESTIGATED

5.0 Introduction

The first part of this chapter presents a grammatical description of the interrogative system of both English, the target language (TL) under study, and Cantonese, the native language (NL) of the classroom learners selected for the present study. In the second part of this chapter, an empirical review of previous research on the acquisition of this structure, first and second, is outlined. The last part of this chapter is about the rationale of choosing this structure and the relevant research questions, derived from the analysis of the target and native language, and from the previous research studies.

5.1 A Grammatical Description of the Interrogative System of English and Cantonese

In general, both English and Cantonese match in their basic word order, in that both use SVO as the order in declarative sentences. Despite this similarity, these two languages utilise different devices for marking questions, which lends support to Li and Thompson's argument that, from a typological point of view, these two languages reflect two diversely different propensities for marking functions with word order (Li and Thompson 1976). According to Thompson (1978), some languages like Chinese utilise predicate-argument order primarily for pragmatic purposes, as in topic-comment sentence organisation, whereas some languages like English essentially make use of word order for grammatical purposes such as signalling questions and exclamations. A more detailed discussion in relation to this functional aspect of the two language systems is found in Chapter 8 when the author attempts to interpret the findings of the present research in this framework.

The discussion below will centre upon three main areas of the interrogative system in both languages:

(a) The types of questions selected in this study:-

English	Cantonese
Yes-No questions	A-not-A questions
WH-questions	Particle questions
Embedded Yes-No questions	WH-questions
	Embedded Yes-No Questions

(b) The grammatical devices for forming these questions,

(c) The semantic functions of these questions.

5.1.1 The Interrogative System of English

5.1.1.1 Yes-No Questions

Rising intonation, according to Quirk et.al. (1985), is the norm for **Yes-No questions**, especially for informal, declarative Yes-No questions. Another grammatical device for marking questions is subject-verb inversion where the operator is placed in the initial position of the sentence before the subject. In this case, it is the whole proposition that is being questioned (Ultan 1978: 223). In sentences where the operator is absent in the verb phrase, a dummy operator 'do' is inserted and placed in sentence initial position. Summing up, the sentence initial operator serve both a pragmatic and syntactic function as a question marker.

5.1.1.2 WH-questions

Another type of interrogative structure is **WH-questions**, usually referred to as 'information questions'. As far as intonation is concerned, Quirk et.al. (1985) reported a survey in which these types of questions are generally found to have falling intonation in sentence final position; but Jespersen (1961) claims that the rising tone is usually concentrated on the Wh-words.

As in Yes-No questions, the emphatic nature of the sentence initial position attracts the wh-element (i.e. the clause element containing the wh-words) to this position and the wh-words takes the initial position in the wh-element. If the wh-element takes the subject position in the sentence, no inversion is

necessary, e.g.

(1) Who drank my soup?

If the wh-element is not the subject but the object, complement or adjunct of the sentence, the operator is placed before the subject. e.g.

(2) What can she paint?

As with Yes-No questions, the absence of an operator in the verb phrase requires the insertion of a dummy operator 'do' before the subject.

(3) Why does she play tennis everyday?

5.1.1.3 Embedded Questions

According to Jespersen (1933), when a question is made into a dependent member of a sentence, an embedded interrogative clause is formed. Such transformation requires the question to undergo certain grammatical changes:

(a) Person, and sometimes tense, are shifted.
(b) The word order is changed i.e. VSO --> SVO
(c) The dummy operator 'do' is not required.

Unlike embedded wh-questions, the subordinate Yes-No interrogative clause is usually introduced by 'whether' or 'if' as a connective (Quirk et al. 1985), e.g.

(5a) I ask her, 'Can you help me?'
(5b) I ask her if she can help me.

Nevertheless, 'if' outstrips 'whether' in frequency as a connective for embedded questions, partly because of the fact that 'whether' seems to be a little higher up the scale of formality than 'if', and partly because of the difference in the meaning of questioning carried by these two connectives. According to Bolinger (1978), 'if' is tilted towards the interrogative, and the less there is about an utterance that suggests a question, the more likely for 'whether' to be used as a connective.

5.1.1.4 Semantic Functions of the English Interrogatives

Lyons (1977) claims that one of the felicity conditions attaching to appropriate utterance of questions is that the speaker should not know the answer to his questions, and he necessarily assumes that his addressee knows the answer. The association between the utterance of a question and the expectation of an answer from the addressee is independent of the illocutionary force of questions.

Huddleston (1971) categorises Yes-No questions as 'polar disjunctives' because the disjuncts differ only as to positive or negative polarity. Quirk et.al. (1985) also state that the response elicited may either be affirmation or negation to the question. Nevertheless, some Yes-No questions are conducive in the sense that they bias towards confirmation or negation as the response to the question. In the present study, only the neutral Yes-No questions are selected, which refer to those that the speaker assumes no biased presupposition as to the type of response it should be.

Jespersen (1933) regards wh-questions as X-questions. As he points out, in X-questions, we have 'an unknown quantity X' and 'the linguistic expression for this X is an interrogative pronoun or pronominal adverb' (1933:305). In terms of meaning, wh-questions seek information via the use of wh-words and they may be matched with a statement called its 'presuppositions' which contains an indefinite expression such as someone, somewhere ... etc. Also, this presupposition is assumed to be true by the speaker. The wh-words are the interrogative substitutes for nouns and a number of adverbials denoting requests for locality, temporality, identity, purpose or causality.

Lyons is of the opinion that both yes-no and wh-questions contain an 'unknown quantity', or a variable to which a value is given by the addressee. Yes-no questions contain a two-valued variable (ie affirmation or negation), while wh-questions contain more than one value, which presupposes the disjunction of a set of propositions (Lyons 1977:758). In other words, a wh-question is potentially an open-ended question, allowing a range of possibilities in a given context for the response.

Embedded Yes-no questions are semantically similar to simple yes-no questions in that they leave a gap of unknown information, represented by an embedded yes-no interrogative clause initiated by 'whether' or 'if'. Curme (1931:212) argues that there should be a distinction between embedded questions (i.e. to ask or report a question indirectly) and those sentences which simply involve the embedding of an interrogative clause, as in the case of certain 'whether' clauses discussed above:

(6) I'm studying whether I should follow this line of argument.

In the present study, those questions which realise the semantic notion of asking a question indirectly are selected, such as:

(7) I'd like to know if you can do me a favour.

From the perspective of functional grammar as discussed in Halliday (1985:56), where the **Topical Theme** takes the first position in a sentence and serves as the point of departure of the message, in yes-no questions, the operator functions as topical theme which embodies the expression of polarity in questioning. In wh-questions, it is the WH-element that functions as topical theme. As for embedded yes-no questions, the phrase 'I'd like to know' as in (7) above functions as a topical theme, followed by another theme 'if you'.

5.1.2 The Interrogative System of Cantonese

Cantonese is one of the dialects of Chinese. It is spoken in Hong Kong as well as in Guangzhou, one of the southern provinces of China. Despite certain dialectal differences in lexical realisations, the interrogative system of both Cantonese and Mandarin Chinese is virtually similar.

Elliott (1965) categorises the interrogative system of Chinese into five types: **Disjunctive (A-or-B, A-not-A) questions, Tag questions, Particle questions, wh-questions** and **embedded questions**, covering the range of semantic functions as described in the section above. For Cantonese, yes-no questions can be realised in either disjunctive A-not-A questions as well as parti-

cle questions. A characteristic of the interrogative system of Cantonese, as we shall see, is that these constructions do not involve a change of word order.

5.1.2.1 Disjunctive Questions

Although Chao (1947) and Elliott (1965) make a distinction between A-or-B and A-not-A questions, these two types of questions are structurally similar and differ only in the number of options from which a choice is made. Cheng (1984) and Li and Thompson (1981) argue that A-or-B questions refer directly to two or more things, persons, or events that form a class from which a selection is to be made; whereas A-not-A questions refer to the juxtaposing of the positive and negative form of the same class from which a selection is made.

In the following discussion, we will concentrate on the formation of A-not-A questions, which are equivalent to Yes-No questions in English.

5.1.2.1.1 Formation of A-not-A Questions

The formation of A-not-A questions depends on which proposition in the declarative statement is being questioned and then juxtaposing the positive and the negative counterpart of its corresponding grammatical constituent, thereby signalling the semantic polarity entailed in yes-no questions. The grammatical device, as such, requires no change of word order because the A-not-A constituent is placed in exactly the same position as where the proposition in question is organised in the information unit. Example (8) below presents the declarative and its interrogative counterparts:

(a) **Adjective-Not-Adjective**
Declarative:

(8a) 佢 高 。 <He is tall.>
3sg tall

Interrogative:

(8b) 佢 高 唔 高 ？ <Is he tall?>
3sg tall-NOT-tall

Answer: (佢) 高 。 or (佢) 唔 高 。 <Yes, he is.> or
(3sg) tall (3sg) not tall <No, he isn't.>

(b) **Adverb-Not-Adverb**

(9) 佢地做 得 快 唔 快? <Are they working fast?>
they do particle fast-not-fast

Answer: 快。 or 唔 快。 <Yes, they are> or
fast not-fast <No, they aren't>

(c) **Verb-Not-Verb**

(10) 你 飲 唔 飲 茶? <Do you drink tea?>
you drink-not-drink tea

Answer: 飲 or 唔 飲。 <Yes, I do.> or
drink not-drink <No, I don't.>

(d) **Be-Not-Be**

(11) 呢 支 筆 是唔是 陳 生? <Is that pen
that classifier pen is-not-is Chan Mr. Mr.Chan's?>

Answer: 係。 or 唔 係。 <Yes, it is.> or
is not-is <No, it isn't.>

(e) **Modal-Not-Modal**

(12) 你 可 唔 可以 等? <Can you wait?>
you can-not-can wait

Answer: 可以。 or 唔 可以。 <Yes, I can.> or
can not can <No, I can't.>

(f) **Have-Not-Have**

'Have' follows a slightly different pattern but the principle of disjunction is still observed.

(i) **Possessive**

(13) 佢 有 冇 呢 本 書? <Has he got
3sg have not-have this classifier book this book?>

Answer: 有。 or 冇。 <Yes, he has.> or
have not-have <No,he hasn't>

(ii) **Perfective marker**

The negative value is indicated by the question particle **/mei/**.

(14) 你 買 咗 支 筆 未？ <Have you bought the pen yet?>
you buy perfect. marker classifier pen Q-part. /mei/

Answer: 買 咗 . or 未 . <Yes, I have> or <not yet>
buy perfect. marker /mei/

5.1.2.1.2 Particle Questions

The second type of yes-no questions in Cantonese are the particle questions which are structurally the least complex of all question types. What signals a question is the presence of a sentence final question particle:

(15) 你 去 嘛？ <Are you going?>
You go ma[5]

Answer: 去 . or 唔 去 . <Yes, I am.> or <No, I'm not>
go not-go

Table 5.1: Distribution of the Question Particles in the Various Types of Sentences

Q-particle	Exclusive to basic sentence	Co-occurrence		Tone	
		wh-words	A-Not-A	Neutral	Biased
/ma5/ 嘛	x			x	
/me1/ 咩	x				x
/ne1/ 呢		x	x	x	x
/a5/ 呀	x	x	x	x	
/na4/ 喱	x				x
/ge3/ 嘅		x		x	
/lei4/ 嚟		x		x	
/ga3/ 喫	x	x	x	x	x

From the table above, we can see that while some question particles such as 嘛 /ma[5]/ function exclusively as a question marker, some others can function alone or co-occur with other interrogative devices like wh-words or A-Not-A constructions:

(16) 你 返 唔 返 学 呀? <Are you going to school?>
you return-not-return school a

Answer: 返。 or 唔 返。 <Yes, I am> or
return not-return <No, I'm not>

As both A-not-A and particle questions are equivalent to yes-no questions in English, it is important to distinguish in what contexts a particular form is used. Li and Thompson (1981) provide a general outline about the use of these two types of questions. A-not-A questions are used only in a neutral context whereas particle questions are used in either a neutral or a non-neutral (biased) context. A neutral context is one in which the speaker has no presupposition concerning the proposition being questioned. Some particle questions may be conducive in the sense that the speaker has already assumed either the truth or falsity of the proposition. For instance, the use of 咩 (**me1**) in (17) indicates that the speaker casts doubt on the fact that the addressee is going to the cinema.

(17) 你 去 睇 戲 咩 <Aren't you going to the cinema?>
you go watch film **me1**

5.1.2.2 Wh-questions

In general, Cantonese consists of a set of wh-words which also find their equivalents in English. The set of wh-lexemes, 边 **/bin1/**, 乜 **/mʌt7/**, 幾 **/gei2/** and 點 **/dim2/**, when serving as the first word of the wh-elements, like '边度' (literally, 'which place'), always indicate a question. Moreover, the type of reference sought is usually implied by the second word of the wh-element. For instance, '樣' in '點樣' (how) requires the addressee to describe the manner or appearance of a certain state of affair, whereas '點' in '點解' (why) requires the addressee to provide an explanation. The following table summarises the functions of the wh-words in Cantonese.

Table 5.2 Classification of wh-words

Types of Wh-word		Reference	Grammatical Functions:
Chinese	English		
A. /bin1/ 邊			
邊 個 /bin1/ classifier	which, who, whom	personal	subject and object pronouns
邊 個 嘅 /bin1/ class- poss. ifier marker	whose	personal	determiner
邊 (本) (書) /bin1/ class- noun ifier	which	event/ impersonal	determiner
邊 度 /bin1/ place	where	place	pro-form for adjuncts
B. /m^t7/ 乜			
乜 嘢 /m^t7/ thing	what	event/ imperson	subject and object pronouns
C. /dim2/ 點			
點 樣 /dim2/ manner/state	how	manner	pro-form for adjuncts
點 解 /dim2/ explain	why	reason	
D. /gei2/ 幾			
幾 時 /gei2/ time	when	time	pro-form for adjuncts
幾 點 /gei2/ hour	what time	time	
幾 (短) /gei2/ (short)	How short	grad- ability	complements

5.1.2.2.1 Formation of wh-questions

Basically, wh-questions are formed by replacing the interrogated grammatical constituent in the corresponding declarative sentence by a wh-pronoun.

(a) **As Subject**

(18) 邊個 攞 咗 我 支 筆 <Who took my pen?>
Who take past my class. pen
marker

Answer: 李生 攞 咗 你 支 筆 <Mr. Lee took your pen.>
Lee Mr take past you class. pen
marker

(19) 乜嘢係 圓 呀？ <What is round in shape?>
What is round Q-particle

Answer: 個 波 係 圓。 <A ball is round.>
Classifier ball is round

(b) **As Indirect Object**

(20) 你 俾 咗 個 橙 邊個？<Who did you give
You give past classifier orange who the orange to?>
marker

Answer: 我 俾 咗 個 橙 個 細路。
I give past classifier orange classifier boy
marker
<I gave the orange to a boy.>

(ii) **As Direct Object**

(21) 你 俾 咗 乜嘢 個 細路？<What did you give
You give past what classifier boy the boy?)
marker

Answer: 我 俾 咗 個 橙 個 細路。
I give past classifier orange classifier boy
marker
<I gave an orange to the boy.>

(c) **As Determiner**

(22) 邊 本 書 易？ <Which book is easy?>
Which classifier book easy

Answer: 呢 本 書 易。 <This one is easy.>
This classifier book easy

(23) 瑪琍 借 咗 邊個 架車？<Whose car did Mary
Mary borrow pass whose car borrow?>
marker

Answer: 瑪琍 借 咗 珍 架 車。 <Mary borrowed
Mary borrow pass Jane poss. car. Jane's car.>
marker marker

(d) **As Complement**

(24) 本 書 幾 厚 呀 ? <How thick is the book?>
classifier book how thick Q-particle

Answer: 本 書 三 寸 厚 <The book is three inches thick.>
classifier book 3 inch thick

(e) **As Adjunct**

(25) 佢地幾時返 学? <When do they go to school?>
They when go school

Answer: 佢地礼拜一返 学。 <They go to school on Monday.>
They Monday go school

(26) 陳 生點樣返 工? <How does Mr. Chan go to work?>
Chan Mr how go work

Answer: 陳 生 搭 巴士 返 工。 <Mr. Chan goes to work by bus.>
Chan Mr take bus go work

(27) 你 去 邊度? <Where are you going?>
You go where

Answer: 我 去 睇 戲。 <I'm going to see a film.>
I go see film

(28) 點解 瑪利 喊? <Why is Mary crying?>
why Mary cry

Answer: 佢 喊 因為 佢 測驗 肥 咗。
She cry because she test fail perfective marker
<She is crying because she has failed the test.>

As seen from the above examples, the position of the Wh-words is guided by pragmatic principles, namely, they are placed where the information is required in the corresponding declarative sentence; as such, the word order of the interrogative and declarative sentences remains essentially the same. Within this framework, it should be mentioned that the position of those wh-words which assume the status of pronoun or determiner is fairly predictable because it is constrained by the SVO order. On the other hand, the wh-adverbials can be placed either in the initial position of the sentence, after the subject, or after the verb. Another position is after the topic of the sentence, as defined by the topic-comment organisation, and in this case, the wh-adverbial is usually preceded, or joined to

the topic by the verb 'is'. For instance,

(29) 彼得 返 屋企 係 幾時？ <When did Peter return home?>
Peter return home is <u>when</u>
< topic > < comment >

Answer: 佢 返 屋企 係 六月。 <He returned home in June.>
3rg return home is <u>June</u>

(30) 你 攞 佢 個 公仔 係 乜？ <Why did you take her doll?>
you take she class.doll is <u>why</u>
< topic > < comment >

Answer: 我 攞 佢個公仔 係 因為 個 公仔 好 靚。
I take she doll is <u>because class. doll very beautiful</u>
<I took his doll because it is beautiful.>

5.1.2.3 <u>EmbeddedYes-No Questions</u>

In a similar way to English, embedded yes-no questions are formed by embedding the subordinate A-Not-A interrogative clause after the main clause.

(31) 我 想 知 你 去 唔 去 睇 戲
I want know you go-not-go see film.
<I want to know whether you are going to see a film.>

(32) 我 想 知 佢 可 唔 可以 唱歌
I want know he can-not-can sing.
<I want to know if he can sing.>

As one can see, this embedding process involves few changes. Furthermore, embedding an interrogative clause to the main clause does not involve any connectives. In reported speech, embedded yes-no questions may require a change of person or dexis in the determiner.

In Cantonese, particle questions cannot be embedded to form embedded questions. As Li and Thompson (1981) point out, the question particle, being sentence final, signals how the entire utterance to which it is attached is to be taken and answered by the addressee. Therefore, as embedded questions may have the pragmatic function of reporting a question asked by the speaker, tagging a question particle after an embedded question is unacceptable in Cantonese, for instance:

(33) 瑪琍問 珍：「你 去 睇 戲 咩？」
Mary ask Jane: You go see film Q-particle.
<Mary ask Jane,'Aren't you going to see a film?>

*(34) 瑪琍問 珍 佢 去 睇 戲 咩
Mary ask Jane she go see film Q-particle.
<Mary ask Mary if she isn't going to see a film.>

5.1.3 Interim Discussion

As described above, both English and Cantonese are seen to exploit different devices to signal questions. Structurally, English exploits word order to mark questions while Cantonese does not. In English, the wh-elements are consistently preposed in questions. It also requires a set of Q-operators for inversion and the change of word order is manifested primarily by inverting the Q-operator before the subject in simple questions and vice versa in embedded yes-no questions. In the case of embedded Do-questions, it is deleted. In fact, subject-verb inversion which changes SVO to VSO order is found to be an uncommon interrogative device. Inversion in Yes-No questions, according to Ultan (1978) occurs in only seven out of thirty eight languages in his survey. In other words, inverted Yes-No questions are more 'marked' than uninverted Yes-No questions.

On the other hand, Cantonese follows a declarative word order in both statements and questions and makes use of the existing grammatical constituents in the sentence such as adjectives, verbs...etc to form a question without changing their position in the sentence; as such, functionally, the topic-comment organisation is maintained and the interrogated element can be any element as described in the previous sections in either the topic or the comment unit.

This way of organising information in questions in Cantonese is different from that in English. As for English, preposing the Q-operator in yes-no questions or the wh-element in wh-questions establishes a thematised topic as a request for new information; in other words, requests for new information always precede old information in simple questions in English. In Cantonese, they are structurally embedded in either the topic or the comment unit.

Seen in this light, it is interesting to find that in English, it is in fact the MOOD (and ILLOCUTIONARY FORCE) which takes priority over PROPOSITIONAL CONTENT in determining word order in English while it is propositional content that dominates over mood in Cantonese.

Prosodically, although intonation is found to be common among a number of languages, it seems that it is less significant in interrogation in Cantonese. It is less common to signal a declarative question by rising intonation; rather, declarative questions are usually attached by a sentence final question particle. Since Cantonese is a tonal language (ie a change of tone will lead to a different lexical realisation), the use of rising intonation at the end of the utterance is restricted as it may lead to a change in the meaning of the lexical items.

5.1.4 Interim Conclusion

In the section above, we have presented a grammatical description of the interrogative system of both English and Cantonese and discussed some differences in terms of their structural properties and organisation of information. From the perspective of SLA, it would be interesting to find out how Cantonese learners of English reorientate their knowledge of forming questions when the TL involves certain properties, both structural and discoursal, which are rather different from their NL. In the following section, an empirical account of the acquisition studies of this structure is presented, the results of which provide a baseline with which we can compare the performance of the Cantonese learners on this structure.

5.2 Acquisition Studies of the English Interrogatives: An Empirical Account

The acquisition of the interrogative system, first and second, has been well researched and a majority of them involve longitudinal observation of a small number of learners in a naturalistic setting, with the aim of discovering whether L2 learners follow similar learning strategies, or stages as those found in L1 learners. The following review will concentrate mainly on the acquisition of interrogation in English but, where appropriate, references from acquisition studies other than English

will be brought into the discussion.

5.2.1 L1 Acquisition of the English Interrogatives

The following description is based on the studies of Klima and Bellugi (1966) and Brown (1968). These studies attempt to capture the syntactic regularities of child language development by means of grammatical phrase structure and transformation rules, which are said to reflect the child's developing competence.

Klima and Bellugi (1966) distinguish three stages of development:-

Period I	**Examples**
Both yes-no and wh-questions are found. The yes-No questions are solely marked by intonation. There is no inversion, no auxiliary and do-insertion in both types of question.	Fraser water? ball go? see hole? What that? Where milk go?
Period II	
Yes-No questions are still marked by intonation, inversion does not appear in either types of questions.	see my doggie? This can't write a flower? Where my mitten? Why not he eat?
Period III	
Inversion appears in Yes-No questions but not in wh-questions.	Did I caught it? Will you help me? What he can ride in? Why Kitty can't stand up?

Klima and Bellugi's three distinctive developmental stages have been criticised for being too general. The transition from the primitive question forms signalled only by intonation in Period I and II to the advanced target-like inverted questions in Period III seems to be rather abrupt. As inversion involves not only the subject, but also the verb, the appearance of either the auxiliary, modal or main verb is important in determining the developmental phenomenon of inversion. Unfortunately, Klima and Bellugi's study provides no account of inversion in

these three linguistic contexts.

Brown (1968) remarks that the early wh-words that emerge are WHAT and WHERE; and that, when acquired, they are already preposed. This finding contradicts Brown's prediction that they should first appear within the sentence in positions according to phrase structure rules.

Tyack and Ingram (1976) examined the production and comprehension of questions by children aged between 24 to 47 months. From the findings, they reported a rough chronological order of acquisition: WHAT, WHERE, WHY, HOW and WHEN.

At this point, it is worthwhile mentioning the findings of the Kiel project carried out in Germany. These studies concern L1 acquisition of interrogation in German. Felix (1980) argues that there may be an early stage in which L1 learners construct wh-questions without a wh-pronoun by modelling after yes-no questions to encode information questions. Moreover, the occurrence of a certain wh-pronoun depends not only on cognitive development, but more importantly, on the formal syntactic properties of the sentences in which it occurs. For instance, 'wo' (where) and 'was' (what) were found in his study to appear first in copular sentences while main verb wh-questions are consistently marked by the non-occurrence of wh-words. The same phenomenon occurred in the learner's application of SV-inversion in wh-questions. Wh-questions without a wh-pronoun were inverted earlier than those with a wh-pronoun.

Wode (1975) tackles L1 acquisition of interrogation in German with a more detailed framework. Apart from tracing the sequence of emergence of wh-words, he also attempts to establish a developmental continuum of interrogation in German. Unlike Klima and Bellugi (1966), Wode asserts that there is an early holophrastic stage marked by one-word intonation yes-no and wh-questions. When tracing the emergence of the auxiliary and the main verb in the learner's speech, he discovered that the auxiliary appeared earlier than the main verb in wh-questions. Like Felix (1980), he discovered a stage in which wh-questions were modelled after yes-no questions and the appearance of the verb

system was accompanied later by target-like placement of the verbs which involved SV-inversion. However, Wode claims that there is no clear evidence to support the previous finding that inversion appears in yes-no questions before wh-questions.

5.2.2 L2 Acquisition of the English Interrogatives in a Naturalistic Setting

Most of the studies reported here address the issue of whether a learner acquiring a second language would go through a developmental sequence similar to that found in first language acquisition. Also, a majority of them are based on longitudinal observation, collecting data from spontaneous speech. The following review is divided into two sections: (a) Simple questions, and (b)Embedded questions.

5.2.2.1 Overall Sequence of Development

There are quite a few studies attempting to investigate the developmental sequence of the English interrogatives by second language learners (Ravem 1974,1978; Wode 1978; Huang and Hatch 1978; Cancino et. al. 1975; Butterworth and Hatch 1974; Adams 1978; Zobl 1980à, 1982). From these studies, it appears that, despite certain differences, L2 learners from a variety of different L1 backgrounds who acquire this structure in a naturalistic setting do progress in a similar though not identical fashion to L1 learners. The overall sequence of development may be described as follows:-

(1) Intonation and uninverted yes-no questions are first utilised for questioning purposes. Wh-questions first appear as uninverted.

(2) Subject-Verb Inversion appears first in copular and modal sentences of both yes-no and wh-questions.

(3) Do-insertion in main verb sentences; it may or may not be inverted.

(4) Embedded questions begin to occur.

Nevertheless, this progression cannot be interpreted as absolute stages of development every learner must go through because the empirical studies also reveal a great deal of variation within each stage and overlap between stages. This variation may be

due to individual differences (since most of them are longitudinal studies involving one or two subjects), or L1 influences. In the following discussion, the various acquisitional aspects of the English interrogatives are discussed.

5.2.2.2. The Development of Simple Questions

5.2.2.2.1 Developmental order of wh-words

Earlier reports, as mentioned in Section 5.2.1, on the order of development of wh-words acquired by English L1 learners suggest that WHAT and WHERE are by far the most frequent and are acquired early, WHEN and HOW are acquired rather late; varying in between are WHO and WHY. An order similar to that established in L1 studies is found in L2 learners of English, French and German, confirming that the acquisition of wh-words is not random but systematic.

As far as the acquisition of the semantic distinctions of wh-words is concerned, L1 and L2 learners tend to overgeneralise the early acquired wh-words to encode a wider range of wh-questions. Although the universalists claim that this similar pattern reflects a certain universal acquisition process, it seems that this process can only be explained adequately if a distinction is drawn between the difference in the cognitive development of both types of learners. It is reasonable to assume that the emergence of the wh-words denoting locality, identity, temporality or modality among L1 learners is to some extent determined by their cognitive maturational process. However, there may be a bigger gap between the cognitive and the linguistic development of L2 learners when compared with L1 learners. This relatively bigger gap results in deviation which seems to differ from L1 regularities.

Both Wode (1978) and Felix (1978) reported that while L1 learners of German over-generalise WO (where) to WOHIN (where to) and WOHER (where from), L2 learners of German extended WO to include other semantically diverse contexts like WANN (when), WARUM (why) or WIE (how). In other words, though the same strategy of over-generalization is used, L2 learners do not overgeneralise in the same way as L1 learners.

Lightbown (1979) claims that L2 learners simply have more to

say than forms for saying it. This need for communication may force them to stretch their old forms further than L1 learners do. Nevertheless, Lightbown suggests that this similar developmental sequence is a result of the sequence of wh-words addressed to the learner. In her study, she found that the relative frequency of different wh-words produced by the teacher closely followed the order of emergence and overall frequency of wh-words produced by her learners of French, suggesting that teachers did intuitively adjust the sequence of presentation according to the semantic complexity the wh-words entail. The effect of input on the development of Wh-words was also reported by Huang and Hatch (1978) in which their subject learned WHAT, WHERE and WHOSE by first imitating these questions addressed to him frequently during the initial stage of learning.

5.2.2.2.2 Development of Wh-preposing

As far as this aspect of development is concerned, most studies confirm Brown's results that wh-words are not placed within the sentence as a constituent in the underlying phrase structure, rather, they are already preposed when they appear in the sentence. Ravem (1974) claims that transformational grammar in this way fails to capture the psychological reality of language acquisition because there is little evidence so far which confirms this stage of development. This early target usage of preposed wh-words may be due to their structural saliency since they are consistently placed initially in the sentence. However, an exception was found with Butterworth and Hatch's subject, a Spanish learner who produced samples like **He is who?**, with primary stress as in echo questions.

5.2.2.2.3 Development of Subject-Verb Inversion

Another feature which marks a question in English is subject-verb inversion. It is also with this feature that a great deal of variation is found among the studies. The overall sequence of development is that uninverted questions precede inverted questions. Some studies like Ravem (1974), Zobl (1980a), and Adams (1978) found that inversion appeared first in yes-no questions and was later extended to wh-questions, which is similar to the L1 findings reported in Klima and Bellugi's (1966).

Hyltenstam (1978) claims that inversion is first found in auxiliary and is gradually extended to main verb. Nevertheless, Wode (1978) and Cancino et. al. (1978) argue that there is no clear evidence to suggest such a sequence of development. Wode's data shows that inversion occurs in both types of questions at the same time of acquisition and inversion might even appear earlier in wh-questions. Cancino et. al. claim that some of the seemingly inverted elements like 'Do you' or 'Can you' may in fact be unanalysed chunks.

In fact, the acquisition of inversion seems to depend on the inherent structural properties of the TL. Zobl (1980a) claims that the syntactic environment of the TL is also a determining factor governing language acquisition since inversion is not instantaneously acquired and applied to all sentence types. In his study, inversion appears first in copula sentences with a pronoun subject and is later extended to main verb sentences.

Evidence is also found in acquisition studies of other target languages where inversion is necessary. Felix (1977) found his learners of German to be able to subcategorise the verb system into the auxiliary and the main verb, and they selectively applied inversion to auxiliary but not to main verbs. Other studies also provide evidence that the copula environment attracts the development of inversion earlier than the main verb environment (Nicholas 1985, Hyltenstam 1985). Hammarberg (1985) claims that inversion seems to be acquired more easily in Swedish yes-no questions than inversion in either wh-questions or embedded questions. He suggests that inversion in yes-no questions carries greater communicative value, unlike that in the minor clauses in Swedish, in which inversion serves only as a grammatical marker. In line with Zobl's finding, these studies point to the innovative role of inversion in yes-no questions as first suggested by Klima and Bellugi (1966).

Another source of variation with respect to inversion may be attributable to L1 influence. Ravem (1974) argues that similarity between L1 and L2 may either facilitate or slow down the learner's IL development. His Norwegian subjects' reliance on L1 knowledge of inversion led to the co-occurrence of inverted

yes-no questions and intonation questions, thus almost skipping the non-inversion stage.

However, some studies in which the learner's L1 allows main verb inversion like ***Climb you the tree?** found samples which reflect this influence (Ravem 1974, Wode 1978, Zobl 1982, Adams 1978). Based on this finding, Zobl claims that 'transfer' follows certain regularities and it is not in opposition to the 'creative construction process', but 'part of it'. The formal properties of the L2, in this case, subject-verb inversion, apart from controlling the developmental aspect of its acquisition, figures as well in the selective activation of L1 transfer. Nevertheless, Zobl further argues that such transfer errors are part of the developmental process because the learner combines L2 dependent rule construction and L1 influence. Moreover, these types of errors tend to be recalcitrant to restructuring and may slow down the pace of development.

Interestingly enough, Lightbown's English subjects acquiring the French interrogatives did not produce subject main verb inversion because English does not allow such inversion and they have not yet realized that French does (Lightbown 1979).

5.2.2.2.4 Development of Do-insertion

Do-insertion is found to be acquired late in most of the studies because it involves not only the realisation of a dummy operator but also the inversion of it before the subject. The complexity of this development leads to a confusion in its usage. Zobl (1980b) and Wode (1978) found that their learners failed to distinguish the function of it as a Q-operator from the auxiliary and the copula, thus producing ungrammatical strings like ***What do you was doing?** (Wode 1978). In Zobl's study, this confusion occurs in questions which involve a nominal subject only, while no such confusion is found in questions which involves pronoun subjects. One possible reason for this confusion is that the learners might perceive it as an obligatory question marker rather than a dummy operator or a tense carrier.

5.2.2.2.5 Use of Unanalysed Chunks

It seems that at the initial stage of learning, L2 learners

approach the task with different strategies. Although Wode (1978) claims that, unlike L1 learners, L2 learners do not seem to go through a holophrastic stage, a number of studies report that learners do use unanalysed chunks. Imitating questions is the main learning and production strategy adopted by Huang's as well as Wagner-Gough's subject (Huang and Hatch 1978, Wagner-Gough 1978). The protracted copula, as in **Where's pen?**, is, according to Huang, initially treated as part of the wh-element, leading to the non-occurrence of the uninverted stage for this type of questions. However, those structures like 'Do You', 'Are you' that the learner never 'chooses' to imitate do undergo subject verb inversion as observed in the L1 developmental sequence. In Wagner-Gough's study, the need for communication may drive the L2 learner to adopt a strategy by juxtaposing the question: **What is it?**, and the response: **This is truck.**, in the formation of his own question, yielding ***What this is truck?**. This incorporation of both the question and response pattern reflects that L2 learners are able to store longer utterances than L1 learners. These findings make one wonder whether Wode's Stage 1 (i.e. wh + copula + subject e.g. What's it?) is in fact a stage of unanalysed chunks rather than inverted wh-questions.

The use of unanalysed inverted forms was also reported by Lightbown (1979, 1980) in which her learners of French tagged **est-ce** (is it) in **qu'est-ce que** questions. However, she argues that her subjects may not have mastered inversion by that stage since most of the other samples maintain a declarative word order. She ascribes this finding to the input addressed to these learners which consists of ample examples of these types of questions.

5.2.2.3 <u>Development of Embedded Questions</u>

Not many studies have dealt with the development of embedded questions, especially embedded yes-no questions. This particular construction is of special interest because it requires that the learner should not apply inversion and do-insertion which are necessary for simple questions.

Dulay and Burt (1977) found that their L2 learners systematically applied subject-verb inversion and do-insertion in embedded

questions, implying that they regularly over-generalised these rules in embedded questions. This finding has been supported by other studies (Adams 1978, Cazden et. al. 1975 and Hakuta 1975), revealing that embedded questions are mastered later than simple questions.

Cancino et. al. (1978) offer a detailed description of the developmental pattern of inversion in embedded questions. They claim that embedded questions first appear in their uninverted form, which are affected later by the learner's over-application of inversion acquired through simple questions. It is not until they are able to distinguish simple questions from embedded questions that they stop applying this rule in embedded questions.

5.2.2.4 Interim Conclusion

To conclude, although there are similarities between L1 and L2 acquisition in a naturalistic setting, the strong L2=L1 hypothesis does not gain support from the findings in these studies because L2 learners do rely on prior L1 knowledge and other cognitive strategies when approaching the learning task. Nevertheless, it is undeniable that there are striking similarities between L1 and L2 acquisition in naturalistic setting in the sense that both L1 and L2 acquisition involve similar transitional stages of development. Wode (1981a) hypothesises that these similarities may be due to a set of 'linguo-cognitive' processing mechanisms which are universal human abilities determining the linguistic progress in terms of the developmental sequence for the linguistic structures. These universal human abilities as suggested by Wode, can be taken to lead to the kinds of mental presentations of a person's competence as postulated by Chomsky.

5.2.3 Simultaneous Acquisition of an L1 and an L2 in a Naturalistic Setting

The study reported here is a longitudinal observation of a Cantonese pre-school child who has just begun to acquire English in a multilingual setting in which English serves as the lingua franca (Kwan 1986).

Certain parallel developments are found between this study and those established in L1 or L2 acquisition studies of the English interrogatives in a naturalistic setting. These characteristics involve the use of unanalysed chunks or formulas, the use of intonation in the initial stage of learning, the occurrence of non-inversion stage before target like inversion takes place and the use of do-insertion for main verb sentences.

Besides these similar findings, Kwan also finds that yes-no questions provide a more favourable context for the development of inversion as well as 'do-insertion' since they both appear earlier in yes-no questions than in wh-questions. In her study, the strategy of imitation and its resultant chunks appear to be an important aspect of the learner's acquisition process, since the first stage of the developmental sequence was found to be marked by a heavy reliance of unanalysed chunks like 'what's..', 'Can you..', and 'Do you..'.

Kwan's study also presents an interesting case of 'cross-linguistic influence' within this simultaneous acquisition process. Unpreposed wh-words, which are rarely found in L1 and L2 acquisition studies, constitute the initial stage of the developmental sequence of wh-questions in English. Errors such as ***'You're going where?'** reflect the corresponding declarative word order in English; and yet it is also a possible rule in the corresponding interrogative sentences in Cantonese. The subsequent preposing of wh-words in English is later over-generalised to Cantonese, whereby her subject produces preposed wh- words in Cantonese questions, yielding ungrammatical questions like " 乜嘢你想買 " (what you want buy?).

To conclude, the Cantonese learner reported in this study seems to follow certain universal processes governing language acquisition. At the same time, it is interesting to find that these

processes do mediate between the learner's knowledge of L1 and L2, leading to influences from either language at different stages of his developmental sequence.

5.2.4 L2 Acquisition of the English Interrogatives in a Classroom Setting

Studies that attempt to investigate whether classroom learners follow the 'natural developmental sequence' are not many. In the following section, three studies will be summarised and discussed in detail.

In Felix's (1981b) study, the first type of questions appear to be marked by copula sentences, rising intonation and a declarative word order, a feature which found no models because the teacher did not once use this structure in the classroom. The second similarity is that inversion is applied first to yes-no questions while wh-questions remained uninverted.

As mentioned in Section 4.2.1.2.2, Felix ascribes these phenomena to the existence of a language specific cognitive module whose abstract and innate principles are specially geared to the acquisition of language. However, Felix claims that, unlike L1 learners, when faced with the pressure of producing accurate questions which involve structures acquired relatively late in naturalistic SLA, tutored L2 learners follow two basic strategies:-

(a) Random selection of any structure from a given repertoire.

(b) Resort to natural acquisition principles. i.e. they follow the rules which characterise the early stages in naturalistic language acquisition.

Ellis (1984b) agrees with Felix that tutored learners do follow at least some of the learning processes as observed in untutored learners. Nevertheless, he comments that the evidence from Felix's study in which his subjects attained a high level of accuracy in their formation of questions within a short period of time may be a result of the nature of the data collected. Felix's data is mostly drawn from pattern-practice drills in the classroom, therefore the developmental profile, according to

Ellis, is 'modelled' rather than 'natural'.

The 'communicative' developmental profile established by Ellis (1984b) reveals striking similarities when compared with naturalistic learners. In line with Felix, Ellis also claims that learning context does not affect language acquisition in any principled way.

War (1984) compared the acquisition of English interrogation between English medium and non-English medium learners. She found that intensive teaching of 'do' as a Q-operator in the non-English medium environment led to a phenomenal predominance of treating DO and its variants as a common question marker in all types of questions. Her non-English medium subjects consistently produced samples like:

*** Did he is not the class captain?**

*** Where do you can take the book?**

Based on this finding, she argues that learning situations like the non-English medium context may encourage the learner to adopt the strategy of 'slot-filling', which is an ad-hoc means to expand the surface complexity of questions for the purpose of communication.

5.2.4.1 Interim Discussion

Although the studies reported above reveal that formal L2 learners also adopt similar learning processes and follow a similar sequence of development, they all reported differences in the developmental sequence. However, due to the scarcity of research into the effect of formal learning contexts on SLA, it is not at all clear whether these differences are universal among formal learners or whether they are unique characteristics pertaining to the context of learning.

Felix reported that tutored learners had problems distinguishing between yes-no and wh-questions when responding to the teacher's questions, a feature which finds no parallels in naturalistic L2 acquisition. Nevertheless, he argues that this phenomenon is similar to his L1 learners in the previous studies who

produce wh-questions that do not contain any wh-words. The difficulty with the present L2 learners cannot be explained in terms of cognitive maturity since they are familiar with the distinction between the two types of questions; rather, Felix argues that these learners are being bogged down by their confusion with the syntactic devices that formally mark these two types of questions.

Ellis (1984b) found that the spread of new rule appeared to be slower in tutored L2 learners than in untutored L2 learners. For instance, whereas the gap between 'be' and 'do' inversion is not usually a large one in naturalistic SLA, it is considerable for the two learners reported in his study. However, this tentative finding should be taken with caution because:

(a) Ellis admits that they are relatively slower learners than the others.

(b) The slow development of inversion may be due to the lack of communicative needs of these learners since Ellis has suggested that they appear to be contented with the use of intonation questions and do not see the need to use information seeking questions.

Another aspect discussed by Ellis (1984b) is that the early stages of classroom SL development are marked by frequent use of a few formulas which are important to the learner as a means to meet their communicative needs in the classroom when they have not built up their competence to meet this demand.

5.3 Interim Conclusion

All the studies described in Section 5.2. reveal that some universal processes are involved; at the same time, there are some context induced acquisition errors or developmental phenomena, which may be explainable in terms of the nature of the input or the mode of learning in the classroom. However, since studies about L2 acquisition in a classroom setting are not many, it may be too early to draw a conclusion pointing to a universalist explanation for all acquisition types, particularly when later research studies begin to recognise the role of L1 in SLA, thus it is important to uncover the relationship between classroom input and the learner's L1 in second language acquisition.

5.4 Implications for the Present Investigation on the Effect of Learning Context on SLA

5.4.1 The Study of Developmental Continuum

Taking the research findings into consideration, L2 learners do go through a developmental continuum when acquiring linguistic structures like the English interrogative system. This developmental continuum is considered to be dynamic, constantly evolving in the direction of the TL. This dynamic process of complexification and restructuring of IL knowledge seems to involve certain universal acquisition principles, the learner's prior linguistic knowledge or a set of cognitive strategies frequently employed by the learner. Moreover, it is reflected in the stages in which different non-target structures develop before they reach target status.

Another external variable which may exert its influence on the continuum is the environment in which the learner acquires the TL. In the context of this argument, some researchers have adopted a strong universalist hypothesis that environment does not alter the so-called 'predetermined' developmental continuum. In other words, despite restricted, diverse, or distorted input in the classroom, the learner is still able to perceive and select that subset of the input data which matches his current stage of development. Such a strong hypothesis seems to assume that input is all there is and its role is to provide ample positive evidence which triggers off the language acquisition process and as far as possible, to refute incorrect hypotheses.

In a naturalistic setting, a learner is exposed to abundant samples always available in the input; however, for certain types of learners, the sole source of input may stem from the classroom, in which the structures are usually sequenced intuitively according to their level of complexity. Supposing that there is an absence of a particular structure in the classroom input, a structure which forms the next stage of development, would the classroom learner be able to generalise, internally speaking, from this 'i' in order to acquire '1' in the absence of positive evidence or is he going to 'wait' until the structure is presented to him? The second solution ascribes a heavier dependence on classroom input for SL development. The first

solution implies that a classroom learner may be faced with a bigger 'projection' problem (Zobl 1985) which involves projecting his current IL knowledge in the absence of positive evidence. Some of the studies mentioned in the last chapter, like Eckman et.al. (1988), seem to suggest that a deliberate attempt to manipulate the instruction variable may determine the learner's ability of projecting his IL knowledge. In fact, it is still not clear how the projection of IL knowledge is made possible. Above all, most of these subjects are university adult learners from different language backgrounds, which implies that they may have received some instruction before, and imparting knowledge about the TL language the second time round may reactivate the IL knowledge previously learned, thereby resulting in better performance in the experiment.

In the context of the present study, the conscious attempt by the teacher to teach inversion to classroom learners can be equated roughly with this kind of 'deliberate attempt' research, in the sense that teaching this relatively more marked structure, as defined by the previously established developmental sequence, should enable the learner to circumvent the non-inversion stage. In this respect, this instructional phenomenon may exert some influence on the learner's developmental continuum, which results in certain acquisitional phenomena pertaining to this type of input.

To sum up, it is reasonable to assume that certain natural processes are involved in classroom SLA, but different learning contexts may influence the operation of these processes and this variation may result in differences in their developmental continuum.

5.4.2 Establishing a Developmental Continuum for the Cantonese Learners' Acquisition of the English Interrogatives

5.4.2.1 The Rationale of Choosing The English Interrogative System

Linguistically, the interrogative system in both English and Cantonese provides an interesting case of study, recalling the structural as well as discoursal differences between these two languages described in Section 5.1. above. In the present

study, three broad types of questions are selected: **simple yes-no questions, wh-questions**, and **embedded yes-no questions.** The learner's development of the simple questions has been well documented, which provides a basis for comparison with the performance of the Cantonese learners in the present study. As regards the acquisition studies concerning embedded questions, most of the studies emphasise the development of embedded wh-questions while little has been said about embedded yes-no questions. These two types of embedded questions cannot be treated on a par with each other since they involve some subtle differences in the embedding process, namely, in the case of embedded yes-no questions, it requires an additional rule of supplying a connective, serving both a pragmatic as well as a syntactic purpose.

The motivation behind this study is to find out how the interlanguage of a Cantonese learner develops, to what extent his prior linguistic knowledge of L1 contributes to his L2 acquisition of a language whose rules for question formation are so different from those of his L1. Secondly, it is an attempt to investigate how classroom input (the teaching of the English interrogatives is included in the syllabus), which may encourage the development of metalinguistic knowledge, influences the learner's development.

One postulate thus derived is that the perceived distance between the NL and the TL by the learner prevents him from relying on his L1. This perceived distance may also be as a result of intensive classroom training where the rules of the TL are usually highlighted for the learner. In this case, there are a few possibilities:

(a) He may resort to the universal natural processes for language acquisition, thereby reflecting stages of development similar to those established in naturalistic SLA.

(b) He may also rely on the rules that he learns from classroom input. If he relied on metalinguistic knowledge, certain transitional structures such as declarative questions would not turn up in the developmental sequence; and certain structures such as do-insertion would be acquired without much trouble because, at some stage, this structure is taught to the learner and practised intensively.

On the other hand, if cross linguistic influence is taken to be an integral part of SLA, one may question under what conditions would cross linguistic influence take place in the case of Cantonese learners of English. As mentioned in Chapter two, Wode argues that transfer is not random but systematic, that 'it occurs in developmental sequences only under specific conditions and that the structure to be transferred from the L1 into the target L2 has to be crucially similar to the respective L2 structure before the L1 structure could be transferred to the L2.' (Wode 1984:175). In the light of this argument, one may postulate the following occurrence in the learner's development:

(a) Cross linguistic influence would circumvent the effect of metalinguistic input, and in this case, 'collaborates' with the natural processes of L2 acquisition, thereby producing declarative questions during the first stage of development, since declarative questions constitute the first stage of the L2 developmental sequence, which is somewhat similar to the learner's L1 structure. A corollary question is whether this stage persists longer than other learners whose L1 (e.g. German) requires word order permutations for question formation. If it does, one should be able to find more frequent use of declarative questions in Cantonese learners of English.

5.4.2.2 Empirical Considerations for Establishing A Developmental Continuum

One of the problems of establishing a developmental continuum in form of stages is to assume that this continuum consists of discreet stages of development. In fact, it has been argued by some researchers that this continuum is not linear, rather, the stages of this continuum overlap to a certain extent (Meisel et.al. 1981, Wode 1981a).

This variable phenomenon is reflected by the gradual application of a rule in different possible linguistic contexts. As mentioned in Section 5.2 above, some researchers argue that certain linguistic contexts may be favourable in triggering the acquisition of a certain rule; and that a rule is not acquired and

applied simultaneously to all possible linguistic contexts. Rather, the learner may go through a period of undifferentiation followed by subsequent subcategorisation of linguistic contexts in which the rule can be applied.

To sum up, the study of the acquisition of a linguistic system, or interrogation in this case, should take into consideration the sequence of possible linguistic contexts in which the rules are applied. A systematic study of the acquisition of English interrogation is possible by isolating the features to be acquired:-

(a) The types of questions - yes-no questions, wh-questions and embedded yes-no questions.

(b) The rules of the interrogative systems:

Simple Questions	Embedded Yes-no Questions
(1) wh-movement	(1) non-application of inversion
(2) inversion	(2) supply of a connective
(3) do-insertion	

(c) The linguistic contexts in which inversion and wh-preposing are applied. The linguistic contexts involve:

(1) types of questions
(2) different wh-questions
(3) different Q-operators

In this way, by establishing a developmental continuum according to these parameters, we should be able to capture the diachronic aspect of classroom learner's IL development.

Following the argument as outlined in Chapter four, concerning the empirical separation of the development of knowledge from production, it is possible to establish a developmental continuum with the classroom learners both at the level of knowledge and production and devise a systematic investigation into these.

5.5 Conclusion

In this chapter, the interrogative system of both English and Cantonese as well as the relevant empirical studies have been presented. We have also discussed the implications for the present study. In the following chapter, the experimental procedures of the present investigation will be outlined.

CHAPTER SIX
EXPERIMENTAL PROCEDURES

6.0 Introduction

This chapter presents the experimental procedures used in this study, to be followed by a description of the scoring criteria and an outline of the hypotheses to be tested.

6.1 The Identification of Learning Context

6.1.1 The Problem of Studying the Effect of Learning Context on SLA

Researchers interested in studying the effect of learning context on SLA do agree that it is extremely difficult, if not impossible, to study the absolute effect of either formal instruction or informal exposure on second language acquisition (SLA) since both factors may coexist in any type of learning environment, not to mention in any individual learning style. Therefore, instead of treating classroom and naturalistic learners as opposites, it is more appropriate to see them as different elements on a formal-naturalistic learning continuum, their location on which reflects the relatively different nature and amount of formal-informal input available to them.

Since the present study involves SL learners whose exposure to the TL is mainly from the classroom, the crucial variables of determining the characteristic nature of a classroom learning environment are the combination of the varying degree of formal instruction and informal exposure available to the learner. Furthermore, the mode of instruction may also vary with respect to how the language is presented, the level of explicitness and elaboration in the explanation, as well as the nature and amount of practice the learner has to go through. These considerations will be regarded as the yardsticks in our identification of the experimentally appropriate learning contexts.

In the present study, three groups of L2 learners of English were identified, each presenting a typical classroom learning situation. Among them, two groups of learners were from Hong Kong and the third group was from the southern province of Mainland China. The following sections provide a general descrip-

tion of the three types of learning environment identified for the study.

6.1.2 The Hong Kong Situation

Hong Kong, a British colony, has acquired a bilingual outlook from a sociolinguistic perspective. Cantonese, a Chinese dialect, is the L1 of the subjects in this study. English is by and large the SL in the wider community, and in education in particular, and informal exposure to English through the media like films or TV series is readily accessible. The learning of English begins at primary level and the students may opt for either the English or the Chinese medium of instruction from primary one onwards.

6.1.2.1 The English Medium Learning Environment (EMHK)

Despite the fact that the lack of contact between the Chinese and the English speaking sectors of the population makes it difficult for learners to have any opportunity to communicate with native speakers of English, there is still some form of informal exposure outside the school context. According to the opinions of the subjects, it is confined to the occasional switching to the English channels of the radio and television, or the random but relatively more frequent flipping through the pages of English newspapers or novels.

However, in the school context, they have ample opportunity to expose themselves to the TL by attending not just English lessons, but also a whole host of content subjects and school activities like assemblies, drama, debates, choral speaking etc., in which English is the tool of communication. A majority of the subjects, when being interviewed, indicate that the bulk of their informal exposure is not derived from engaging in social functions in which the target language (TL) is the medium of communication; rather, it is mainly from their engagement in class discussions and leisure reading, or their involvement in school activities in which English is used.

While agreeing that grammar has a role to play in SL learning, the local teachers being interviewed claimed that they would not emphasise the teaching of grammar since most of the students

find the learning of grammar monotonous and the public examination syllabus stresses the development of language skills; while the language system occupies just one component in the syllabus. These teachers say they seldom attempt to present English as a formal system to the learners; instead, they would resort, on the basis of the students' performance, to the strategy of negative feedback, usually in the forms as described in Chapter four, which is usually as implicit as rules of thumb.

6.1.2.2 The Chinese Medium Learning Environment (CMHK)

The Chinese medium learners have all their lessons entirely in Chinese throughout their course of schooling except the English lessons. A brief interview with the subjects involved in the study reveals that the amount of informal exposure outside the school is minimal since few of them are keen on going to English films, reading English materials, and they neither have the need, nor the chance, to communicate with each other in English, not to mention with native speakers of English.

An interview was conducted with the local teachers of English involved who claim that their teaching approach is basically textbook-oriented. Apart from certain routine practice like title-based composition, dictation, occasional listening and oral practice, English lessons are usually supplemented by grammar drills, memorising useful phrases and sentences, as well as the explanation of texts and the meanings of words in Chinese. When asked about their view on the role of grammar teaching in the curriculum, all of them regard grammar as a crucial element in the teaching syllabus despite the fact that they are encouraged to replace teaching of grammar by communicative, meaning-oriented learning activities. In recent years, according to the teachers, the importance of any grammatical explanation about the TL has been de-emphasised and replaced, to a certain extent, by their painstaking attempts to introduce some more interesting learning tasks into the classroom.

6.1.3 The Guangzhou Learning Environment (CMG)

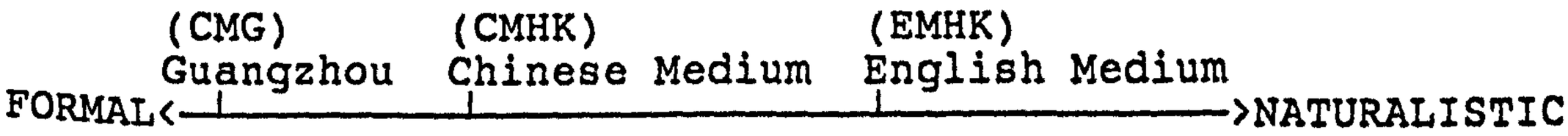
The Guangzhou learning environment presents a stark contrast with the situation of Hong Kong in terms of the status of Eng-

lish in the society, the teaching methodology adopted by the teacher, and the mode of learning behaviour among the students. English is regarded as a foreign language in Mainland China, and its recognition as the international language of communication is widespread among teachers and learners alike. The language policy is in a state of flux at the moment as the provincial government is attempting to upgrade the professional standard of English language teaching by designing a national syllabus and standardising the English proficiency examination.

In schools, the official medium of instruction in all subjects except English is Putonghua, the national language of China, though Cantonese is often used in and out of the classroom. The teaching of English officially begins in primary four, but the students are taught simple English words or phrases before then. As far as the English lessons are concerned, the teachers are still adopting a rather traditional, structural teaching syllabus and methodology. The English lessons are usually made up of reciting dialogues and passages, explicit explanation of grammatical points in Chinese followed by intensive pattern drills, direct oral translation of sentences, distinguishing sound patterns by means of minimal pairs, or heavily guided composition. As a matter of fact, this practice is geared towards the preparation for the English proficiency examination, the major components of which include translation, sentence transformation, grammar, sound patterns, vocabulary and comprehension. The learning of grammar is perceived by both teachers and learners alike as of paramount importance and language achievement is measured upon the extent to which the learners know the formal system of English.

6.1.4 Rationale for Selecting the Three Types of Learning Context

From the above description, it is possible to plot the three groups of subjects on the formal-naturalistic learning continuum as follows:



To quote from Ellis's classification of educational settings where different frequency of discourse interactions are characterised (Ellis 1985a:151), the EMHK learners can roughly be equated with the 'immersion learners' by virtue of their resemblance, to a certain degree, to naturalistic learners in the way they are exposed to the TL. Nevertheless, it is important to point out the fact that this is by and large a non-native speaking environment for this group of subjects, who just have relatively bigger chance to expose themselves to English. The CMHK learners, on the other hand, are similar to those students who learn a language in a SL classroom where interactions will focus on form, rather than meaning, though there may be some chance for negotiation of meaning. The CMG learners are learning a language in a setting which is the least natural in the sense that English is taken to be and confined as the object of metalinguistic analysis.

Although the three groups of subjects are sharing the same L1 background, they are differentiated by (i) the accessibility of English in the wider community, which determines the extent of informal exposure available to them, and (ii) the characteristic mode of instruction and learning which the three groups of learners have been experiencing. As a consequence, it is both theoretically and pedagogically interesting to see whether these differences have any significant effect on their SL developmental pattern in terms of:

(1) the order of acquisition of the English interrogative system,

(2) the development of interlanguage knowledge and use,

(3) the development of metalinguistic knowledge and its relationship with SL knowledge and use.

6.2 Selection of Samples

In the present study, 45 subjects were randomly selected in each type of learning environment and sub-divided according to their year of schooling into three levels of proficiency. Learners from primary six (referred to as **P6** hereafter), secondary two (referred to as **S2** hereafter) and secondary four (referred to as **S4** hereafter) were selected for the following reasons:

(a) Empirically, this study is conceived as a one-shot study, including learners from three levels of proficiency, with the aim of establishing a developmental pattern of the features investigated.

(b) In the history of SLA research, the interrogative system, and in particular the simple yes-no and wh-questions, is regarded as a structure acquired relatively earlier than the other more complicated structures like the relative clauses or the verb complements. Therefore, it would be more appropriate in the context of the study to recruit a group of subjects at the primary level, considering the fact that the teaching of English for these three groups of subjects does begin at this level.

(c) Pedagogically, a review of the teaching syllabus of these three educational settings indicates that simple yes-no and wh-questions are usually taught in primary five, and the embedded questions in primary six and again in the beginning of secondary one, for the Hong Kong situation and secondary three for the Guangzhou situation, selecting the subjects from these levels is considered appropriate since a time gap is necessary to allows the settling of their knowledge of this system.

The division of the sample population and the age range are presented as below:

	EMHK	CMHK	CMG	AGE GROUP
PRIMARY 6	15	15	15	11-12
SECONDARY 2	15	15	15	13-14
SECONDARY 4	15	15	15	15-16
TOTAL:	45	45	45	

Originally, a decision was made to administer a standardised cloze test on the basis of the results of which subjects of similar levels of proficiency would be selected. Unfortunately, the proposal met strong opposition from the school authorities who claimed that, together with the proposed four elicitation

tasks which lasted for a total of three and a half hours, it would take up too much of the students' time and might create problems of administration and management. In the face of such opposition, the writer had no alternative but to adopt the method of random sampling from the students of the same year of schooling in each environment. As a consequence, any interpretation of the results derived from comparing the quantitative performance or development of IL knowledge between the three groups of subjects may need to take into account the difference in their proficiency. However, such a drawback in the selection of samples should not deter us from examining the qualitative aspects of the IL development within each group, and some indirect comparison between the three groups of subjects can also be made.

6.3 Elicitation Procedures

Since the aim of the study is to investigate the different degrees of quantitative as well as qualitative development of the learner's interlanguage as a result of the different degrees of discourse interactions in the classroom environment in which they find themselves, it is necessary to include three types of data in the investigation.

(a) **Intuitional Data** - the learner's intuitions of grammaticality may provide an indirect access to the mental representations of his interlanguage.

(b) **Production Data** - this type of data provides information about the qualitative development of automaticity of the learner's interlanguage.

(c) **Metalinguistic Data** - this type of production data provides information about the qualitative development of analyticity of the learner's interlanguage.

There are obvious advantages of setting up a series of elicitation tasks in interlanguage research. Firstly, if one agrees that different elicitation tasks may yield different facets of the learner's knowledge of the TL, the adoption of multiple tests is deemed necessary in order to produce a relatively more comprehensive picture of the learner's interlanguage. In fact, Corder in one of his papers dated as early as 1971 had already claimed that, in order to arrive at both observational and des-

criptive adequacy in interlanguage research, one has to supplement **textual data** by **intuitional data** and to set up systematic methods of investigating the relation between them (Corder 1971).

Secondly, Bialystok (1982) remarks that different learning environments do exhibit qualitative differences which may be captured by using different elicitation tasks. Thirdly, as mentioned before, tasks tapping the learner's judgments and those which capture the learner's production may provide a methodological framework with which one may separate, empirically, the analysis of the development of the internalised abstract knowledge of the TL (declarative knowledge), and the knowledge which is responsible for fluent access to the internalised system (procedural knowledge). This empirical separation of knowledge from production, and the systematic investigation of the relation between them, may shed light on the issue of synchronic variability of interlanguage development.

6.3.1 Elicitation Tasks

In the present study, four elicitation tasks were designed in accordance with the rationale mentioned above. The textual data were derived from the **Oral Production** task (referred to as **OP** hereafter), **Written Dialogue Completion** task (referred to as **DC** hereafter), and the **Error Correction** task (referred to as **CR** hereafter), while the intuitional data was derived from the **Grammaticality Judgment** task (referred to as **GJ** hereafter).

6.3.1.1 Oral Production Task

Although it is recognised by the researcher that spontaneous production provides the most natural data for the analysis of the learner's IL at the production level, in the face of the restriction of time and the problem of eliciting adequate data in free speech, an alternative oral elicitation task was used.

The subjects were invited to engage in a series of role-plays, individually with the researcher, in which they were prompted to seek information from the researcher by asking questions. In order to make the situations as natural as possible, they were encouraged to digress and ask for other information than

that required of them. This was done by withholding from the interviewee all the required information they had to seek, and, at appropriate moments during the conversation, handing to him a flashcard on which the information was indicated. To ensure that they understood the situation and the information they had to seek, the description was in Chinese. A summary of the role-play situations and the required information is provided in Appendix 1a, and the table showing the distribution of the auxiliaries and the test items is provided in Appendix 1b.

6.3.1.2 Written Dialogue Completion Task

This written task attempts to measure to what extent the learner is able to produce grammatically well-formed and contextually appropriate question$, given the benefit of time. In this task, the subjects were asked to complete a series of short dialogues by supplying appropriate questions in the blanks provided. There was control on the length and the topics of the dialogues. It was decided to give dialogues of not more than six turns since too long a dialogue may require too much attention to the comprehension of the contextual details. As for the topics of discourse, it was decided that the topics should be familiar to the subjects, to assist them in setting up certain expectations of the speech turns. To ensure that the subjects understood the context of the dialogues, a summary introduction to the dialogues was provided in Chinese. The sample test paper, and the distribution of the auxiliaries and test items are provided in Appendix 2a, and 1b respectively.

6.3.1.3 Grammaticality Judgment Task

In this task, a series of both grammatical and ungrammatical questions were flashed, one at a time, on a screen with an overhead projector. The subjects were given approximately 10 seconds to read the question and to indicate their judgment on a 5-point scale:

1=absolutely ungrammatical
2=seriously ungrammatical
3=moderately ungrammatical
4=just slightly ungrammatical
5=totally grammatical

In order not to confound the measure of grammaticality with the measure of certainty, a separate 2-point certainty scale was given beside each scale of grammaticality and the subjects were asked to indicate the certainty of their judgment on this scale. The test items together with the instructions can be found in Appendix 3a; the test paper can be found in Appendix 3b. The table of test item distribution with the ungrammatical features is provided in Appendix 3c.

It should be mentioned that a post-hoc experiment was carried out, inviting 20 English speaking teenagers, of similar age to the secondary four subjects in the present study, to perform this task so that we can compare the native speakers' order of acceptance of the rules of the target structure with those established by the three groups of subjects. The result of the analysis on the native speakers' performance can be found in Section 7.5.1.2. in the following chapter.

6.3.1.3.1 Criteria for Identifying Ungrammatical Features

From the review of literature on grammaticality judgments, depending on the aim of research, some researchers identify ungrammatical features by examining the textual data produced by the subjects, while some prefer to make hypotheses, on the basis of a certain linguistic theory, about the potential errors usually produced as a result of the influence of the learner's L1 on his L2.

Within the scope of the present study, it would be more appropriate to adopt the first method of identification of errors because the main focus of this study is to investigate any potential effect of learning environment on SL development. Therefore, a preliminary observation of the possible errors was carried out to delineate the areas of difficulty usually encountered by Cantonese learners, with the aim of establishing a reliable set of ungrammatical features which would be used to set up the ungrammatical questions in both the GJ and CR tasks.

6.3.1.4 Error Correction Task

For this task, the subjects were presented with the same set of test items used in the **GJ** task but clothed in different vocabulary. They were asked to judge whether the questions were grammatical or not. For those questions which they judged to be ungrammatical, they would have to locate the errors, correct them, and to explain the grammatical rule being violated. This task was not intended to be timed, and the subjects were allowed to use either Chinese or English to explain the errors. The sample test paper can be found in Appendix 4a and the table of test item distribution with the ungrammatical features and the test scores is provided in Appendix 3c.

6.3.2 Criteria for Assessment

In view of the different nature of the four tasks set up for this study, adopting a uniform scoring procedure would seem to be inappropriate. Therefore, different scoring procedures were used in order to best reflect the subject's performance on them.

6.3.2.1 Scoring Procedures for the Oral Production and Dialogue Completion Tasks

For the **OP** and **DC** tasks,the following criteria were applied:

In general, no score was given for the contextually inappropriate questions.

For **wh-questions:**

(a) correct supply of the wh-pronoun----------1 mark
(b) correct positioning of the wh-pronoun------1 mark
(c) correct supply of Q-operator---------------1 mark
(d) correct application of SV-inversion--------1 mark

In this case, a semantically appropriate and grammatically well-formed question will yield a total of 4 marks.

For **yes-no questions:**

(a) correct supply of Q-operator----------------1 mark
(b) correct application of SV-inversion---------1 mark

In this case, a correct response to a test item will yield a total of 2 marks.

For **embedded yes-no questions:**

(a) correct supply of a connective----------1 mark
(b) no application of SV-inversion----------1 mark
(c) correct supply of Q-operator----------1 mark

In this case, a correct response to a test item will yield a total of 3 marks.

6.3.2.2 Scoring Procedures for the Grammaticality Judgment Task

Since both grammatical and ungrammatical questions were included in this task and were judged using the same 5-point scale, before scoring this task, certain transformations on the raw data had to be done.

First, the scale values on the 5-point scale, from 1 to 5, were recoded to values from 0 to 4. This procedure is necessary because it accords with the general concept of language testing whereby the learner's performance is usually measured on a scale beginning with zero performance.

As for the grammatical questions, the scale values of the items endorsed by the subjects were recoded on the new 0-4 scale. For example, an original scale value of 5 was recoded to a value of 4 and an original value of 4 was recoded to 3 and so forth.

As for the ungrammatical questions, before the score was computed, the direction of item scores was reversed so that an original value of 5 was recoded to 0 and an original value of 4 would become 1 and so forth.

Having transformed the scale values in the way mentioned above, the scores of the test items were added up to yield a performance score of this task.

6.3.2.3 Scoring Procedures for the Error Correction Task

In this task, the following procedures were applied:

0=unable to identify the error
1=able to identify and locate the error but unable to correct it
2=able to identify, locate and correct the error, but unable to provide any adequate explanations
3=able to do all of the above and to give an adequate explanation

During the course of analysis, as we shall see, an interim procedure was carried out during the analysis of **Task Performance** (Section 7.1) whereby the CR score was broken down into (i) judging grammaticality (**CR(J)**), (ii) correcting the errors (**CR(C)**), and (iii) explaining the rules (**CR(E)**). Therefore, the full score for judging grammaticality was 1, correcting the errors was 2, and explaining the errors remained 3.

6.4 Hypotheses

The hypotheses fall into four main groups. For each group of hypotheses, both the null hypothesis and its alternative hypotheses are stated.

6.4.1 Group 1: Diachronic Variability of IL Development

The hypotheses in this group address the issue of the fundamental nature of IL, diachronic variability of IL development, i.e. IL develops over time in its approximation of the TL.

HYPOTHESIS 1

H_0: The IL continuum is not developmental. In the context of this study, it means that there are no significant differences in the performance of the subjects between the three levels of proficiency identified in each learning environment.

H_1: The IL continuum is developmental and systematic, and learners move along the continuum in the approximation of the TL. In other words, the subjects of these three levels can be placed at different points of the continuum according to their proximity to the TL. Therefore, there are significant differences between the levels identified in each learning environment.

6.4.2 Group 2: Synchronic Variability of IL Development

This group of hypotheses addresses the issue of synchronic variability of IL development. The analysis requires the comparing of the subjects' performance on different elicitation tasks, which are believed to impose different qualitative demands on the subjects' IL knowledge and use.

HYPOTHESIS 2.1

H_0: There is no synchronic variability in the subjects' IL development. The subjects do not exhibit differences in their performance on the tasks which are devised to capture the different combination of analyticity and automaticity of their IL competence.

H_1: Different tasks necessitate varied demands on analyticity and automaticity of the learner's IL competence, which lead to differences in his performance under different language situations. In other words, there should be significant differences in the subjects' performance on the tasks, which can then be arranged in terms of an order of difficulty according to the ability of the three groups of subjects to meet these demands.

HYPOTHESIS 2.2

H_0: There are no significant differences in the subjects' performance on the rules of the interrogative system between tasks.

H_1: The subjects' should display significant differences in their retrieval of the IL rules of the interrogative system as a result of the different demands imposed by the tasks.

6.4.3 Group 3: The Order of Development within the Interrogative System

This group of hypotheses are related to the order of development of the interrogative system, with particular reference to the eight wh-questions, simple Yes-no questions and embedded yes-no questions.

HYPOTHESIS 3

H_0: There is no order of development of the interrogative system with respect to:

(a) the order of the types of questions,
(b) the order of inversion in different types of questions, and
(c) the order of inversion of the Q-operators.

H_1: The IL continuum can be described in terms of an order of development through which a learner passes.

These developmental stages overlap and do not exhibit clearcut distinctions between them.

6.4.4 Group 4: The Effect of Learning Environment on Second Language Acquisition

This group of hypotheses address the issue of the effect of learning environment on SLA.

GENERAL HYPOTHESIS 4

H_0: There are no significant differences in the subjects' performance between the three learning environments identified for this study.

H_1: There are significant differences in the performance of the subjects between the three learning environments and these differences can be explained by the environmental characteristics to which these subjects are exposed.

HYPOTHESIS 4.1

H_0: There are no significant differences in the performance of the subjects between the three learning environments on the elicitation tasks.

H_1: There are significant differences in the performance of the subjects between the three learning environments on the elicitation tasks.

HYPOTHESIS 4.2

H_0: There are no significant differences in the development of metalinguistic knowledge between the three types of second language learners.

H_1: There are significant differences in the development of metalinguistic knowledge between the three groups of subjects and these differences can be explained by the nature of input to which they are exposed.

HYPOTHESIS 4.3

H_0: There are no significant differences in the development of automaticity (i.e. the degree of fluent access to IL competence) between the three groups of subjects.

H_1: There are significant differences in the development of automaticity between the three groups of subjects and these differences are reflected by their different performance on the oral and written tasks.

HYPOTHESIS 4.4

H_0: There are no significant differences in the order of development of the interrogative system between the three groups of subjects.

H_1: There are significant differences in the order of development of the interrogative system and these differences can be explained by the environmental differences and the different modes of learning these three groups of subjects go through.

6.5 Pilot Testing: A Brief Report

Before the final administration of the tasks, a pilot test was conducted to examine the suitability of the tasks for the subjects under study.

6.5.1 Selection of Subjects

As it was impossible to administer the tasks to all three types of subjects described above, and, as the aim of the pilot test was to determine the suitability of the tasks and to gain the experience in administering them, the author decided to try the tasks out with learners from just one type of environment. Therefore, in accordance with the design of the study but fairly reduced in scale, 10 subjects were selected from each level of primary 6, secondary 2 and secondary 4.

6.5.2 Administration of the Pilot Tests

The elicitation tasks were administered in the manner described above. Depending on the level of proficiency, except the OP task which took roughly between 25-45 minutes to complete, most of the tasks took roughly 1 hour to 1 hour 30 minutes. A general discussion with the students about the tasks was held usually afterwards. It was necessary to mention at this point that the original length of each task was slightly longer than that in the main study and it was indeed the major complaint among the

students. The original item distribution of the tasks are included in Appendix 5a and 5b. Apart from that, they gave invaluable reflections on the difficulty of the tasks and some of the confusing items they encountered.

6.5.3 Subsequent Changes

In the light of the comments made by the pilot subjects, the following changes were made:

(a) The test items were reduced by first discarding the few baffling test items and then reducing the number of the test items within each type of questions under investigation.

(b) The CR task was halved into two subtests because it was still a fairly long test having 117 test items after reduction.

6.6 Final Administration of the Tasks

The tasks were administered in the same sequence as adopted in the pilot test:

OP --> DC --> GJ --> CR

It was thought better to administer the OP and DC tasks first because they were more to do with the meaningful use of questions in appropriate contexts. The CR task was administered last and particularly after the GJ task in order to avoid any intervention of metalinguistic knowledge in the first three task. As mentioned before, the OP task was administered individually to the subjects with the author being the other partner in the role-play situations. The other three tasks were administered usually to the whole group of 15 subjects altogether.

6.7 Conclusion

In this chapter, the framework of the present research as well as the relevant hypotheses were set out. In the following two chapters, the results and their interpretations will be presented.

CHAPTER SEVEN
DATA ANALYSIS

7.0 Introduction

In this chapter, the results of the subjects' task performance are presented. The subject's responses on each of the tasks were scored in accordance with the criteria for assessment discussed in Chapter six. The sequence of presentation of the results is as follows: first, the subject's performance on the elicitation tasks; second, an investigation of their performance on the different types of questions; third, the development of inversion in these questions as well as the inversion of the three types of Q-operators identified for this study; fourth, an examination of their performance on the different rules of the English interrogative system in general. The last part of the presentation deals with the investigation of the order(s) of development in terms of (i) the order of the Q-types, and (ii) the order of the rules of the interrogative system. In each of these sections, the analysis is discussed in terms of **Diachronic Variability** in relation to YEAR OF LEARNING, **Synchronic Variability** in relation to STRUCTURE or TASK, and, in some cases, variability as a result of LEARNING ENVIRONMENT will be examined in detail.

Most of the results of the analysis were obtained through the use of the computer software programme Statistical Package for the Social Sciences (SPSSx in short). The analysis of the order(s) of development of the interrogative system was carried out using the Rasch Model and the rationale of adopting this model will be provided in the beginning of the section.

7.1 Subjects' Performance on the Elicitation Tasks

The first requirement in the analysis is to examine the overall subjects' performance on the elicitation tasks. The total score of each task was computed by adding up the total scores achieved by the subjects on each Q-type in the task. As was described in Section 6.3.2.3., during the analysis of the subjects' task performance, an interim procedure was carried out in which the correction task was broken down into three sub-tasks, with the

aim of analysing the subject's performance in greater details.

7.1.1 Preliminary Analysis of the Mean Scores of Tasks

Table (1) provides a summary of the mean percentage scores of the subjects' performance on the tasks. The mean raw scores can be found in Table (2) of Appendix 6a.

Table (1). Mean Percentage Scores of Elicitation Tasks

		OP	DC	GJ	CR(E)	CR(C)	CR(J)
EMHK		71.66	79.86	61.58	51.26	72.63	74.56
	P6	57.44	64.29	52.83	33.61	44.71	46.36
	S2	75.79	84.08	64.41	59.48	83.75	86.05
	S4	81.74	91.21	67.50	60.68	89.42	91.26
CMHK		55.11	67.96	55.99	48.10	60.40	64.90
	P6	41.68	52.71	48.70	31.80	39.61	44.83
	S2	56.94	70.96	55.79	46.25	61.80	67.73
	S4	66.72	80.21	63.47	66.25	79.80	82.14
CMG		49.60	63.31	57.18	53.37	64.44	69.45
	P6	24.61	31.83	51.46	26.46	35.93	44.29
	S2	52.33	70.62	54.58	57.34	67.70	71.26
	S4	71.86	87.47	65.49	76.32	89.69	92.79

Keys:

Learning Environment
EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

Year of Learning
P6: Primary Six
S2: Secondary Two
S4: Secondary Four

Types of Tasks
OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Correction (Untimed Judgments)

A preliminary comparison of the mean percentage scores among the tasks reveals that :

(a) there is considerable variation in the amount of movement that takes place between the three levels in each learning environment and the increase in the performance scores with the year of learning indicates that these learners did benefit from the length of exposure to the target language (TL).

(b) the learners from each learning environment showed differences in their performance on the tasks, which indicates that these elicitation tasks are tapping different qualitative aspects of their IL knowledge. Furthermore, it appears that learners from different learning environments exhibit a different order of difficulty for the tasks they attempted.

7.1.2 Variability due to Time (Year of Learning)

In this section, the effect of time (i.e Year of Learning) on the performance on the elicitation tasks is examined. Such analysis is based on the assumption that the learner's IL competence(s) are developmental and increase in complexity over time.

7.1.2.1 ANOVA: Time as Factor

Following Woods, Fletcher and Hughes (1986) and Hatch and Farhady (1982), ANOVA as a statistical test was chosen for the analysis. The null hypothesis for Hypothesis 1 as stated in Section 6.4.1. in the last chapter is as follows:

HYPOTHESIS 1

H_0: The IL continuum is not developmental. In the context of this study, it means that there are no significant differences in the performance of the subjects between the three levels of proficiency identified in each learning environment.

Since the comparisons involve exactly the same number of subjects and one dependent variable (task) at a time, the use of the raw scores is justified. The results are presented in Table (3) below:

Table (3). ANOVA: Task by Level

EMHK	OP	DC	GJ	CR(E)	CR(C)	CR(J)
MEAN SQUARE:						
BETWEEN GROUP	11020.02	13357.35	19655.08	23910.86	26912.82	9047.78
WITHIN GROUP	248.57	287.59	1703.75	411.17	360.06	115.65
F. RATIO	*44.33	*46.44	*11.53	*58.15	*74.74	*78..24
CMHK	**OP**	**DC**	**GJ**	**CR(E)**	**CR(C)**	**CR(J)**
MEAN SQUARE:						
BETWEEN GROUP	10945.68	13458.82	17932.15	30591.62	18406.02	5312.81
WITHIN GROUP	383.39	621.93	1062.03	624.94	472.29	142.65
F. RATIO	*28.54	*21.64	*16.88	*48.95	*38.97	*37.24
CMG	**OP**	**DC**	**GJ**	**CR(E)**	**CR(C)**	**CR(J)**
MEAN SQUARE:						
BETWEEN GROUP	38739.08	55916.60	17832.68	64711.48	33168.06	8860.02
WITHIN GROUP	505.85	566.47	885.83	756.77	438.59	145.16
F. RATIO	*76.58	*98.71	*20.13	*85.50	*75.62	*61.03

P<0.05 DF BETWEEN = 2 DF WITHIN = 42 F.Crit=3.22

Keys

Learning Environment
EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

Types of Tasks
OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Untimed Judgments

The F variance ratios as shown in the above table are consistently significant across all the tasks for the three groups of subjects investigated, which allows us to reject the null hypothesis and adopt the working hypothesis that there is progressive movement along the IL continuum as a function of time.

7.1.2.2 Scheffé Tests: Time as Factor

Even though the F Ratios in Table (3) indicate that the overall variations between the proficiency levels are significant, there is no indication as to where the actual differences lie between the levels. In view of this, Scheffé tests for post-hoc comparisons between the means of the three proficiency levels were carried out. The results of the post-hoc Scheffe tests are presented in Table (4) below:

Table (4). Scheffé Tests: Task by Level

EMHK	OP	DC	GJ	CR(E)	CR(C)	CR(J)
COMPARISONS:						
P6 Vs S2	*6.83	*6.83	*3.60	*9.12	*9.80	*10.12
P6 Vs S4	*9.03	*9.30	*4.55	*9.54	*11.23	*11.45
S2 Vs S4	2.19	2.46	0.96	0.42	1.42	1.32
CMHK	**OP**	**DC**	**GJ**	**CR(E)**	**CR(C)**	**CR(J)**
COMPARISONS:						
P6 Vs S2	*4.56	*4.29	*2.79	*4.13	*4.86	*5.25
P6 Vs S4	*7.49	*6.46	*5.81	*9.85	*8.81	*8.56
S2 Vs S4	*2.92	2.17	*3.02	*5.72	*3.95	*4.13
CMG	**OP**	**DC**	**GJ**	**CR(E)**	**CR(C)**	**CR(J)**
COMPARISONS:						
P6 Vs S2	*7.22	*9.55	1.34	*8.02	*7.25	*6.14
P6 Vs S4	*12.31	*13.70	*6.04	*12.95	*12.26	*11.05
S2 Vs S4	*5.08	*4.15	*4.70	*4.93	*5.00	*4.09

P<0.05 DF BETWEEN =2 DF WITHIN =42 T'CRIT=2.53

Keys

Learning Environment
EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

Types of Tasks
OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Untimed Judgments

7.1.2.3 Interpretation of the Results

The results of the Scheffe tests reveal that there are significant differences between the proficiency levels in most cases, all beyond 0.05 probability level of significance. One of the possible explanations for the consistent lack of significant differences between the S2 and S4 levels of the EMHK subjects

is that their development of the interrogative system seems to have slowed down gradually from S2 level onwards, thus resulting in the insignificant differences between these two levels in the tasks. Nevertheless, the majority of the results do suggest that the subjects' IL knowledge develops over time.

7.1.3 Variability due to Task Differences

In the previous chapters, we discussed some of the methodological and theoretical issues involved in adopting different types of elicitation techniques and the kind of data they yield. These different kinds of data are important as they may shed light on the theoretical issue of synchronic variability, which, in this case, is variability due to different task demands.

The null hypotheses of synchronic variability due to task difference as described in Section 6.4.2. are:

HYPOTHESIS 2.1

H_0: There is no synchronic variability in the subjects' IL development. The subjects do not exhibit differences in their performance on the tasks which are devised to capture the different combination of analyticity and automaticity of their IL competence.

Hypothesis 2.1 will be tested by means of ANOVA and correlational analysis. If the null hypothesis is rejected, which implies that the learners do show differences in their performance on the elicitation tasks, the establishing of a difficulty order of these tasks for each group of subjects is justified.

7.1.3.1 Analysis of Task Variability: Correlational Analysis

Hatch and Farhady (1982:192) point out that correlation studies allow us to determine "the extent to which scores on one test are associated with scores on another test. ... The basic concern in correlational analysis is to identify whether a subject scoring high on one measure also scores high on the other."

Within the context of the study, one of the functions of correlational analysis is to indicate how far the performance on two tasks share some underlying common attributes. If different

tasks demand some different underlying attributes in the learners, correlational analysis is useful for differentiating these tasks according to the learners' ability to perform them.

Having discussed the rationale for adopting a correlational analysis, we can proceed to investigate the performance of the subjects on the tasks. Table (5) below provides a matrix summary of the correlation coefficients between the tasks.

Table (5). Pearson Product-Moment Correlations between Tasks

(I) EMHK

(P6)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.7529*	.0496	.2341	.2138	-.1318
DC		1.0000	.2507	.3142	.2853	-.0119
CR(E)			1.0000	.9359**	.9442**	.2664
CR(C)				1.0000	.9954**	.3164
CR(J)					1.0000	.3212
GJ						1.0000

(S2)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.5996	.3486	.5075	.4578	.4549
DC		1.0000	.8081**	.7755**	.7104*	.3654
CR(E)			1.0000	.8780**	.8497**	.5539
CR(C)				1.0000	.9852**	.6983*
CR(J)					1.0000	.7087*
GJ						1.0000

(S4)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.7155*	.2631	.3302	.3567	-.0198
DC		1.0000	.3326	.3312	.3353	.1350
CR(E)			1.0000	.9806**	.9751**	.4080
CR(C)				1.0000	.9947**	.4709
CR(J)					1.0000	.4135
GJ						1.0000

(II) CMHK

(P6)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.8626**	.8315**	.8605**	.7510*	.3737
DC		1.0000	.8712**	.8703**	.7315*	.3545
CR(E)			1.0000	.9454**	.8333**	.3759
CR(C)				1.0000	.9370**	.4806
CR(J)					1.0000	.6182
GJ						1.0000

(S2)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.7550*	.7824**	.8842**	.8050**	.4701
DC		1.0000	.6300	.7232*	.6213	.3448
CR(E)			1.0000	.8950**	.8602**	.5613
CR(C)				1.0000	.9739**	.6693*
CR(J)					1.0000	.6381
GJ						1.0000

(S4)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.5432	.3651	.2886	.2677	.4401
DC		1.0000	.4498	.4836	.4762	.6818*
CR(E)			1.0000	.8826**	.8552**	.4981
CR(C)				1.0000	.9964**	.5281
CR(J)					1.0000	.5392
GJ						1.0000

(III) CMG

(P6)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.8858**	.7079*	.6608*	.4956	.1173
DC		1.0000	.7200*	.6348	.4822	-.0346
CR(E)			1.0000	.9616**	.8692**	.3397
CR(C)				1.0000	.9389**	.3778
CR(J)					1.0000	.2901
GJ						1.0000

(S2)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.8037**	.4965	.4906	.4712	-.1718
DC		1.0000	.6688*	.6620*	.6638*	-.0819
CR(E)			1.0000	.9852**	.9757**	.2320
CR(C)				1.0000	.9927**	.2829
CR(J)					1.0000	.2764
GJ						1.0000

(S4)	OP	DC	CR(E)	CR(C)	CR(J)	GJ
OP	1.0000	.4042	.2343	.4396	.3651	.1419
DC		1.0000	.5264	.6328	.5485	.2375
CR(E)			1.0000	.8750**	.8369**	.5476
CR(C)				1.0000	.9676**	.6396
CR(J)					1.0000	.6813*
GJ						1.0000

* SIGNIF. LE .01 ** SIGNIF. LE .001

Keys:

Learning Environment
EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

Year of Learning
P6: Primary Six
S2: Secondary Two
S4: Secondary Four

Types of Tasks
OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Correction (Untimed Judgments)

7.1.3.1.1 Interpretation of the Results

Two potential scenarios emerge from the results of the correlational analysis: first, for all three groups of subjects, a consistently stronger correlation between the CR(E), CR(C) and CR(J) tasks at all levels was found, while tasks like the OP and GJ tasks, which tap the automatic retrieval of unanalysed knowledge, seldom correlated with each other, or with most of the other tasks; second, the number of significant correlations generally decreased with the increase in the years of learning.

The first finding suggests that time is a significant factor for transferrability of knowledge as tasks requiring analysed knowledge in untimed condition correlated more strongly between each other than those which are presumably based on unanalysed knowledge and are timed. Moreover, the latter kinds of tasks, especially the GJ task, appeared to act independently and were not generally related to other performance of the same learner, nor with the CR(J) task which differs only in the time

condition. However, it appears that there is a growing relationship between them, as shown by the improving correlations with proficiency at least with the Chinese medium subjects in both contexts. It seems to suggest that these subjects can eventually retrieve even metalinguistic knowledge in timed judgment as designed in the present study. The significant correlation between these two tasks with the CMG(S4) subjects does suggest this possibility. The EMHK subjects seem to display a relatively different pattern in the sense that significant correlation were found only with the S2 subjects and it is only with this group that relatively more significant interactions between tasks were found, suggesting that their reliance on metalinguistic knowledge in performance
is more prominent at this level.

The consistently significant correlations between the CR(J) and the other CR tasks do suggest that the analysed aspect of the subjects' IL knowledge was retrieved during their performance when sufficient time was given. This finding runs counter to Bialystok's claim that providing simple judgments is based on unanalysed knowledge (Bialystok 1979, 1982). Given sufficient time, the subjects were able to draw on the analysed aspect of their IL knowledge in their judgment of grammaticality.

In spite of the general lack of significant correlations between the OP task and most of the other tasks, some relatively stronger correlations were found between the OP and the DC tasks at P6 and S2 levels of the CMHK and CMG subjects and at P6 and S4, but not at S2 level of the EMHK subjects. The explanation of this phenomenon can be tied up with the second finding as mentioned previously in the beginning of this section. For the **CMHK** and **CMG** subjects, the relatively more instances of significant correlations with most except the GJ task at P6 and S2 levels seem to suggest that the subjects at these levels have not yet achieved the 'marked' qualitative aspects of their IL knowledge, thus resulting in the lack of differentiation in their task performance. Nevertheless, greater differentiation was shown among the tasks with the increase in proficiency.

The picture posed by the **EMHK** subjects is somewhat different,

though a general pattern similar to the other two groups is observed. In effect, more significant correlations were discovered between the tasks performed by the EMHK(S2) subjects only, while the same correlational relationships between the CR tasks were found among the P6 and S4 subjects. The grammatical awareness of the S2 subjects appeared to be so high that tasks which tap the knowledge of form all correlated with each other while the OP and DC tasks which deal with both form and meaning did not correlate either with each other or with any other tasks. On the other hand, the significant correlation between the OP and DC tasks at S4 level suggests that at this advanced stage of learning, this group of subjects were better able to transfer the IL knowledge and time may not be a significant factor for better performance on production in meaningful contexts.

Moreover, the general lack of significant correlations between the OP or the DC and the various CR tasks in most instances indicates that having knowledge of the rules does not necessarily imply that one is able to use them in meaningful contexts. In fact, the strength of the relationship between the OP and the CR(E) tasks decreases with the increase in the years of learning, indicating that the subjects did perform differently on these tasks relative to the year of learning English. Such findings are further supported by comparing the mean percentage scores of these two tasks in Table (1), where one can see that the EMHK and CMHK subjects performed better in the OP than in the CR(E) tasks while the CMG subjects performed better in the CR(E) than in the OP task.

To conclude, the results from the correlational analysis above reveal that variability due to task differences is evident in the performance of the three groups of subjects. With this preliminary analysis, we can proceed to compare the subjects' performance on the tasks directly by ANOVA, to find out which tasks are relatively easier/more difficult for which types of subjects.

7.1.3.2 ANOVA: Task as Factor

In the following analysis, the percentage scores were used since

the total raw scores of the tasks are different, standardisation of the raw scores was deemed necessary in order to carry out a fair comparison of the subjects' performance between tasks. The statistical procedure MANOVA in SPSSx was used as it provides a model for a repeated measure analysis. As the aim of this analysis is to examine whether there is a general difference in the subjects' task performance, the 15 subjects from each level were combined to form a total population of 45 subjects. The results of the analysis are presented in the table (6):

Table (6). ANOVA: Subject's Performance Between Tasks

EMHK: Tests involving 'TASK' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	15593.87	220	70.88		
TASK	24199.04	5	4839.81	68.28	.000

CMHK: Tests involving 'TASK' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	11555.55	220	52.53		
TASK	11683.14	5	2336.63	44.49	.000

CMG: Tests involving 'TASK' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	20410.98	220	92.78		
TASK	12543.72	5	2508.74	27.04	.000

Keys

EMHK : English Medium Hong Kong
CMHK : Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

The results reveal that the subjects from each of the learning environments performed differently on the elicitation tasks. In view of this, Hypothesis 2.1 that there are no differences in the subject's performance between the tasks can thus be rejected and we can proceed to investigate the significant interactions between the tasks as well as task difficulty for each group of subjects.

7.1.3.3 Scheffé Tests: Task as Factor

Post-hoc Scheffé tests were carried out to discover the significant differences in the subjects' performance as a result of task differences. Table (7) below presents the pattern of significant interactions between the elicitation tasks performed by the subjects.

Table (7). Scheffé Tests: Subjects' Performance Between Tasks

(I) EMHK

		CR(E)	GJ	OP	CR(C)	CR(J)	DC
CELL MEANS		51.26	61.58	71.66	72.63	74.56	79.86
CELL TOTALS		2306.70	2771.10	3224.70	3268.35	3355.20	3593.70
CR(E)	2306.70	0	464.40*	918.00*	961.65*	1048.50*	1287.00*
GJ	2771.10		0	453.60*	497.25*	584.10*	822.60*
OP	3224.70			0	43.65	130.50	369.00*
CR(C)	3268.35				0	86.85	325.35*
CR(J)	3355.20					0	238.50
DC	3593.70						0

df = 220 N = 45 MSE = 70.88 k-1 = 6 F crit = 2.14 p = 0.05
F s = 12.84 t'crit = 286.20 *p = 0.05

(II) CMHK

		CR(E)	OP	GJ	CR(C)	CR(J)	DC
CELL MEANS		48.10	55.11	55.99	60.40	64.90	67.96
CELL TOTALS		2164.50	2479.95	2519.55	2718.00	2920.50	3058.20
CR(E)	2164.50	0	315.45*	355.05*	553.50*	756.00*	893.70*
OP	2479.95		0	39.60	238.05	440.55*	578.25*
GJ	2519.55			0	198.45	400.95*	538.65*
CR(C)	2718.00				0	202.50	340.20*
CR(J)	2920.50					0	137.70
DC	3058.20						0

df = 220 N = 45 MSE = 52.53 k-1 = 6 F crit = 2.14 p = 0.05
F s = 12.84 t'crit = 246.38 *p = 0.05

(III) CMG

		OP	CR(E)	GJ	DC	CR(C)	CR(J)
CELL MEANS		49.60	53.37	57.18	63.31	64.44	69.45
CELL TOTALS		2232.00	2401.65	2573.10	2848.95	2899.80	3125.25
OP	2232.00	0	169.65	341.10*	616.95*	667.80*	893.25*
CR(E)	2401.65		0	171.45	447.30*	498.15*	723.60*
GJ	2573.10			0	275.85	326.70	552.15
DC	2848.95				0	50.85	276.30
CR(C)	2899.80					0	225.45
CR(J)	3125.25						0

df = 220 N = 45 MSE = 92.78 k-1 = 6 F crit = 2.14 p = 0.05
F s = 12.84 t'crit = 327.44 *p = 0.05

Keys:

Learning Environment
EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

Types of Tasks
OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Untimed Judgments

7.1.3.4 Interpretations of the Results

In general, the subjects were found to perform differently on most of the tasks, thus largely confirming our hypothesis that SL learners at various stages of their IL development display

variability in their performance as a result of their different ability to meet task demands.

The significantly different performance in CR(E) task, as against most of the other tasks, suggests that this task was relatively more difficult to perform by all three groups of subjects. This finding is particularly obvious among the EMHK and CMHK subjects; but in the case of the CMG subjects, the OP task appears to be more difficult than the CR(E), though not statistically significant. The consistently significant difference in the subjects' performance between the OP and the DC tasks reveals again that classroom learners generally benefit from time in their performance.

The results also indicate that subjects from different learning contexts were responding differently to the elicitation tasks. The **EMHK** subjects found the DC task the easiest to perform while consistently showed different performance between the various tasks except that between the OP, CR(J) and CR(C) tasks. In fact, it is interesting to discover that these subjects are not disadvantaged by the general lack of grammatical input, as they showed comparable performance on tasks tapping either the automatic or the analysed aspect of their IL knowledge.

The **CMHK** subjects found the DC task, and to some extent, the CR(J) task the easiest and the CR(E) task the most difficult. but no differences were found between the GJ, OP and CR(C) tasks. It seems that this group of subjects are lagging behind in their mastery of the tasks which demand a certain degree of automatic retrieval and functional use of their IL knowledge of the interrogative system, as revealed by their relative difficulty in performing the OP and GJ tasks and comparable performance on tasks which concentrate mainly on the form, but not the use of questions in appropriate contexts.

With respect to the results of the **CMG** subjects, their performance on the OP and CR(E) tasks was consistently different from the other tasks; but no differences were found between the CR(E) and the OP as well as GJ tasks on the one hand, and between the GJ, DC, CR(C) and CR(J) tasks on the other. Above all, the

CR(J) and CR(C) tasks were found to be the easiest to perform. The picture posed by the CMG subjects is rather complicated to interpret. As mentioned above, the OP and the CR(E) tasks were found to be more difficult than the other tasks for this group of subjects, which may help to explain why there is no significant difference in their performance between them. Unlike the CMHK subjects, the CMG subjects' performance in tasks which are either untimed and/or concentrate on the formal knowledge of the interrogatives showed no significant differences in the analysis, which suggests that the transfer of the formal knowledge system is greatly facilitated whenever sufficient time is given, as shown especially by the obvious lack of significant difference between the DC, CR(J) and the CR(C) tasks. In fact, the lack of any significant interaction between the GJ and the CR tasks or the DC task suggests that these subjects might ultimately be able to retrieve metalinguistic knowledge even in timed judgments.

To sum up, from the analysis significantly different task performance was found in each group of subjects and it is possible to set up an order of task difficulty pertaining to the types of environment in which the subjects acquire the TL. The orders of task difficulty will be presented and discussed in Section 8.3.1.4. of the following chapter.

7.1.4 Variability due to Learning Environment

In this section, attempts are made to verify some of the hypotheses listed under General Hypothesis 4 in Section 6.4.4., which are:

HYPOTHESIS 4.1

H_0: There are no significant differences in the performance of the subjects between the three learning environments on the elicitation tasks.

HYPOTHESIS 4.2

H_0: There are no significant differences in the development of metalinguistic knowledge between the three types of second language learners.

HYPOTHESIS 4.3

H_0: There are no significant differences in the development of automaticity (i.e. the degree of fluent access to IL competence) between the three groups of subjects.

Hypothesis 4.1 was examined with respect to each of the elicitation tasks in question, Hypothesis 4.2 was verified by the subjects's performance on the correction tasks, and Hypothesis 4.3 was verified by the subject's performance on the OP task. The aforementioned hypotheses are based on the assumption that the different types and nature of input of the TL from the learning contexts in which the learners find themselves can be reflected by comparing their performance on the elicitation tasks. Even though carrying out a direct comparison between the three groups of subjects does not seem to be justifiable, due to the author's failure to control for the proficiency level. However, if we interpret the results with caution, we should still be able to provide some tentative suggestions for the similarities as well as differences in their performance on these tasks.

7.1.4.1 ANOVA : Learning Environment as Factor

As mentioned in the last section, since the author suspects that the different proficiency levels of the three groups of subjects may be an intervening variable in the analysis, a 2-way ANOVA is deemed necessary if we attempt to compare these three groups of subjects. The advantage of carrying out a 2-way ANOVA is two-fold. A 2-way ANOVA reveals the interactive effect of proficiency level and group in question; at the same time, a post-hoc Scheffé test provides a more detailed analysis of the subjects' performance in terms of the differences in their performance between the proficiency levels within as well as between the groups. Consequently, tentative comments can be derived from the author's cautious interpretation made possible by this relatively detailed statistical analysis. In the light of this rationale, the 15 subjects from each proficiency level were taken to be one sample population in the analysis. The results of the analysis on each of the tasks are presented in Table (8).

Table (8). ANOVA: Tasks by Learning Environment

(I) ORAL PRODUCTION

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	163744.978	4	40936.244	107.933	0.000
GROUP	54303.600	2	27151.800	71.589	0.000
LEVEL	109441.378	2	54720.689	144.277	0.000
2-WAY INTERACTIONS	11968.222	4	2992.056	7.889	0.000
GROUP LEVEL	11968.222	4	2992.056	7.889	0.000
EXPLAINED	175713.200	8	21964.150	57.911	0.000
RESIDUAL	47788.533	126	379.274		
TOTAL	223501.733	134	1667.923		

(II) DIALOGUE COMPLETION

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	175974.741	4	43993.685	89.418	0.000
GROUP	30035.970	2	15017.985	30.524	0.000
LEVEL	145938.770	2	72969.385	148.311	0.000
2-WAY INTERACTIONS	19526.963	4	4881.741	9.922	0.000
GROUP LEVEL	19526.963	4	4881.741	9.922	0.000
EXPLAINED	195501.704	8	24437.713	49.670	0.000
RESIDUAL	61992.267	126	492.002		
TOTAL	257493.970	134	1921.597		

(III) GRAMMATICALITY JUDGMENT

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	120608.163	4	30152.041	24.771	0.000
GROUP	17111.215	2	8555.607	7.029	0.001
LEVEL	103496.948	2	51748.474	42.514	0.000
2-WAY INTERACTIONS	7342.919	4	1835.730	1.508	0.204
GROUP LEVEL	7342.919	4	1835.730	1.508	0.204
EXPLAINED	127951.081	8	15993.885	13.140	0.000
RESIDUAL	153368.400	126	1217.210		
TOTAL	281319.481	134	2099.399		

(IV) CORRECTION (EXPLAINING)

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	221095.556	4	55273.889	92.488	0.000
GROUP	4313.378	2	2156.689	3.609	0.030
LEVEL	216782.178	2	108391.089	181.367	0.000
2-WAY INTERACTIONS	21645.778	4	5411.444	9.055	0.000
GROUP LEVEL	21645.778	4	5411.444	9.055	0.000
EXPLAINED	242741.333	8	30342.667	50.771	0.000
RESIDUAL	75302.000	126	597.635		
TOTAL	318043.333	134	2373.458		

(V) CORRECTION (CORRECTING ERRORS)

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	161740.296	4	40435.074	95.444	0.000
GROUP	10567.304	2	5283.652	12.472	0.000
LEVEL	151172.993	2	75586.496	178.416	0.000
2-WAY INTERACTIONS	5800.830	4	1450.207	3.423	0.011
GROUP LEVEL	5800.830	4	1450.207	3.423	0.011
EXPLAINED	167541.126	8	20942.641	49.433	0.000
RESIDUAL	53380.400	126	423.654		
TOTAL	220921.526	134	1648.668		

(VI) CORRECTION (JUDGING)

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	35406.919	4	8851.730	86.958	0.000
GROUP	1589.393	2	794.696	7.807	0.001
LEVEL	33817.526	2	16908.763	166.108	0.000
2-WAY INTERACTIONS	1333.852	4	333.463	3.276	0.014
GROUP LEVEL	1333.852	4	333.463	3.276	0.014
EXPLAINED	36740.770	8	4592.596	45.117	0.000
RESIDUAL	12826.000	126	101.794		
TOTAL	49566.770	134	369.901		

From the results of the 2-way ANOVA analysis, in the GJ task, the interactive effect of GROUP x LEVEL was insignificant while the main effects of either GROUP or LEVEL were significant, suggesting that the learning context has some effect on the subject's development at the knowledge level. On the other hand, significant differences were found for the main effects as well as the interactive effect for the other five tasks. Therefore, Hypothesis 4.1 is rejected in all the tasks, Hypothesis 4.2 and 4.3 are rejected in the light of the results of the CR tasks and the OP task; however, we need to qualify our claims in that it is the interaction of GROUP and LEVEL which led to the significant differences in these tasks.

7.1.4.2 Scheffé Tests: Task by Learning Environment

Since the results above show that there are differences between the three groups of subjects in their performance on each of the tasks, Scheffé tests were carried out to discover where the differences are between the proficiency levels of the three groups. The results are presented in Table (9).

Table (9). Scheffé Tests: Task by Learning Environment

(I) ORAL PRODUCTION

		CMG (P6)	CMHK(P6)	CMG (S2)	CMHK(S2)	EMHK(P6)	CMHK(S4)	CMG (S4)	EMHK(S2)	EMHK(S4)
CELL MEANS		52.66	89.20	112.00	121.86	122.93	142.80	153.80	162.20	174.93
CELL TOTALS		789.90	1338.00	1680.00	1827.90	1843.95	2142.00	2307.00	2433.00	2623.95
CMG (P6)	789.90	0	548.10*	890.10*	1038.00*	1054.05*	1352.10*	1517.10*	1643.10*	1834.05*
CMHK(P6)	1338.00		0	342.00	489.90*	505.95*	804.00*	969.00*	1095.00*	1285.95*
CMG (S2)	1680.00			0	147.90	163.95	462.00*	627.00*	753.00*	943.95*
CMHK(S2)	1827.90				0	16.05	314.10	479.10*	605.10*	796.05*
EMHK(P6)	1843.95					0	298.05	463.05*	589.05*	780.00*
CMHK(S4)	2142.00						0	165.00	291.00	481.95*
CMG (S4)	2307.00							0	126.00	316.95
EMHK(S2)	2433.00								0	190.95
EMHK(S4)	2623.95									0

df = 126 N = 15 MSE = 379.27 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 445.72 *p = 0.05

(II) DIALOGUE COMPLETION

	CMG (P6)	CMHK(P6)	EMHK(P6)	CMG (S2)	CMHK(S2)	CMHK(S4)	EMHK(S2)	CMG (S4)	EMHK(S4)
CELL MEANS	68.13	112.80	137.60	151.12	151.86	171.66	179.93	187.20	195.20
CELL TOTALS	1021.95	1692.00	2064.00	2266.80	2277.90	2574.90	2698.95	2808.00	2928.00

CMG (P6) 1021.95	0	670.05*	1042.05*	1244.85*	1255.95*	1552.95*	1677.00*	1786.05*	1906.05*
CMHK(P6) 1692.00		0	372.00	574.80*	585.90*	882.90*	1006.95*	1116.00*	1236.00*
EMHK(P6) 2064.00			0	202.80	213.90	510.90*	634.95*	744.00*	864.00*
CMG (S2) 2266.80				0	11.10	308.10	432.15	541.20*	661.20*
CMHK(S2) 2277.90					0	297.00	421.05	530.10*	650.10*
CMHK(S4) 2574.90						0	124.05	233.10	353.10
EMHK(S2) 2698.95							0	109.05	229.05
CMG (S4) 2808.00								0	120.00
EMHK(S4) 2928.00									0

df = 126 N = 15 MSE = 492.00 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 507.65 *p = 0.05

(III) GRAMMATICALITY JUDGMENT TASK

	CMHK(P6)	CMG (P6)	EMHK(P6)	CMG (S2)	CMHK(S2)	CMHK(S4)	EMHK(S2)	CMG (S4)	EMHK(S4)
CELL MEANS	227.93	240.86	247.26	255.46	261.13	297.06	301.46	306.53	315.93
CELL TOTALS	3418.95	3612.90	3708.90	3831.90	3916.95	4455.90	4521.90	4597.95	4738.95

CMHK(P6) 3418.95	0	193.95	289.95	412.95	498.00	1036.95*	1102.95*	1179.00*	1320.00*
CMG (P6) 3612.90		0	96.00	219.00	304.05	843.00*	909.00*	985.05*	1126.05*
EMHK(P6) 3708.90			0	123.00	208.05	747.00	813.00*	889.05*	1030.05*
CMG (S2) 3831.90				0	85.05	624.00	690.00	766.05	907.05*
CMHK(S2) 3916.95					0	538.95	604.95	681.00	822.00*
CMHK(S4) 4455.90						0	66.00	142.05	283.05
EMHK(S2) 4521.90							0	76.05	217.05
CMG (S4) 4597.95								0	141.00
EMHK(S4) 4738.95									0

df = 126 N = 15 MSE = 1217.21 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 798.48 *p = 0.05

(IV) CORRECTION (EXPLAINING)

	CMG (P6)	CMHK(P6)	EMHK(P6)	CMHK(S2)	CMG (S2)	EMHK (S2)	EMHK(S4)	CMHK(S4)	CMG (S4)
CELL MEANS	69.06	83.00	87.73	120.73	149.66	155.26	158.40	172.93	199.20
CELL TOTALS	1035.90	1245.00	1315.95	1810.95	2244.90	2328.90	2376.00	2593.95	2988.00

CMG (P6) 1035.90	0	209.10	280.05	775.05*	1209.00*	1293.00*	1340.10*	1558.05*	1952.10*
CMHK(P6) 1245.00		0	70.95	565.95*	999.90*	1083.90*	1131.00*	1348.95*	1743.00*
EMHK(P6) 1315.95			0	495.00	928.95*	1012.95*	1060.05*	1278.00*	1672.05*
CMHK(S2) 1810.95				0	433.95	517.95	565.05*	783.00*	1177.05*
CMG (S2) 2244.90					0	84.00	131.10	349.05	743.10*
EMHK(S2) 2328.90						0	47.10	265.05	659.10*
EMHK(S4) 2376.00							0	217.95	612.00*
CMHK(S4) 2593.95								0	394.05
CMG (S4) 2988.00									0

df = 126, N = 15, MSE = 597.64, F crit =1.95 at p = 0.05, K-1=9,
Fs = 17.55, t'crit =560.94, *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

	CMG (P6)	CMHK(P6)	EMHK(P6)	CMHK(S2)	CMG (S2)	CMHK(S4)	EMHK(S2)	EMHK(S4)	CMG (S4)
CELL MEANS	62.53	68.93	77.80	107.53	117.80	138.86	145.73	155.60	156.06
CELL TOTALS	937.95	1033.95	1167.00	1612.95	1767.00	2082.90	2185.95	2334.00	2340.90

CMG (P6)	937.95	0	96.00	229.05	675.00*	829.05*	1144.95*	1248.00*	1396.05*	1402.95*
CMHK(P6)	1033.95		0	133.05	579.00*	733.05*	1048.95*	1152.00*	1300.05*	1306.95*
EMHK(P6)	1167.00			0	445.95	600.00*	915.90*	1018.95*	1167.00*	1173.90*
CMHK(S2)	1612.95				0	154.05	469.95	573.00*	721.05*	727.95*
CMG (S2)	1767.00					0	315.90	418.95	567.00*	573.90*
CMHK(S4)	2082.90						0	103.05	251.10	258.00
EMHK(S2)	2185.95							0	148.05	154.95
EMHK(S4)	2334.00								0	6.90
CMG (S4)	2340.90									0

df = 126 N = 15 MSE = 423.65 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 471.07 *p = 0.05

(VI) CORRECTION (JUDGING)

	CMG (P6)	CMHK(P6)	EMHK(P6)	CMHK(S2)	CMG (S2)	CMHK(S4)	EMHK(S2)	EMHK(S4)	CMG (S4)
CELL MEANS	38.53	39.00	40.33	58.93	62.00	71.46	74.86	79.40	80.73
CELL TOTALS	577.95	585.00	604.95	883.95	930.00	1071.90	1122.90	1191.00	1210.95

CMG (P6)	577.95	0	7.05	27.00	306.00*	352.05*	493.95*	544.95*	613.05*	633.00*
CMHK(P6)	585.00		0	19.95	298.95*	345.00*	486.90*	537.90*	606.00*	625.95*
EMHK(P6)	604.95			0	279.00*	325.05*	466.95*	517.95*	586.05*	606.00*
CMHK(S2)	883.95				0	46.05	187.95	238.95*	307.05*	327.00*
CMG (S2)	930.00					0	141.90	192.90	261.00*	280.95*
CMHK(S4)	1071.90						0	51.00	119.10	139.05
EMHK(S2)	1122.90							0	68.10	88.05
EMHK(S4)	1191.00								0	19.95
CMG (S4)	1210.95									0

df = 126 N = 15 MSE = 101.79 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 230.91 *p = 0.05

Keys:

Learning Environment
EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou

Year of Learning
P6: Primary Six
S2: Secondary Two
S4: Secondary Four

Types of Tasks
OP : Oral Production
DC : Written Dialogue Completion
GJ : Timed Grammaticality Judgments
CR(E) : Correction (Explaining)
CR(C) : Correction (Correcting Errors)
CR(J) : Correction (Untimed Judgments)

7.1.4.3 Interpretation of the Results

The results further confirm our hypotheses that there are significant differences in the subjects' performance on the tasks between the proficiency levels of the three groups of subjects who came from different learning environments. These results are not surprising because we did expect differences in the subjects' performance due to the general difference in the proficiency level. However, if we compare the development of their ability to perform these tasks between the three groups of subjects, taking into account their development over time within the same group, it is interesting to find that some of the sig-

nificant interactions between the groups as shown in the Scheffe results above may be due to the difference in the learning environment.

The results reveal that the OP task which demands automatic retrieval of IL knowledge in producing appropriate questions is a significant factor in contributing to a big discrepancy between the different levels of the EMHK and the CMHK or CMG subjects. When sufficient time is allowed to produce appropriate questions as in the DC task, the subjects from the CMG and CMHK environments, from S2 level onwards, were shown to perform better to the extent that they could produce similar performance as the EMHK subjects at equivalent levels.

Even though the GJ task also demands a certain degree of automaticity, it is easier than the OP task for both the CMHK and CMG subjects because this task is mainly to do with the form of the language and with recognition rather than with production. As a result, relatively fewer significant differences were found between the S2 and S4 levels within as well as between the groups. In fact, it seems that by S4 level, all three groups of subjects were performing similarly in the judgment task, suggesting that they may share a similar level of competence as far as the interrogative system is concerned.

While the EMHK subjects, especially those at the S2 and S4 levels, were leading in their performance on the OP, DC and the GJ tasks, the results from the CR(E) task reveal that this group of subjects were largely inadequate in their ability to perform tasks which involve relatively more explicit metalinguistic knowledge, or 'articulated knowledge' in Bialystok's terms. On the other hand, it is the CMG subjects who outperformed the other two groups during the course of time,as revealed by the growing discrepancy between the scores at equivalent levels. Also, the consistent lack of significant interactions between the P6 subjects of the three environments suggest that the development of metalinguistic knowledge, especially the ability of rule verbalisation, is a rather late achievement. This finding is congruent with Sorace's results (1985) that the ability to make rules explicit is a relatively late attainment, even in a

learning environment as formal as that found in Guangzhou where the students receive a greater amount of metalinguistic input. Despite the relatively poorer performance of the EMHK subjects in the CR(E) task, comparable performance in the CR(J) and CR(C) tasks was found at equivalent levels between the EMHK and CMG or the CMHK subjects, suggesting that the EMHK subjects are not disadvantaged at all despite the general lack of emphasis on grammatical input during their learning process.

To sum up, the general lack of significant differences in the CR(C) task between the EMHK and CMG or CMHK subjects as proficiency increases reveals the fact that the EMHK subjects could perform just as well on tasks tapping the +analysed aspect of their IL knowledge. On the other hand, as proficiency increases, not only have the CMG subjects achieved a level of underlying competence comparable to the EMHK and CMHK subjects, but their IL knowledge is also qualitatively more analysed than the other two groups, even though they started late in learning English. Nevertheless, such rapid development at the level of metalinguistic knowledge does not guarantee fluent access to their knowledge in production in meaningful contexts.

Lastly, the results of the Scheffe tests further indicate that most of the differences lie between the EMHK and the CMHK or the CMG subjects while the differences between the CMHK and CMG subjects are not always significant, suggesting that while the CMG subjects are gaining ground over time in their IL development, the CMHK subjects appear to be lagging behind.

7.1.5 Interim Summary

A summary of the above analysis is provided below:

(a) The ANOVA results (Section 7.1.2.1.) suggest that significant improvement was shown in each elicitation task between the levels of each group and these results can be attributed to the length of exposure to the TL. However, the results from the Scheffe tests (Section 7.1.2.2.) indicate that the S2 and S4 level of the EMHK subjects are the only two levels who did not show any differences in their performan-

ce on the elicitation tasks.

(b) The results from the Pearson Product-moment Correlations (Section 7.1.3.1.) suggest that different tasks in fact impose different demands on the subjects. The GJ and the OP task, which tap the automatic retrieval of IL knowledge in its unanalysed form, were shown to behave differently from the other tasks which showed a stronger relationship between each other as a result of their dependence on the analysed aspect of IL knowledge.

(c) The results from ANOVA between tasks (Section 7.1.3.2) further confirm that the subjects showed different performance on the elicitation tasks.

(d) Comparisons between the three groups of subjects were carried out on each of the elicitation tasks and significantly different performance between the groups in all the tasks were found. However, these significant differences can be explained in terms of the interactive effect of the learning environment as well as the proficiency level in most of the tasks being examined.

7.2 Development of the Types of Questions

In this section, the analysis will be centred upon the analysis of the production of semantically appropriate and grammatically well-formed questions in the OP and the DC tasks. Although the ten questions selected for the present study can be classified broadly as WH-questions (referred to as **WH-Q** hereafter), Yes-NO Questions (referred to as **YN-Q** hereafter), and Embedded Yes-NO Questions (referred to as **EYN-Q** hereafter), in the following analysis, each question is treated independently of the others to allow more detailed investigation of their development.

Before we proceed to the analysis, it should be mentioned here that two items which were supposed to induce the production of the WHEN + COP questions in the OP and DC tasks were discarded after the experiment, for the reason that most of the subjects preferred to express the future aspect with future tense, which involves an auxiliary 'will' and an 'infinitive verb'. For

example, instead of asking **'When is the next swimming competition?' (DC Q.18)**, most subjects would say ***'When will the next competition?', *'When will be the next competition?'** or **' When will the next competition be held?'**. In view of the difficulty in scoring these items according to the desired type of Q-operators and in the subjects' failure of encoding the semantic aspect of futurity with the simple present tense, the researcher decided to discard these items.

7.2.1 Preliminary Analysis of the Mean Scores of Q-types

The mean percentage scores and the mean raw scores of each type of question in the OP and DC tasks are presented in Appendix 7a (Table 10a and 10b) respectively. The mean percentage scores in Table (10a) show that, for all three groups of subjects, there was improvement in the performance on most types of questions over time, and this phenomenon is consistent across the two tasks attempted by the subjects. However, exceptions were found where improvement was quite slow with WHERE, WHEN, WHY and YN-Qs between the S2 and the S4 levels of the EMHK subjects. On the other hand, there seems to be little improvement in EYN-Qs with the CMHK subjects, while considerable improvement was shown among the Q-types with the CMG subjects.

7.2.2 Variability due to Time (Year of Learning)

The analysis that follows is an attempt to find out whether the subject's IL knowledge of these ten questions showed significant improvement over time (i.e. Hypothesis 1 as stated in Section 6.4.1.).

7.2.2.1 ANOVA : Time as Factor

The results as shown in Appendix 7b (Table 11a, 11b and 11c) were produced by a one-way ANOVA comparing the performance of the subjects between the three proficiency levels.

The results from Q-type by proficiency level analysis show that there is significant improvement in the performance on each type of question over time for the EMHK and the CMG subjects, implying that the subjects' IL knowledge of these ten questions was progressing diachronically and increasing in its complexity and

such a phenomenon was dependent on the amount of time they spent on learning the TL language (Table 11a and 11c). As for the CMHK subjects, significant differences were found in all types of questions except EYN-Qs where their performance was insignificant between the levels (Table 11b). In view of the results, Hypothesis 1 as stated in Section 6.4.1. is rejected in all cases except EYN-Qs with the CMHK subjects.

7.2.2.2 Scheffé Tests: Q-types by Level

Having confirmed that the performance of the three proficiency levels within each group is significantly different, our next procedure is to find out where these differences are. The tables showing the results of the Scheffé tests on the performance of each group of subjects can be found in Appendix 7c (Tables 12a, 12b, 12c).

From the results of the performance of the **EMHK** subjects (Table 12a), significant improvement in almost all Q-types was found between the P6 and S2 or S4 subjects. However, the performance between the S2 and S4 subjects was consistently found to be not significant, though exceptions were found in WHICH-Qs in the OP task and EYN-Qs in the DC task. It seems that the EMHK subjects' development of the different types of questions is slowing down gradually as the subjects are nearing the target structures, or in fact reaching fossilisation, as revealed by the consistent lack of significant interactions between the S2 and S4 levels on most of the questions in both tasks.

As regards the performance of the **CMHK** subjects, in general, insignificant differences were found in most of the Q-types between the S2 and S4 levels except WHO-Qs and WHEN-Qs in the DC task, and WHERE-Qs, WHEN-Qs and HOW-Qs in the OP task (Appendix 7c. Table 12b). Besides, insignificant differences in the OP task were also found between the P6 and the S2 subjects in WHO-Qs, WHERE-Qs, and WHEN-Qs. It appears that the subjects from this environment are progressing rather slowly in their development of producing appropriate questions. In fact, the development of EYN-Qs was so slow between the three levels that it did not achieve any significance throughout.

As for the **CMG** subjects, the performance on the Q-types between the P6 and S2 or S4 subjects was usually significant, suggesting that there is significant improvement over time between the levels compared (Appendix 7c. Table 12c). However, as proficiency increases, the significant interactions for certain types of questions also decreases, especially those which we normally consider to be early acquired questions like WHAT-Qs, WHY-Qs and YN-Qs and this pattern of development is similar across the two tasks examined and is more obvious in the DC task.

7.2.3 Variability due to Different Q-types

Having confirmed in the earlier section that the acquisition of each Q-type is developmental over time, our next analysis is an attempt to investigate synchronic variability in the subjects' performance between the ten different types of questions. In this section, our initial investigation is to test whether the acquisition of the ten Q-types is developmental or not. If we can reach a position in which we are allowed to reject the null hypothesis, we can proceed to establish an order of acquisition for the ten types of questions for each group of subjects in the Rasch analysis that follows and compare these orders with an attempt to discover whether a universal sequence exists or not. To recapitulate, the null hypothesis with respect to the development of Q-types as stated in Section 6.4.3. is:

HYPOTHESIS 3

H_0: There is no order of development of the interrogative system with respect to:

(a) the order of the types of questions.

7.2.3.1 ANOVA : Q-types as Factor

As our ultimate goal is to establish an order of acquisition for each group of subjects who learnt the TL in a particular learning environment and to compare these orders between them, the 45 subjects from the three levels were grouped together to form one sample population. The analysis was based on a one-way ANOVA with a repeated measure design (i.e. procedure MANOVA in SPSSx). Since the total raw scores for the three broad types of questions are different, the author decided to use the

percentage scores in this analysis in order to strike a fair comparison between the means of the questions. The results of the ANOVA analysis can be found in Appendix 7d (Tables 13a, 13b and 13c).

The results indicate that the comparison of the subjects' performance between the ten types of questions is highly significant in both tasks for the three groups of subjects, thus allowing us to reject the null hypothesis that there is no significant development between the types of questions under investigation.

7.2.3.2 Scheffé Tests: Q-types as Factor

In this section, the results of the Scheffé tests between the Q-types for each group of subjects are presented in Appendix 7e (Tables 14a, 14b and 14c).

As regards the performance of the **EMHK** subjects, the results show that the significant interactions were usually found between WHOSE-Qs, WHICH-Qs, HOW-Qs or EYN-Qs and the other types of questions in the OP as well as the DC tasks, implying that these Q-types are relatively more difficult to acquire than the others (Table 14a). On the other hand, the lack of significant interactions between WHO-Qs, WHAT-Qs, WHERE-Qs, WHEN-Qs, WHY-Qs and YN-Qs indicates that, as far as the development of these types of questions is concerned, similar performance was found among them in both tasks examined.

A similar pattern of significant interactions was found with the **CMHK** subjects (Appendix 7e. Table 14b). However, no significant differences were found among these two sets of questions themselves.

Table (14c) of Appendix 7e presents the results of the Scheffé tests of the **CMG** subjects. As far as this group of subjects is concerned, there are more significant interactions between the Q-types in the OP task than in the DC task. In fact, this picture poses a stark contrast when we compare the pattern of significant interactions between the three groups of subjects on the two tasks together, which suggests that there is a greater

amount of variation in the performance on the Q-types among the CMG subjects as a result of task differences. The findings from the CMG subjects also reveal that the number of significant interactions reduces drastically as the task allows time for the subjects to 'monitor' their performance via the use of metalinguistic knowledge, thus further confirming the previous finding that the discrepancy between the OP and DC tasks is very much greater in this group of subjects than in the CMHK and especially the EMHK subjects.

7.2.3.3 Interim Discussion

From the results, in appears that since all three groups of subjects are classroom learners of a certain type, tasks which tap the degree of automaticity or automaticity plus function as in the OP task would yield more variable performance between the Q-types under study. Furthermore, the more formal the type of classroom environment is, the more variable the performance between the Q-types in these tasks one can find, as evidenced in the performance between the OP and the DC tasks of the CMG learners.

As far as the performance on the Q-types is concerned, for all three groups of subjects, as mentioned earlier, while WHAT-Qs and WHERE-Qs were found to be easiest, WHOSE-Qs, WHICH-Qs, and EYN-Qs were found to be relatively more difficult than the others. This phenomenon is quite consistent in both the OP and the DC tasks, which suggests that these three types of questions would appear late in the developmental continuum.

Despite the common occurrences in the subjects' performance on the Q-types mentioned above, there are some differences as to the degree of difficulty for certain types of questions between the three groups of subjects.

With the **EMHK** subjects, the YN-Qs, which we would expect to show relatively better performance, turned out to be more difficult than WHAT-Qs, WHERE-Qs, WHY-Qs or WHEN-Qs, though not always shown to be significantly different from them. It seems that this group of subjects, having been given a great deal of opportunity of using English colloquially, no longer regard un-

inverted YN-Q as unacceptable and have included this feature in their repertoire. Besides, there is a possibility that L1 influence is at work here since the interrogative system of Cantonese does not require inversion, and the informal input they receive also enhances the feasibility of asking declarative questions.

As regards the **CMG** subjects' performance on YN-Qs, the pattern of learning which we found among the EMHK subjects does not exist in the sense that these types of questions were consistently found among the easier questions like WHAT-Qs or WHERE-Qs. It seems that without the benefit of any informal exposure and being subjected to massive metalinguistic input, these subjects would only resort to the most formal syntactic structure in forming questions, which results in the better performance of YN-Qs. Moreover, unlike the EMHK and the CMHK subjects, the CMG subjects' performance on WHOSE-Qs especially in the DC task was found to be among the easier questions. The facility of the CMG subjects in the production of WHOSE-Qs may be due to the effect of formal teaching in which the semantic features of WH-words were precisely imparted, thus minimising the chance of semantic confusion in the production of the various types of WH-Qs.

To conclude, the results of ANOVA and post-hoc Scheffé tests indicate that the development of the ten Q-types is sequential. Equipped with these results, we are in a position to establish an order of development for each group of subjects in the Rasch Analysis in the last section (Section 7.5) of this chapter.

7.2.4 Interim Summary

To recapitulate, the results of the subjects' performance are summarised as follows:

(a) Each group of subjects showed significant differences in their performance on each type of question over time. From the results of the Scheffé tests, most significant interactions on the types of questions performed by the CMHK and the EMHK subjects were found between the P6 and S2 or S4, but not between

S2 and S4 levels, suggesting that the learning process of these two groups of subjects is slowing down over time.

(b) Significant differences were also shown when we compared the subjects' performance between the ten Q-types together, implying that there is an order of development for the questions under investigation.

7.3 Development of Inversion

The central aim of the analysis in this section is about the subjects' development of inversion in different Q-types and of the three broad types of Q-operators, namely the **Copula**, **Modal** and **Do**. The analysis is based on the assumption that the development of inversion is not instantaneous and, as such, the subjects' performance on inversion is variable in that it may be first applied in some types of questions or Q-operators before the others. The first part of the analysis will concentrate on the development of inversion in different Q-types. In this analysis, the development of non-inversion in EYN-Qs will also be brought into the scope in order to investigate the subjects' development of the entire concept of inversion within the interrogative system.

Before we tackle this issue, we need to verify whether inversion develops over time in each group of subjects. The mean percentage scores and the mean raw scores of the subjects' performance on inversion in different Q-types can be found in Appendix 8a (Tables 15a and 15b).

7.3.1 Development of Inversion in Different Q-types

7.3.1.1 Preliminary Analysis on the Mean Scores of Inversion in Different Q-types

The different percentage scores between the proficiency levels as shown in the tables suggest that the subjects' development of inversion in YN-Qs and WH-Qs increases in complexity over time (Appendix 8a. Table 15a). Moreover, the differences in the percentage scores across the different types of questions also suggest that the inversion rule behaves differently in different types of questions. Among the scores of the Q-types of the CMHK and CMG subjects, non-inversion in EYN-Qs exhibits a different

pattern of development in the sense that the percentage scores of the P6 subjects are in some cases bigger than that of the S2 subjects and this phenomenon is consistent across the different elicitation tasks, suggesting that regression took place during the learning process of this type of question. In fact, it can be explained by the fact that these P6 subjects preferred to use uninverted EYN-Qs in the beginning of their acquisition of EYN-Qs, which were gradually taken over by their knowledge of inversion when acquiring the simple questions. This finding provides some evidence that the initial stage of development with respect to the acquisition of EYN-Qs as far as Cantonese learners are concerned is in accord with some universal unmarked knowledge from which the subjects' IL knowledge develops.

7.3.1.2 Variability due to Time (Year of Learning)

The analysis that follows is an attempt to test if the development of inversion between the different levels of subjects in each learning environment is significant. ANOVA and post-hoc Scheffé tests were adopted in the analysis. The null hypothesis (i.e Hypothesis 1 of Section 6.4.1.) states that there are no significant differences between the three levels of proficiency.

7.3.1.2.1 ANOVA : Time as Factor

The results presenting the performance of each group of subjects between the proficiency levels can be found in Appendix 8b (Tables 16a, 16b and 16c). They largely confirm the hypothesis that there is significant development between the three levels of subjects within each learning environment. In effect, these significant differences were generally found in all the tasks except the GJ task where only a few significant differences were reported.

7.3.1.2.2 Scheffé Tests : Inversion by Level

Having confirmed that there is significant development of inversion in the majority of the elicitation tasks, our next step is to discover the development of inversion between the levels by means of Scheffé tests. The tables showing the results of the Scheffé tests can be found in Appendix 8c (Tables 17a, 17b and 17c).

Despite the fact that the **EMHK** subjects' mean percentages of inversion suggest improvement in relation to the length of exposure, the results from the Scheffe tests reveal that significant interactions occur between the P6 and S2 or S4 levels, while the difference in the performance between the S2 and S4 levels is not significant in most cases except for EYN-Qs in the CR(E) and the CR(C) tasks, and WHICH-Qs in the OP task (Table 17a). If we compare the **t'obs** values of EYN-Qs between the tasks, those in the CR(E) and the CR(C) tasks are usually bigger than those in the OP and DC tasks, suggesting that while the subjects are slowing down in the development of EYN-Qs at the production level, relatively faster development was found in the development of their metalinguistic knowledge of this structure. As for WHICH-Qs in the OP task, the results indicate that as far as this type of question is concerned, significant improvement on inversion was still found over time.

As for the **CMHK** subjects, in general, a contrast was shown in terms of the development of inversion in the different tasks under investigation. From the results, there appears to be a great deal of development of this rule in most Q-types in the CR(E) and the CR(C) task while such extent of development was not found in the OP and the DC tasks (Table 17b). This significant improvement in most of the questions in the CR tasks suggests that the CMHK subjects' metalinguistic knowledge of inversion was improving over time. Though equipped with some formal knowledge of the interrogative system, it appears that this group of subjects, the S2 as against S4 in particular, failed to operate it when they were required to ask appropriate questions in performing both the OP and DC tasks.

Table (17c) of Appendix 8c presents the results of the **CMG** subjects. Like the CMHK subjects, significant development in terms of explaining the rule was found between the levels. In terms of correcting the error of inversion, it is interesting to discover that insignificant interactions were found between the P6 and S2 or S4 levels with regard to the YN-Qs. A review of the comparably higher mean percentage scores of this question between the levels (Appendix 8a) reveals that the subjects were able to correct inversion in this question at an early stage of

development. Though insignificant interactions were also found with WHO-Qs and WHY-Qs between the P6 and S2 levels, the relatively lower mean percentage scores indicate that the development of correcting inversion was slower than in these 2 Q-types, that found in YN-Qs. On the other hand, significant improvement in most questions was found between the levels in the OP and DC tasks. In the DC task, however, similar performance was found between the S2 and S4 levels in WHO-Qs, WHAT-Qs, WHY-Qs, HOW-Qs, WHICH-Qs, and YN-Qs, suggesting that development was slowing down.

7.3.1.3 Variability due to Inversion in Different Q-types

The analysis above provides some evidence that the subjects' performance on inversion in the different types of questions is variable. The following analysis is an attempt to investigate this variability in Q-types. The null hypothesis states that no differences are found in the subjects' performance on inversion between the ten Q-types (i.e. Hypothesis 3 of Section 6.4.3).

7.3.1.3.1 ANOVA : Inversion by Q-types as Factor

In the following analysis, MANOVA in SPSSx was used as the method of analysis and the percentage scores were used. The results of this analysis can be found in Appendix 8d (Tables 18a, 18b and 18c), which reveal that the development of inversion between the ten Q-types was significant for each group of subjects. In the light of the results indicated, the null hypothesis that there are no significant differences for the development of inversion between the Q-types is rejected and we can proceed to discover the significant relations via the use of Scheffé tests.

7.3.1.3.2 Scheffé Tests: Inversion by Q-types

The results of the Scheffé tests for each group of subjects are presented in Appendix 8e (Tables 19a, 19b and 19c).

The results (Table 19a) from the **EMHK** subjects indicate that the development of inversion was quite stable with respect to WHO-Qs, WHAT-Qs, WHERE-Qs, WHEN-Qs, WHY-Qs, and YN-Qs in the OP and

DC tasks, while significant interactions were found between questions such as WHOSE-Qs, WHICH-Qs, and HOW-Qs and the other types of questions. Furthermore, significant differences in the subjects' performance on non-inversion in EYN-Qs were always found in the two tasks. On the contrary, there was a general lack of significant interactions between most of the questions except EYN-Qs in the other three tasks. The lack of significant interactions in the CR(E) and CR(C) tasks can be explained by the fact that in the CR(E) task, most of the subjects were not able to explain the violation of inversion in the ungrammatical sentences while they could in most cases correct the mistakes. In fact, they found it easier to explain and correct the violation of inversion in YN-Qs than WH-Qs where similar performance was found, and non-inversion in EYN-Qs appears to be consistently more difficult to perform than inversion in most tasks.

The EMHK subjects' performance on the GJ task seems to be different from the other tasks in the sense that there were fewer significant relations among the Q-types and certain questions appear to behave differently in this task. Inversion in WHY-Qs and YN-Qs, which was found to be relatively easier to perform in other tasks, was found to be relatively more difficult to judge in the GJ task, which further confirms the previous finding in Section 7.2.3.3 as regards the EMHK subjects' relatively poorer performance on YN-Qs. On the other hand, although it was found that HOW-Qs were relatively more difficult to invert in the OP and the DC task, the violation of inversion in this Q-type turned out to be easier to judge than the other types of questions, and also easier to correct in the CR(C) task.

The **CMHK** subjects generally produced similar results as the EMHK subjects did. However, unlike the EMHK subjects, the CMHK subjects were more consistent in their performance on YN-Qs across tasks, and their performance on this question in the CR(E) was significantly different from that of other Q-types, suggesting that the development of inversion was consistently earlier in YN-Qs than in other types of questions across the tasks (Table 19b).

The **CMG** subjects, while largely similar to the CMHK subjects with respect to their performance on YN-Qs, also found inversion in WHY-Qs relatively more difficult to perform across the tasks (Table 19c). Moreover, the relative ease this group of subjects had with non-inversion in EYN-Qs in the OP task has already been explained in Section 7.3.1. Moreover, when the subjects were allowed time to monitor their performance, non-inversion became relatively more difficult than inversion in simple questions, suggesting that their metalinguistic knowledge of inversion may interfere with their performance on non-inversion in EYN-Qs, whenever time was allowed for them to monitor their output.

7.3.1.4 Interim Summary

In this section, we attempted to investigate the development of inversion in the ten Q-types selected for the study. The results are summarised as follows:

(a) Significant Improvement on inversion was largely shown between the three levels of proficiency in the OP, DC, CR(E) and CR(C) tasks, but not so in the GJ task for all three groups of subjects.

(b) Inversion was also shown to behave differently in different questions, from the results of the MANOVA analysis (Section 7.3.1.3.1). Significant differences were generally found between WHICH-Qs, WHOSE-Qs, HOW-Qs, EYN-Qs and WHO-Qs, WHAT-Qs, WHERE-Qs, WHY-Qs and YN-Qs, suggesting that inversion in the former types of questions is developmentally more difficult than the latter types.

7.3.2 Development of Inversion of Q-Operators

In the following section, the development of inversion was examined in relation to the three types of Q-operators selected for this study, which are **Be**, **Modal** and **Do**. Among them, Be is used as a Copula and the Modal and Do are used as auxiliary verbs. The mean percentage and mean raw scores of the subjects' performance on inversion of Q-operators can be found in Appendix 9a (Tables 20a and 20b).

7.3.2.1 Preliminary Analysis of the Mean Percentage Scores of Inversion of Q-operators

The mean percentage scores of Table 20a of Appendix 9a reveal improvement over time as well as variability between the three types of Q-operators. In general, the group means suggest that inversion of Do was relatively more difficult than that of Modal and Be where the discrepancy as shown was not considerable. However, a comparison on the subjects' performance at each individual level suggests that as proficiency increases, the EMHK and CMG subjects' development of inversion of Do becomes comparable to or just exceeds that of Be in the OP and DC tasks, while their performance in the GJ and CR tasks indicates that inversion of Do is relatively more difficult, with the exception of the CMG(S4) subjects who ultimately found explaining inversion of Do easier than Be and Modal. The CMHK subjects, on the other hand, found inversion of Modal easier than the others with improvement in proficiency; but their development of inversion of Do remained relatively slower than the other two groups of subjects. Therefore, the results suggest that the three groups of subjects performed variably with respect to inversion of the different Q-operators.

7.3.2.2 Variability due to Time (Year of Learning)

7.3.2.2.1 ANOVA: Time as Factor

The following analysis is an attempt to test whether the three groups of subjects form a continuum in the development of inversion of the three Q-operators. Our null hypothesis states that there are no significant differences in the subjects' performance between the three proficiency levels (i.e. Hypothesis 1 of Section 6.4.1.). The ANOVA results can be found in Appendix 9b (Tables 21).

From the results, significant differences were found for all three groups of subjects in the OP, DC and the two CR tasks. In the light of the results, Hypothesis 1 is rejected in the four tasks mentioned. As regards the GJ task, no differences were found for all the Q-operators among the EMHK subjects (Table 21) but differences were found for Modal and Do with the CMHK subjects (Table 21) and Do with the CMG subjects (Table 21) . The consistent lack of significant interactions between

the levels with respect to inversion of Be in the GJ task among all three groups of subjects provides further hints that inversion of Be may be acquired earlier than the others, at least at their level of competence.

7.3.2.2.2 Scheffé Tests: Inversion of Q-operators by Level

The procedure that follows is an attempt to investigate further the development of inversion of the Q-operators between the levels by using pair-wise Scheffé tests, the results of which can be found in Appendix 9c (Tables 22).

The results indicate that, for the EMHK subjects, significant differences were found between the P6 and S2 or S4 subjects in all the tasks examined (Table 22). For the other two groups of subjects, significant improvement over time was shown in most cases, especially with inversion of Do, suggesting that there may be some effect of teaching on the development of DO.

7.3.2.3 Variability due to the Different Q-operators

The following analysis is about the subjects' performance on the three Q-operators in each of the task situations. Our main concern, apart from examining whether there exists an order of development, is to investigate the effect of intensive teaching of inversion of these types of Q-operators on the subjects' IL development. The null hypothesis states the development of inversion in these three main types of Q-operators is not developmental (i.e. Hypothesis 3 of Section 6.4.3.).

7.3.2.3.1 ANOVA: Inversion of Q-operator as Factor

The tables presenting the results of the subjects' performance on inversion of Be, Modal and Do in different task situations can be found in Appendix 9d (Tables 23a, 23b and 23c).

The results indicate that, for all three groups of subjects, the development of inversion of the three Q-operators is significant in all but the DC task performed by the EMHK subjects, thus allowing us to reject the null hypothesis in these cases and adopt the working hypothesis that there are significant differences in the subjects' performance on inversion of the three types of Q-operators in most of the task situations.

7.3.2.3.2 Scheffé Tests: Q-operator as Factor

Having confirmed that there are differences in the subjects' performance on inversion of the Q-operators, Scheffé tests were carried out to investigate further the relationship between the Q-operators by pair-wise comparisons. The results of the Scheffe tests can be found in Appendix 9e (Tables 24a, 24b and 24c).

The results indicate that the **EMHK** subjects' performance on inversion of Do (Table 24a. Appendix 9e) is generally different from the other two Q-operators, implying that Do is, developmentally speaking, more difficult to acquire, though its relation with either or both of the other two Q-operators did not reach significance level in the OP, DC and GJ tasks. On the other hand, significant interactions between Be and Modal were found only in the OP and GJ tasks, suggesting that for this group of subjects, their performance on the inversion of Modal and Be was quite stable in general, especially in the untimed tasks. The similar percentage scores of these two Q-operators across the three levels of proficiency also indicate this tendency (Appendix 9a).

The results from the **CMHK** subjects are different from the EMHK subjects in that the subjects' performance on inversion of Do was consistently different from both Be and Modal which in turn did not display any significant difference except in the GJ task where Be was found to be easier to judge than the Modal (Table 24b). A review of the differences in the percentage scores of these three Q-operators between the three levels in each of the elicitation tasks shows that there is always a big gap in the scores between inversion of Do and that of either Be or Modal (Appendix 9a). It seems that this group of subjects had great difficulty reaching the stage where inversion is applied to Do. The effects of intensive teaching of inversion of Do did not seem to have created any significant learning effect among this group of subjects.

As for the **CMG** subjects, while displaying similar difficulty in inversion of Do, their performance of this Q-operator and the Modal was poorer than Be, as revealed by the significant differences between them (Table 24c). Though the subjects performed

poorly on inversion of Do and the Modal, a survey of the percentage scores reveals that there was considerable development of inversion of these two Q-operators, especially between P6 and S2 level. By S4, its development is almost comparable to Be. Moreover, while intensive teaching did not create significant learning effects among the CMHK subjects, it seems that it somehow accelerated the rate of development of inversion of these two Q-operators among the CMG subjects. However, as far as the order of development is concerned, intensive grammatical input as experienced by the CMG subjects did not seem to have altered the developmental sequence.

7.3.2.4 Variability due to Task Differences

Another issue in relation to synchronic variability is whether the subjects invert the Q-operators consistently in the tasks under investigation. To test this issue, the subjects' performance on inversion of each of the three Q-operators between the tasks was compared. The null hypothesis states that there are no significant differences in the subjects' performance in their application of inversion with each of the Q-operators between the elicitation tasks (i.e. Hypothesis 2.2 of Section 6.4.2.).

7.3.2.4.1 ANOVA :Inversion of Q-operators Between Tasks

For the analysis, MANOVA in SPSSx was adopted and the mean percentage scores were used. The tables presenting the results of the ANOVA analysis can be found in Appendix 9f (Tables 25a, 25b and 25c).

The results indicate that the subjects from each learning environment showed significant differences in their retrieval of inversion in different task conditions. In the light of the results, the null hypothesis that there are no differences in the subjects' performance on the inversion of Q-operators between the tasks is rejected and our next task is to discover the differences via the adoption of the Scheffé tests. The tables showing the results of the Scheffé tests can be found in Appendix 9g (Tables 26a, 26b and 26c).

7.3.2.4.2 Scheffé Tests: Inversion of Q-operators Between Tasks

From the results presented in Table 26a of Appendix 9g of the **EMHK** subjects' performance, significant differences in the inversion of the Q-operators were generally found with Be and Do but not the Modal among the OP, DC and CR(C) tasks. Also, their performance on all the three Q-operators in these tasks was also found to be significantly different from either the CR(E) or the GJ tasks, which in turn did not show any significant differences between each other, suggesting that these subjects had difficulty in performing the three Q-operators in these two tasks. Moreover, as mentioned previously, inversion of the two modals in this study, **Can** and **Should**, was found to be insignificant among the OP, DC and the CR(C) tasks, suggesting that the retrieval of the inversion rule for these two modals is relatively more automatic than that of Be and Do, since time difference in the three production tasks does not result in differences in their performance.

The **CMHK** subjects appear to have some difficulty in the development of inversion of the Q-operators, as suggested by the lack of significant differences among most of the tasks, especially the OP, CR(E) and the GJ tasks (Table 26b. Appendix 9g). Most of the significant differences were found between the DC or CR(C) tasks and the first three mentioned previously. These findings suggest that the development of the automatic retrieval of inversion of any of the Q-operators under study is quite slow as far as this group of subjects are concerned. Moreover, as the application of inversion also depends on the emergence of the appropriate Q-operators, the poorer performance of inversion of Do when compared with the other two operators can also be explained by the fact these subjects have difficulty in reaching the stage where Do is re**more readily** available for them to manipulate.

Similarly to the CMHK subjects, significant differences were found in the **CMG** subjects mainly between the CR(C) or the DC tasks and the OP, GJ and the CR(E) tasks in turn did not show any differences in the subjects' performance among them (Table 26c. Appendix 9g). The retrieval of inversion of Q-operators

was found to be the easiest with the CR(C) task in general, to be followed by the DC and the CR(E) tasks, which suggests that these subjects showed heavy reliance on their metalinguistic knowledge for better performance. This phenomenon may also explain the difficulty this group of subjects had in retrieving such knowledge in the OP task, as revealed by the significantly poorer performance between this task and the others. Lastly, the late emergence of Do together with the slow improvement of automatic retrieval of metalinguistic knowledge in language production, especially when contextual knowledge is involved, provide some explanation for the general lack of significant interactions between the tasks in the subjects' performance on inversion of Do.

7.3.2.5 Variability due to Learning Environment

In the previous section, we have obtained some preliminary evidence that the development of inversion of the three Q-operators is largely sequential. Also, the order of difficulty in inverting the three Q-operators as revealed by each group of subjects appears to be similar, though its degree of difficulty was shown to be different. In the following analysis, we attempt to investigate further the issue of 'the degree of difficulty', i.e. whether the three groups of subjects exhibit a similar rate of development with respect to each of the Q-operators, with the rationale that, since inversion with respect to the three types of Q-operators, especially Do, was taught in one form of method or other during the course of learning among the three groups of subjects, it is interesting to compare the subjects' rate of development between them. As mentioned in Section 7.1.4., a direct comparison between the three groups of subjects may not be justifiable. However, as the findings revealed by the results of a 2-way ANOVA carried out on the subjects' task performance (Section 7.1.4.1.) has provided us with some hints about the general pattern of development of the three groups of subjects; an attempt was made to compare their performance again, this time, with respect to the development of inversion of the Q-operators.

7.3.2.5.1 ANOVA: Learning Environment as Factor

In the following analysis, task differences were ignored for the moment and the scores of the three types of Q-operators from all the tasks were combined to form a total index of their performance on inversion of the three Q-operators. Following the method of analysis on environmental differences in task performance, a 2-way ANOVA was adopted to provide a more detailed investigation which takes into account their proficiency level. The null hypothesis states that there are no significant differences in the subjects' performance on each of the Q-operators (i.e. Hypothesis 4. of Section 6.4.4.).

The results from a 2-way ANOVA (Appendix 9h. Table 27) suggest that the main effects are in general more significant than the interactive effect of GROUP x LEVEL, with respect to which, inversion of Be was found to be insignificant. Nevertheless, the interactive effect as shown in inversion of DO and Modal was significant beyond 0.05 probability level of significance. Therefore, in the light of the results above, the null hypothesis is rejected for all the Q-operators but it is the interactive effect of GROUP x LEVEL which causes the significant differences in the performance on inversion of the Modal and Do between the three groups of subjects, while the significant differences in the subjects' performance on the inversion of Be can be explained in terms of the difference in the learning environment.

7.3.2.5.2 Scheffé Tests: Learning Environment as Factor

In the following analysis, post-hoc comparisons were made by means of Scheffé tests and the results are presented in table (28).

Table (28). Scheffé Tests: Learning Environment as Factor

(I) INVERSION OF 'BE'

		CMHK(P6)	EMHK(P6)	CMG (P6)	CMHK(S2)	CMG (S2)	EMHK(S2)	CMG (S4)	CMHK(S4)	EMHK(S4)
CELL MEANS		42.72	52.36	52.76	63.71	64.17	69.10	70.19	70.24	73.19
CELL TOTALS		640.80	785.40	791.40	955.65	962.55	1036.50	1052.85	1053.60	1097.85
CMHK(P6)	640.80	0	144.60	150.60	314.85*	321.75*	395.70*	412.05*	412.80*	457.05*
EMHK(P6)	785.40		0	6.00	170.25	177.15	251.10*	267.45*	268.20*	312.45*
CMG (P6)	791.40			0	164.25	171.15	245.10*	261.45*	262.20*	306.45*
CMHK(S2)	955.65				0	6.90	80.85	97.20	97.95	142.20
CMG (S2)	962.55					0	73.95	90.30	91.05	135.30
EMHK(S2)	1036.50						0	16.35	17.10	61.35
CMG (S4)	1052.85							0	0.75	45.00
CMHK(S4)	1053.60								0	44.25
EMHK(S4)	1097.85									0

df = 126 N = 15 MSE = 81.41 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 206.50 *p = 0.05

(II) INVERSION OF MODAL

		CMG (P6)	CMHK(P6)	EMHK(P6)	CMHK(S2)	CMG (S2)	CMG (S4)	EMHK(S2)	CMHK(S4)	EMHK(S4)
CELL MEANS		16.75	32.34	49.01	53.68	54.25	70.91	71.40	74.68	77.33
CELL TOTALS		251.25	485.10	735.15	805.20	813.75	1063.65	1071.00	1120.20	1159.95
CMG (P6)	251.25	0	233.85	483.90*	553.95*	562.50*	812.40*	819.75*	868.95*	908.70*
CMHK(P6)	485.10		0	250.05	320.10*	328.65*	578.55*	585.90*	635.10*	674.85*
EMHK(P6)	735.15			0	70.05	78.60	328.50*	335.85*	385.05*	424.80*
CMHK(S2)	805.20				0	8.55	258.45	265.80	315.00*	354.75*
CMG (S2)	813.75					0	249.90	257.25	306.45*	346.20*
CMG (S4)	1063.65						0	7.35	56.55	96.30
EMHK(S2)	1071.00							0	49.20	88.95
CMHK(S4)	1120.20								0	39.75
EMHK(S4)	1159.95									0

df = 126 N = 15 MSE = 170.97 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 299.26 *p = 0.05

(III) INVERSION OF 'DO'

		CMG (P6)	CMHK(P6)	EMHK(P6)	CMHK(S2)	CMG (S2)	CMHK(S4)	EMHK(S2)	EMHK(S4)	CMG (S4)
CELL MEANS		13.44	14.00	28.66	37.88	44.13	61.63	64.20	72.33	74.80
CELL TOTALS		201.60	210.00	429.90	568.20	661.95	924.45	963.00	1084.95	1122.00
CMG (P6)	201.60	0	8.40	228.30	366.60*	460.35*	722.85*	761.40*	883.35*	920.40*
CMHK(P6)	210.00		0	219.90	358.20*	451.95*	714.45*	753.00*	874.95*	912.00*
EMHK(P6)	429.90			0	138.30	232.05	494.55*	533.10*	655.05*	692.10*
CMHK(S2)	568.20				0	93.75	356.25*	394.80*	516.75*	553.80*
CMG (S2)	661.95					0	262.50	301.05	423.00*	460.05*
CMHK(S4)	924.45						0	38.55	160.50	197.55
EMHK(S2)	963.00							0	121.95	159.00
EMHK(S4)	1084.95								0	37.05
CMG (S4)	1122.00									0

df = 126 N = 15 MSE = 233.99 k-1 = 9 F crit = 1.94 p = 0.05
F s = 17.46 t'crit = 350.09 *p = 0.05

From the results, the development of **inversion of Be** appears to stabilise quite early in the learning process with proficiency, as suggested by the general lack of significant interactions from S2 levels onwards in all the three learning environments. For the CMG(P6) subjects, intensive teaching of Copula inversion

is evident in their comparable performance with the EMHK and CMHK subjects at equivalent levels, despite the fact that they have been learning English for only two years. In fact, during the time of the experiment, they were observed by the author to engage in classroom practice on forming Copula questions as well as the 'Do you...' type of question, implying that some teaching on this structure had been imparted.

As regards **inversion of Modal**, it seems that the performance of the CMHK and the EMHK subjects are relatively better than the CMG subjects. However, the results indicate that the CMG subjects' development of this structure between the P6 and S2 levels is more significant than that between the S2 and S4 levels, suggesting that considerable development took place in the interim years between P6 and S2.

On the other hand, despite the lack of significant interactions between the S4 subjects from the three learning contexts on **inversion of Do**, the CMHK subjects were shown to be lagging behind in their development of this structure, to the extent that by S4 level there appears to be a big gap in their development of this structure when we compare the percentage scores between the EMHK(S2) and (S4), as well as the CMG(S4) subjects. Moreover, inversion of Do does not produce any significant differences among the P6 subjects of the three environments, suggesting it is a late achievement.

In general, when the three groups of subjects were compared with respect to the rate of development of each of the Q-operators, it was found that the CMG subjects were progressing relatively more rapidly in their development of inversion of Modal and Do; to the extent that, with improvement in proficiency, they (i) may supercede the CMHK subjects in their performance, or (ii) they can almost achieve comparable performance with the CMHK or the EMHK subjects. These results suggest that the effect of intensive teaching can speed up the rate of development with respect to the structures discussed above, especially at the level of metalinguistic knowledge.

7.3.3 Interim Summary

(a) The subjects were found to exhibit a developmental pattern in their acquisition of inversion in different Q-types in which inversion in YN-Qs was found to be relatively easier than most of the WH-Qs and non-inversion in EYN-Qs was found to be almost the most different to perform in all the tasks examined (Section 7.3.1.3.1.)

(b) Inversion of the Q-operators is developmental and inversion of Do is the most difficult but some differences in the subjects' performance on the other two Q-operators were found (Section 7.3.2.3.1.).

(c) The hypothesis that the three groups of subjects displayed significant difference in their performance on inversion of the three Q-operators was confirmed and differences were found between the three groups of subjects in the retrieval of inversion in different task conditions (Section 7.3.2.4.1.).

(e) The effect of learning context on the rate of development of the inversion rule was also confirmed by the 2-way ANOVA analysis, and the CMG subjects were found to outperform the CMHK subjects in the development of inversion of Do during the course of time (Section 7.3.2.5.1.).

7.4 Development of the Rules of the Interrogative System

In this last section before we proceed to the Rasch Analysis, the author would like to compare the general development of the different rules involved in the formation of the three broad types of questions under investigation, with the aim of examining whether the three groups of subjects are following a similar order of development. The rules are categorised according to the types of questions examined:

(A) WH-Qs: (i) preposing of WH-pronouns,
(ii) subject-verb inversion, and
(iii) development of the Q-operators.

(B) YN-Qs: (i) subject verb inversion,
(ii) development of the Q-operators.

(C) EYN-Qs: (i) non-inversion,

(ii) development of the appropriate connective.

In the first part of the analysis, the issue of diachronic variability was examined with respect to : (i) the subjects' development of the formation of WH-Qs; and (ii) the subjects' development of the rules involved in YN-Qs and EYN-Qs. The second part of the analysis dealt with synchronic variability in terms of the subjects' development of these sets of rules in each of the elicitation tasks.

7.4.1 Variability due to Time (Year of Learning)
7.4.1.1 Development of the Rules of WH-Qs
7.4.1.1.1 Preliminary Analysis of the Mean Scores of WH-rules

In this analysis, the subjects' performance on individual Wh-Qs was ignored and a total index of their performance was calculated by adding up the scores for each of the rules in individual WH-Qs. The tables presenting the mean percentage scores and the mean raw scores of the subjects' performance on the three rules involved in the formation of WH-Qs can be found in Appendix 10a (Tables 29a and 29b).

The mean percentage scores (Table 29a) indicate that the subjects' performance was generally improving over time while exception was found with the EMHK(S4) subjects who showed not only poorer performance on explaining WH-preposing than the S2 subjects of the same environment, but also little improvement in their ability to explain the other two rules. This finding seems to suggest that the ability to articulate IL knowledge is almost beyond the grasp of this group of subjects, to the extent that they might not perceive the need to improve their metalinguistic knowledge, at least of the structure in question, for production in meaningful contexts.

Apart from the above phenomenon, some differences in the subjects' performance on the rules were also found. Preposing of Wh-words was consistently found in all the tasks to be relatively easier to perform than inversion and the supply of an appropriate Q-operator. On the other hand, the supply of an inappropriate Q-operator was found to be more difficult to jud-

ge, to correct, and to explain in particular, as shown in the GJ, CR(E) and the CR(C) tasks. Furthermore, the lack of substantial differences in the subjects' performance between inversion and the supply of Q-operator in the OP and DC tasks, and a bigger difference as shown in the other three tasks can be explained by (i) the nature of the task requirements, and (ii) the subjects' development of these two rules.

In the production tasks such as the OP and the DC tasks, the subjects had to supply a Q-operator before inversion can be applied. From the data, it seems that the subjects were blocked sometimes by the lack of knowledge of inversion, and at other times, by their failure to invert an appropriate Q-operator, thus producing a number of instances of inverted yet ungrammatical questions such as ***Why does Miss Wong so angry? (DC Q.4)**. If this interpretation is correct, it helps to explain why the differences are smaller in the OP and DC tasks, because supplying an appropriate Q-operator, especially Do, would ensure a greater chance of applying the inversion rule, even though we should not ignore the phenomenon of uninverted Copula and Modal questions which constitutes a major stage of the subjects' IL development. Their performance in the GJ, CR(E) and CR(C) tasks further confirms that this might be the case, as revealed by the difficulty they had with the Q-operators in these tasks.

7.4.1.1.2 Anova and Scheffé Tests: Time as Factor

In the following analysis, ANOVA and post-hoc Scheffé tests were used to examine whether the three levels of subjects within each learning environment form a developmental continuum of these rules. The null hypothesis states that there are no differences in the subjects' performance on these rules between the proficiency levels (i.e. Hypothesis 1 of Section 6.4.1.). The tables showing the results of ANOVA and Scheffé tests can be found in Appendix 10b and 10c.

As shown from the ANOVA analysis (Table 30. Appendix 10b), significant results were found in most of the tasks but inversion in the GJ task was found to be insignificant for all three groups of subjects. With these results, the null hypothesis that there are no significant differences in the subjects' per-

formance on WH-rules between the three levels of proficiency is rejected but retained in the case of inversion in the GJ task.

In fact, it is interesting to find that the three levels of subjects consistently displayed similar judgment with respect to inversion while their judgment on WH-preposing and Q-operator supply was significantly different. These findings may be an indication of the effect of teaching as frequent reinforcement does create some impact on the subjects' conception of the inversion rule during their IL development.

The results from the post-hoc Scheffé tests (Table 31. Appendix 10c) indicate that significant differences were generally found between P6 and S2 or S4 for all three groups of subjects, implying that the subjects' performance was improving over time. Nevertheless, progress was slowing down between S2 and S4 levels of the EMHK subjects, while the CMHK and CMG subjects were still progressing in their development of inversion and Q-operator supply. The development of WH-preposing, being easier than the other two rules as shown by the higher percentage scores in Table 29a of Appendix 10a, was seen to be slowing down gradually as the subjects' IL knowledge was nearing the target structure, as suggested by the consistent lack of significant differences between the S2 and S4 subjects in most of the tasks.

7.4.1.2 Development of the Rules of YN-Qs and EYN-Qs

7.4.1.2.1 Preliminary Analysis of the Mean Scores of the Rules of the YN-Qs and EYN-Qs

The tables presenting the mean percentage scores and the mean raw scores of the subjects' performance on the rules of the YN-Qs and EYN-Qs can be found in Appendix 11a (Tables 32a and 32b).

From the results (Table 32a), a similar relation was found between inversion and Q-operator supply in YN-Qs among the tasks. As for EYN-Qs, the development of non-inversion at P6 levels of the CMHK and CMG subjects has been commented on in Section 7.3.1.1.. Comparing their performance on this feature with that of the supply of an appropriate connective in the OP and DC tasks confirms the previous finding that uninverted EYN-Qs without a connective such as ***I'd like to know my son should stay in bed?' (DC Q.32)** constitutes the initial stage of the develop-

ment of this type of question.

Moreover, supplying an appropriate connective was found to be more difficult in the OP and the DC tasks, but easier in the GJ, CR(E) and the CR(C) tasks. This finding can be explained by the design of the test items for testing non-inversion in EYN-Qs. While just one error was included in the testing of the supply of the connective, such as ***'I'd like to know the babies are hungry.'**, the test items for testing non-inversion such as (i) ***'I'd like to know can Mr. Chan jump over the wall.' (CR Q.48)** or (ii) ***'I'd like to know that is the cup on the table.' (CR Q.30)** contains two errors, though the main feature tested is inversion in the ungrammatical sentences. It might be that it is more difficult for the subjects to analyse one error, as in the omission of the connective, than inversion plus the omission or the supply of an inappropriate connective.

Nevertheless, from the performance of the subjects on these types of ungrammatical sentences in the CR(E) and CR(C) tasks, most of them regarded (i) as correct, and in (ii), a majority of the subjects, if they could provide an explanation, tended to claim that 'inverted EYN-Qs' do not need 'that'. It is only when the embedded questions were presented in their uninverted form that the more advanced subjects realised that a connective, usually 'if', was missing. The explanation provided by the subjects together with their performance on these structures seem to suggest that the realisation of non-inversion in EYN-Qs at a later stage triggers the development of connective in EYN-Qs.

7.4.1.2.2 <u>ANOVA and Scheffé Tests ; Time as Factor</u>

The tables presenting the results of the ANOVA and Scheffé tests can be found in Appendix 11b and 11c. The aim of the analysis is to test the null hypothesis that the three levels of subject within each learning environment do not exhibit differences in their performance of these rules (i.e. Hypothesis 1 of Section 6.4.1.).

The significant differences as found in the ANOVA (Table 33. Appendix 11b) allow us to reject the null hypothesis with res-

pect to the development of the rules in the OP, DC, CR(E) and CR(C) tasks but to retain it in some cases in the GJ task. Similar judgment on non-inversion (i.e. -INV) or connective (i.e. -CON) in EYN-Qs was found between the three levels of subjects in the EMHK and the CMHK environments. However, significant development of judging -INV was found with the CMG subjects, who also did not show significant differences in their judgment between the levels on inversion and the supply of appropriate Q-operator in YN-Qs.

The results from the Scheffé tests (Table 34. Appendix 11c) suggest that as far as the development of the rules of YN-Qs is concerned, significant development was found in all three groups of subjects between P6 and S2 or S4, while the development between S2 and S4 was not always significant, implying that these rules, which may have been acquired earlier, were developing more slowly as proficiency improved.

On the other hand, the rules for forming EYN-Qs displayed a later development than those in the YN-Qs in the case of the CMHK and CMG subjects, as indicated by the lack of significant development between P6 and S2 but the presence of it between P6 and S2 or S2 and S4. While the CMG subjects exhibited significant development between the levels, the CMHK subjects' development of these rules was comparatively slower than the CMG subjects, as shown by the lack of significant differences between the S2 and S4 levels in the OP and DC tasks and the T'_{obs} values in the CR(E) and CR(C) tasks are usually smaller than those of the CMG subjects.

7.4.2 Variability due to the Different Rules

Having confirmed in most cases that the subjects' development of the rules of the interrogative system is progressing over time, out next analysis will concentrate on the comparison of the subjects' performance between these rules in each of the elicitation tasks, to see if these rules themselves exhibit an order of development. The 45 subjects from each learning environment were combined to form one sample population and the statistical procedure MANOVA in SPSSx was adopted for this analysis. The null hypothesis states that there are no signifi-

cant differences in the subjects' performance on these rules (i.e Hypothesis 3 of Section 6.4.3.).

7.4.2.1 ANOVA and Scheffé Tests: Rules as Factor

The ANOVA results of each group of subjects can be found in Appendix 11d (Tables 35a, 35b and 35c). The tables displaying the results of the Scheffé tests for each group of subjects can be found in Appendix 11e (Tables 36a, 36b and 36c).

The subjects' significant performance on the rules in each of the tasks allows us to reject the null hypothesis that these rules do not exhibit differences in the subjects' performance (Appendix 11d). Having confirmed this finding, we can proceed to examine the relationships between the rules performed by the subjects.

Even though the ANOVA results suggest that the **EMHK** subjects' performance on the rules discussed was significantly different in each of the tasks investigated, the results from the Scheffé tests reveal that the significant differences were mainly derived from (i) the rules of EYN-Qs as against the rules of the simple YN-Qs or WH-Qs, and (ii) between inversion in YN-Qs or WH-preposing and the supply of Q-operator in either or both types of simple questions, depending on the demand of the tasks (Table 36a. Appendix 11e). This finding suggests that in general the EMHK subjects' development of the rules of the simple questions, especially inversion in YN-Qs and WH-preposing, was more stable than the rules of EYN-Qs, which can be explained by their being more advanced in the development of the interrogative system, as shown in the previous finding.

Within this framework of interpretation, a more detailed survey of the EMHK subjects' performance on these rules in all the tasks suggests that WH-preposing, inversion as well as the supply of an appropriate Q-operator in YN-Qs were found to be easier to perform than the other rules in the OP and DC tasks. While errors concerning WH-preposing remained easier to judge, correct and explain, those that involve the supply of an inappropriate Q-operator in YN-Qs, and in WH-Qs, were found to be more difficult to judge, to explain and correct, alongside the other re-

latively more difficult rules like non-inversion in EYN-Qs. This finding may provide further evidence that this group of subjects did not depend entirely on their metalinguistic knowledge in producing grammatical questions, as shown by their relatively better performance on these rules in the OP and DC tasks.

Though significant differences were found in the EMHK subjects' performance in the GJ task, the Scheffé results show that the differences were derived mainly from the feature WH-preposing while the other features remain insignificant between each other, suggesting that a similar 'degree of ungrammaticality' with respect to the rules examined was perceived by this group of subjects. It might also be due to the difficulty of the task itself because it requires the subjects to make decisions on subtle ungrammatical features in timed conditions by relying on their underlying knowledge of these rules which may have not been stabilised. Another possible explanation is that this task also requires some extent of metalinguistic ability, which seems to be developing rather slowly among the EMHK subjects. These interpretations may help to explain the significant differences in the subjects' judgment on WH-preposing, which was shown to be a relatively salient and stable rule when compared with the other rules.

As for the **CMHK** subjects, the results suggest that their performance on most of the rules in the OP and DC tasks was largely significant (Table 36b. Appendix 11e). However, exceptions were found with the easier rules like WH-preposing, inversion and the supply of an appropriate Q-operator in YN-Qs where the subjects' performance did not display any significant differences. Unlike the EMHK subjects, the errors concerning inversion in YN-Qs together with WH-preposing remained easier to judge than the other rules. On the other hand, the incorrect supply of Q-operator in both YN-Qs and WH-Qs, as well as those rules involving EYN-Qs were consistently proved to be relatively more difficult to judge, correct and explain than the other rules of simple questions.

As regards the performance of the **CMG** subjects, like the EMHK

and CMHK subjects, retrieving rules like WH-preposing, inversion or the appropriate supply of Q-operator in YN-Qs was easier than the other rules in the OP and DC tasks (Table 36c. Appendix 11e). The relatively earlier position occupied by non-inversion in EYN-Qs in the OP task was caused by the seemingly acquired knowledge of non-inversion by the P6 subjects in the initial stage of their learning of EYN-Qs, which was refuted when the subjects had the opportunity to manipulate their metalinguistic knowledge of inversion in simple questions in the DC task. Also, the inappropriate supply of Q-operator in both types of simple questions together with the errors concerning +inversion or -connective in EYN-Qs were relatively more difficult to judge, correct and explain than to produce in meaningful contexts.

7.4.3 Variability due to Task Differences

In the following analysis, the subjects' performance on each of the rules in different task conditions was analysed, with the aim of examining whether **Task** as a factor would influence the subjects' retrieval of their IL knowledge of these rules. The null hypothesis (i.e. Hypothesis 2.2. Section 6.4.2.) states that there are no significant differences in the subjects' performance on each of these rules between the tasks.

7.4.3.1 ANOVA : Rules Between Tasks as Factor

In the following analysis, ANOVA and post-hoc Scheffé tests were adopted as the methods of analysis. The results of the ANOVA analysis are presented in Appendix 11f (Tables 37a,37b and 37c).

The results suggest that the three groups of subjects were showing differences in their retrieval of knowledge of these rules as a result of the difference in task demands, thus allowing us to reject the null hypothesis that there are no differences in the subjects' performance between the tasks. However, even though the 0.05 level of significance was adopted during the analysis, the relatively less significant results in the CMHK subjects' performance on non-inversion in EYN-Qs implies that we may have to retain the null hypothesis for this group of subjects as far as this feature is concerned (Table 37b). As mentioned previously, the CMHK subjects were performing rather

poorly on this structure, which may help to explain the weaker significant relation in their performance on this feature than the others between the tasks.

7.4.3.2 Scheffé Tests: Performance on Rules Between Tasks

Having confirmed this hypothesis, our next task is to investigate further the relationship of these significant differences. The results of the Scheffé tests are presented in Appendix 11g (Tables 38a, 38b and 38c).

In general, the **EMHK** subjects' found these rules more difficult to judge than to produce or correct, as shown by the consistent significant interactions between the GJ or CR(E) and the other tasks for almost all seven rules under investigation (Table 38a). The saliency of WH-preposing and inversion in YN-Qs, as well as the subjects' development of metalinguistic knowledge of these features led to a better performance in the CR(C) task than in the two meaningful production tasks. On the other hand, it was found that producing appropriate Q-operators was easier than correcting them. Lastly, the general lack of significant interactions and the low percentage scores as regards non-inversion and connectivesin EYN-Qs suggest that these two rules were relatively more difficult to perform than the others as far as this group of subjects is concerned.

With the **CMHK** subjects, insignificant differences were found in non-inversion in EYN-Qs and where significant interactions were found with the subjects' performance on connectives; it is interesting to find that it was a lot easier to judge, explain and correct than to produce in the OP and DC tasks, suggesting that the subjects' development of connectives in EYN-Qs is largely restricted to the knowledge level (Table 38b). Unlike the EMHK subjects, it was found that, together with the GJ and CR(E) tasks, retrieving knowledge of these rules in the OP task was also a problem with these subjects. Their reliance on time for better performance was also shown in their supply of Q-operator in the OP and DC tasks, since there is always significant interaction between these two tasks.

The **CMG** subjects displayed some differences in their retrieval

of their IL knowledge of these rules (Table 38c). With respect to the rules of the simple questions, there is a clearly different pattern in their performance on these rules between the timed and untimed tasks. In general, similar performance on the rules was found among the untimed tasks which in turn showed significant differences when compared with the timed tasks like the OP and the GJ tasks. In fact, the retrieval of metalinguistic knowledge for correction and explanation about the errors was found to be relatively easier than retrieving it in spontaneous production. Lastly, it was found that the subjects were better at judging errors involving non-inversion and connectives in EYN-Qs than retrieving such knowledge in any of the production tasks. As mentioned in Section 7.4.1.2., it was discovered that the P6 subjects began their acquisition process of this type of question in fact with the non-inversion stage, which made them outperform their S2 counterparts in some tasks such as the GJ task. It is the better performance of this group of subjects which led to relative ease of judging the ungrammatical sentences.

7.4.4 Interim Summary

To recapitulate, the results of the analysis confirm that:

(a) The three groups of subjects displayed significant differences in their performance over time (Section 7.4.1.1.2.).

(a) The hypothesis that the subjects' development of these rules is sequential was confirmed by comparing the means scores of these rules within each elicitation tasks (Section 7.4.2.1.).

(c) The three groups of subjects also exhibited significant differences in their performance on the rules of the interrogative system between the elicitation tasks (Section 7.4.3.1.).

7.5 Analysis of the Orders of Development

One of the central aims of this study is to investigate whether the subjects from the three learning environments exhibit differences in the order of development with respect to:

(i) the ten types of questions, and
(ii) the rules of the interrogative system.

In the previous sections, the subjects' performance on the two issues above was proved to be statistically different, thereby providing the basis for us to establish an order of development for each group of subjects for further analysis. The null hypothesis to be tested is:

HYPOTHESIS 4.4

H_0: There are no significant differences in the order of development of the interrogative system between the three groups of subjects.

7.5.1 The RASCH Model of Analysis

In the analysis that follows, instead of using Guttman's Implicational Scaling for establishing the orders of development, the author proposes to adopt the RASCH model as an alternative method of analysis for the following reasons:

(a) the RASCH model provides an objective analysis that predicts, probabilistically, what will happen when a person with a given level of ability meets a test with given characteristics. In effect, in the Rasch model, the ability of people and difficulty of the test items are explicitly plotted on the same scale (the meaning of the scale is inferred from the test items that make it up), which enables us to find out, statistically, the relative difficulty of the test items as reflected by the performance of a sample of subjects (Pollitt and Hutchinson 1987:78).

(b) this model of analysis is sample independent since it assumes from the outset that the relative difficulty of test items would be the same for different groups of subjects. The Mean Difficulty value for test items is always '0' as shown in Table (ii) below, and the difficulty order of test items would be the same for any set of sample. Therefore, any differences that derive from the analysis would be due to different group attributes. This concept is part-

icularly suitable if the aim of our investigation is to find out whether the three groups of subjects display a different order of development as a result of environmental differences.

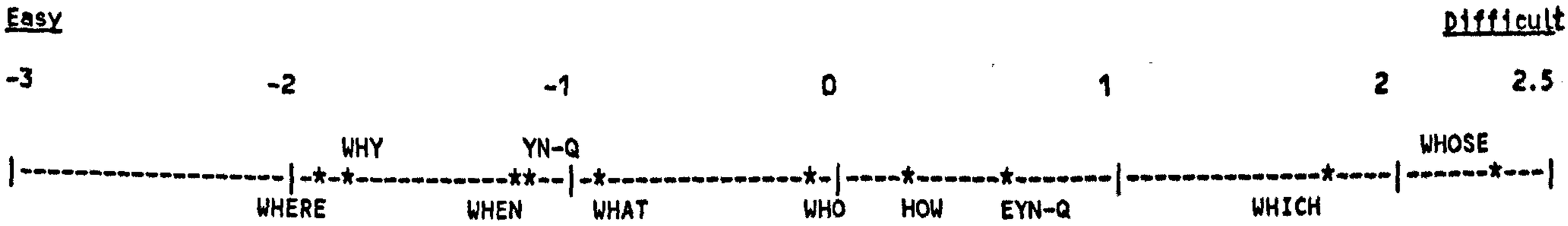
(c) The problems with Implicational Scaling have been documented in SLA research studies (see Hatch and Farhady 1982:182), and criticisms are usually levied on the adoption of an artificial cutoff point, usually in terms of a percentage point, to determine whether a structure is acquired or not acquired. This artificial cutoff point in fact mirrors the <u>deterministic</u> nature of Guttman's Implicational Scaling in the sense that it prescribes the subjects' process of acquisition in terms of either zero knowledge (0) or 'full' acquisition (1). This 'either-or' condition always causes a lot of trouble when we try to justify the adoption of a particular cutoff point, not to mention the possibility that manipulating a different cutoff point may result in a different order for a set of items examined. In this respect, the RASCH model provides a better alternative because the cutoff point is no longer needed in the analysis as the relationship between the difficulty level of the test items and the ability of the subjects is described at a probabilistic level. In other words, by placing all the items on a scale of difficulty, usually ranged between +5 and -5, it enables us to claim, with a certain degree of confidence, given the assumption that a subject's ability is determined by the level of difficulty of a particular item he can handle, it is highly probable that he can handle those items which are plotted lower down on the scale but his chance of success decreases as he tries to handle those items higher up the scale. In short, while allowing us to get round the problem of selecting an artificial cutoff point to determine whether a structure is acquired or not, the Rasch analysis provides a picture of the subjects' development by maintaining an <u>implicational</u> relationship built upon

the subjects' chance of success between the grammatical categories being scaled.

Since the Rasch model is built upon the **Item Response Theory**, in the following analysis, the test items were treated individually by assigning to each of them a DIFFICULTY ESTIMATE. These figures were later categorised according to the grammatical features investigated and were averaged in order to derive a **MEAN DIFFICULTY INDEX** (see Appendix 12). This procedure assumes that the test items are representative of the grammatical features under investigation. With these indices, we can establish a scale of difficulty for the grammatical categories. Since the Mean Difficulty is zero, the values smaller than zero suggest relative ease while the values bigger than zero would suggest relative difficulty. In other words, the bigger the positive value, the more difficult the respective grammatical category is and vice versa.

Another issue is whether these scales of difficulty reflect the subjects' order of development. It has to be mentioned that these orders may not reflect the order of emergence of the features under investigation, as most of the naturalistic studies attempt to do. However, given the implicational characteristic of this model of analysis as well as the reliable evidence from the sample statistics, we should be able to infer from the data the subjects' general development of the interrogative system. As demonstrated in the following scale, the relative difficulty of the types of questions performed by the EMHK subjects on the OP task can be plotted on the scale.

Figure 7.1. Orders of Development of Q-types by the EMHK subjects



From the scale, WHOSE-Qs are found to be more difficult to produce than any of the Q-types located lower down the scale, implying that if a subject is capable of producing WHOSE-Qs, he should be able to produce any of the questions lower down the

scale. His chance of success in producing WHICH-Qs is lower than when he attempts to produce EYN-Qs or HOW-Qs, but we can almost be certain that he is capable of producing WHERE-Qs and WHY-Qs.

Apart from providing a difficulty estimate for the items, the Rasch analysis also provides sample statistics for each procedure, which allows us to evaluate the credibility of the analysis. An example of the Sample Statistics on the EMHK subjects on the OP task is shown in the following set of tables:

Example: Rasch Analysis on the OP Task : EMHK

(i) Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 1.17 Standard Deviation= 0.968
Average Estimated Error = 0.206
Reliability Index = 0.957
Separation Coefficient = 4.69
No. of Reliably Distinct Bands of Ability = 9.72

(ii) Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.658
Average Estimated Error = 0.526
Reliability Index = 0.909
Separation Coefficient = 3.15
No. of Reliably Distinct Bands of Difficulty = 6.64

Table (i) reports the results of the analysis on how the subjects respond to a test, and Table (ii) the results of the analysis on the reasonableness of the test itself. The Reliability Index (analogous to Kuder-Richardson 20 for estimating internal consistency of a test) and Separation Coefficient as shown in both tables demonstrate the degree of reliability of the test in spreading either the sample subjects according to their ability or whether the test items, and in this case, the grammatical features, are sufficiently separated to form an order of increasing difficulty. The values of the Reliability Index will be between 0 and 1. The closer the value approaches 1, the more reliable the test is. As for the Separation Coefficient, the value should **exceed 2** in order to claim reliable separability. The last item in both tables, the number of reliably distinct bands, further reinforces the degree of spread of either the subjects according to their level of ability or the test items according to their level of difficulty.

Having discussed the rationale of adopting the Rasch model of

analysis and the method and statistics it involves, we can proceed to present the analysis on the order of development of the three groups of subjects. The tables showing the Difficulty Estimate of the features, their Mean Difficulty Index, as well as the accompanied Sample Statistics for each task performed by the three groups of subjects can be found in Appendix 12a-e.

In the analysis, the 45 subjects from each learning environment were grouped together to form one sample population. Another consideration is whether we should ignore task differences and produce a general order of development for each group of subjects. As revealed in the previous analysis, differences in task demands to some extent influence the subjects' ability to retrieve their knowledge in performance; in other words, some rules under investigation may be more susceptible to certain task situations than the others. Keeping the tasks separate would allow us to investigate in greater detail the subject's IL development in general as well as the retrieval IL knowledge as a result of task demands. As a consequence, we might end up with a whole host of disparate orders of development. However, it is believed that despite some possible differences, there should be underlying systematicity in the subjects' development of the features under investigation.

7.5.1.1 The Order of Development of Q-types

In the following analysis, only the OP and the DC tasks were included, for these two tasks are concerned with the production of semantically appropriate and grammatically well-formed questions. Moreover, it is hoped that parallels could be drawn between the orders of development established in the previous studies and those established in the present study. The tables showing the Mean Difficulty Index (i.e. the 'overall mean' in the table) of each Q-type together with the sample statistics are provided in Appendix 12a (Tables 39a, 39b and 39c) and 12b (Tables 40a, 40b and 40c). The high reliability indices and separate coefficients as shown in the sample statistics indicate that both the subjects and the grammatical features can be scaled with a high degree of reliability. In view of these results, establishing an order of development for the OP and DC

tasks is justified. Figure 7.2. below displays the orders of development established by the three groups of subjects in the OP and DC tasks .

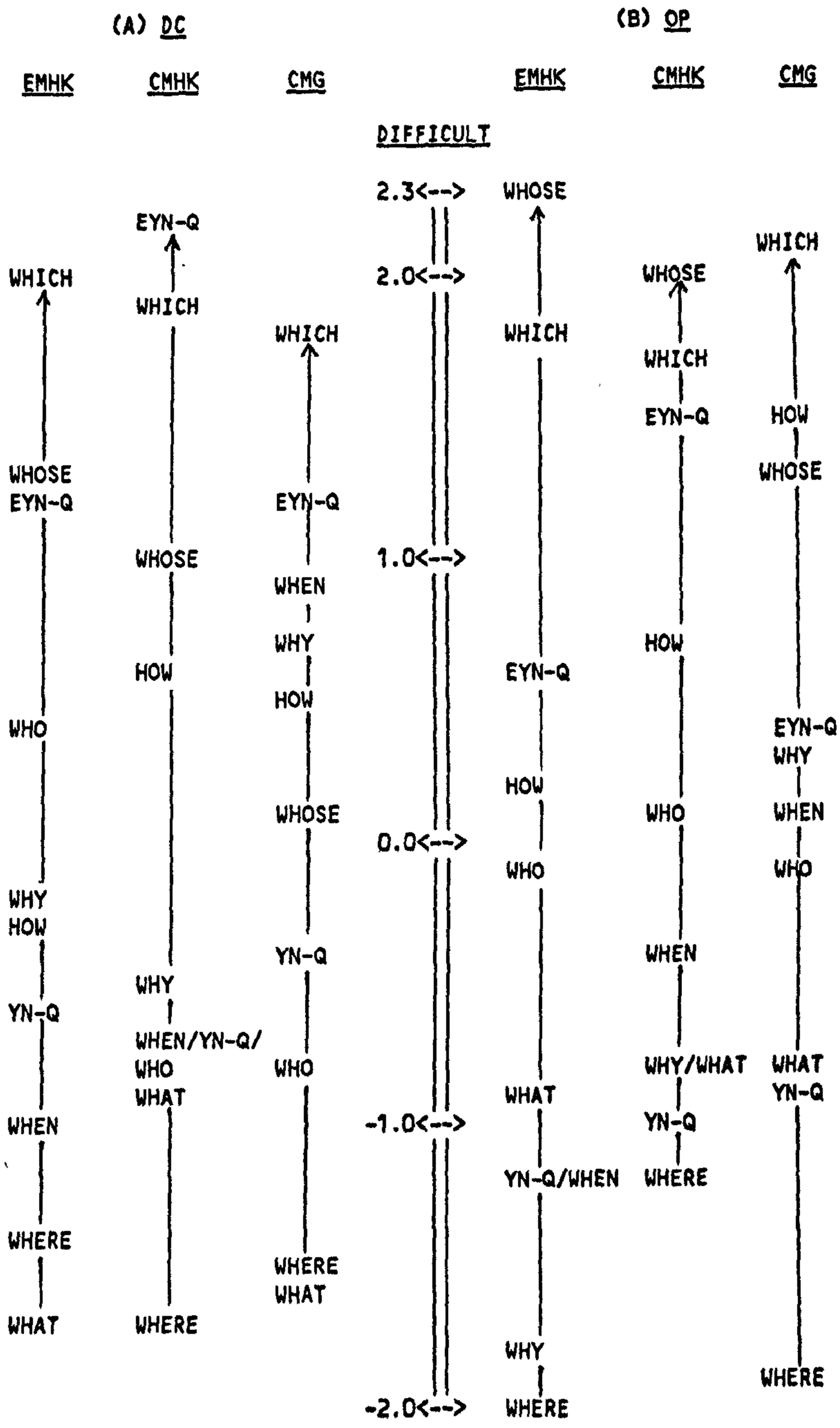
The orders thus established reveal that there are similarities as well as differences either between groups of subjects or tasks. Moreover, the distance between the Q-types in both tasks suggests that a great deal of variability was involved in the subjects' performance. Broadly speaking, the three groups of subjects were following a similar order of development in the sense that WHERE-Qs, WHAT-Qs, and YN-Qs are consistently positioned lower down the scale, suggesting that these questions belong to the early acquired categories. On the top of the scale, WHICH-Qs, EYN-Qs and WHOSE-Qs are always found; lying in the intermediate are WHY-Qs, WHO-Qs, WHEN-Qs and HOW-Qs.

Within this framework, differences are found in the relative position of some of the Q-types between the three groups of subjects. WHOSE-Qs consistently appear late during the acquisition process among the EMHK and to some extent CMHK subjects, as revealed by the higher position it occupies in both tasks.

On the other hand, the lower position of this Q-type as established by the CMG subjects suggests that they are easier for these subjects. Especially in the DC task, when the CMG subjects were given time to reflect upon the use of WHOSE-Qs, more accurate use of this question can be achieved by the CMG subjects, thus indicating that this group of subjects have in store adequate knowledge for the development of this Q-type in the acquisition process.

A similar phenomenon was also found with the EMHK subjects' performance on WHO-Qs, the position of which as displayed by these subjects in both the OP and DC tasks suggests that this Q-type is relatively more difficult when compared with the other groups of subjects. On the other hand, WHEN-Qs, HOW-Qs and to some extent, WHY-Qs were found to be more difficult, especially in the OP task by the CMG and CMHK subjects.

Figure 7.2. The Orders of Development of Q-types



Keys:

Learning Environments	Task Types	Q-types
EMHK: English Medium Hong Kong	OP : Oral Production	YN-Q : Yes-No Questions
CMHK: Chinese Medium Hong Kong	DC : Written Dialogue Completion	EYN-Qs: Embedded Yes-No Questions
CMG : Chinese Medium Guangzhou		

Also from the results, it appears that Q-types which are developmentally early or late are relatively more stable in the subjects' performance than those in the intermediate. It was these intermediate Q-types that were found to be more susceptible to task demands. The position of HOW-Qs between the OP and the DC tasks as shown by the CMG and EMHK subjects to some extent indicates that, before this Q-type becomes stabilised in the learners' IL competence, their performance on this Q-types would be variable and susceptible to different task demands. Another example can be found in WHY-Qs performed by the EMHK subjects. In the OP task, it is next to WHERE-Qs while its position in the DC task is similar to HOW-Qs higher up the scale.

7.5.1.2 The Order of Development of the Rules of the Interrogative System

The ANOVA results in Section 7.4.2.1 have provided some preliminary proof that the subjects' performance on the rules of the interrogative system is significantly different. In this section, the Rasch Model was employed to establish the order of development within each task for the three groups of subjects. In the analysis, the elicitation tasks would be kept separate. The tables showing the results of the OP and DC tasks were presented and discussed in the previous section. For the other three tasks, the tables displaying the difficulty index for each rule (i.e. mean of each grammatical categories) and the sample statistics can be found in Appendix 12c, 12d and 12e.

It should be mentioned here that a post-hoc experiment was conducted in which 20 English speaking students (i.e. **NS** in Figure 7.3) of similar age to the S4 level of the Cantonese learners were invited to do the same GJ task. Their performance was analysed with the Rasch model and an order of grammatical acceptability was derived for comparison.

From the results of the sample statistics, high reliability index and separation coefficient for both the subjects' ability and item difficulty were found in the CR(E) and CR(C) tasks (Appendix 12d and 12e) but not in the GJ task (Appendix 12c) where the reliability index and separation coefficient for scaling the items are not as high as those found in the other tasks,

though they are almost reaching a value of 2, a criterion laid down before carrying out the analysis. As a consequence, the orders established in the GJ task have to be interpreted with caution.

Keys:

Learning Contexts:

EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou
NS : Native Speaking Subjects

Task-types

OP : Oral Production
DC : Dialogue Completion
CR(J) : Correction (Untimed Judgments)
CR(C) : Correction (Correcting Errors)
CR(E) : Explaining the grammatical relations
GJ : Grammaticality Judgments (timed)

Grammatical Features:

W:WH-P : WH-preposing in WH-Qs
W:INV : Inversion in WH-Qs
W:Q-OP : Q-operator in WH-Qs
Y:INV : Inversion in YN-Qs
Y:Q-OP : Q-operator in YN-Qs
E:CON : Connective in EYN-Qs
E:INV : Non-inversion in EYN-Qs

Figure 7.3 . Orders of Development for the Rules of the Interrogative System

In Figure 7.3 above the degree of difficulty as displayed by the spread of the grammatical features in each task further confirms that there is a great deal of variability in the subjects' ability to retrieve their IL knowledge of these rules in different task conditions. Moreover, the subjects' orders of development of the rules of the interrogative system between tasks show some interesting results in relation to the discrepancy between judgment, correction and meaningful production among the three groups of subjects.

The spread of difficulty as regards these rules among the CMG subjects between tasks is not as great as that found in the CMHK and especially the EMHK subjects. In other words, less variability in terms of retrieval of IL knowledge may be found in pure classroom learners like the CMG subjects than that in the CMHK, or the EMHK subjects in particular who reveal extreme difficulty in retrieving the specialised form of metalinguistic knowledge in the CR(E) task, while retrieving acquired knowledge in meaningful production is generally found to be relatively easier.

With respect to the order of development, in general, it was found that the three groups of subjects were largely following a similar order of development, with inversion in YN-Qs (i.e. Y:INV) and WH-preposing (i.e. W:WHP) consistently occupying a lower position on the scale, and rules concerning EYN-Qs were usually found higher up the scale. The relative position of the rules of YN-Qs, consistently preceding those of WH-Qs, provides some evidence that YN-Qs are generally acquired earlier than WH-Qs and EYN-Qs would appear late in the developmental sequence.

Within this framework, however, differences were found between the tasks in terms of the development of inversion and Q-operators in simple questions within each group. In tasks which involve meaningful production, oral or written, the development of inversion and Q-operator is not so easily differentiable in some cases, suggesting that as far as production is concerned, the retrieval of a Q-operator and inversion is closely related. However, when each grammatical feature was singled out for the subjects' identification as in the CR and GJ tasks, the subjects' ability to perform these two rules became more differen-

tiable in that the development of Q-operators in both types of simple questions was found to be relatively later than inversion.

Another example can be found with WH-preposing where its position in the OP task is relatively higher than the rules of YN-Qs. When sufficient time was allowed or when the tasks involve metalinguistic knowledge, this feature became relatively easier to perform.

This difference between tasks which involve meaningful production and those which measure the subjects' metalinguistic development suggests that, as far as classroom learners are concerned, the development of metalinguistic knowledge is to some extent independent of the knowledge involved in meaningful production, though it provides some facility for monitoring the subjects' output.

Another difference between the three groups of subjects in production is the relative position of inversion and Q-operator in both types of simple questions. It is interesting to find that, for the CMHK subjects, the position of Q-operator always precedes that of inversion, while the exact opposite is found among the EMHK subjects, suggesting that the CMHK subjects had consistent difficulty in the development of inversion. The position of these two structures among the CMG subjects is somewhat different. While inversion in WH-Qs (W:INV) always precedes the Q-operator (W:QOP) in both tasks, inversion in YN-Qs (Y:INV) is found to precede the Q-operator (Y:QOP) in the DC task but vice versa in the OP task, suggesting the retrieval of inversion in the latter task is more difficult than in the former.

The picture presented by the GJ task is somewhat different from the others in that (i) the spread of the grammatical categories is smaller, and (ii) the order of some of the grammatical categories are different between the groups of subjects and the tasks they attempted. In effect, the spread was found to be the smallest among the EMHK subjects, clustering together were those rules concerning inversion and Q-operators of simple questions. A similar clustering pattern was found with the CMHK subjects

except that inversion in YN-Qs is distinctively located at the bottom of the scale. On the other hand, the pattern as shown by the CMG subjects is rather different in the sense that the grammatical features spread out more widely than those found in the other two groups of subjects, suggesting they might be more sensitive, grammatically speaking, to the different rules involved.

Differences were found between the three groups of subjects in the GJ task. In effect, inversion in YN-Qs was found to be easier to judge among the CMHK and CMG subjects but not the EMHK subjects. Moreover, the relative positions of the rules of EYN-Qs (i.e. E:INV and E:CON) are different between the three groups of subjects. Judging non-inversion was found to be easier among the EMHK subjects but the most difficult among the CMHK subjects and vice versa in the case of connective. The CMG subjects on the other hand, found these two rules of EYN-Qs easier to judge than inversion and Q-operators of WH-Qs. These differences are interesting in the sense that, while the development of non-inversion is always the last feature for the CMHK subjects, the different position found between knowing this feature as in the GJ task and retrieving it in the OP and DC tasks suggest that the CMG and EMHK subjects had certain intuitive knowledge of this rule, but failed either to make it explicit (as shown by the CR tasks) or use it appropriately in meaningful situations.

Comparing the order of grammatical acceptability established by the English speaking subjects with the orders established by the three groups of classroom learners, striking differences with respect to the positions of inversion in YN-Qs, WH-prepos-ing and the Q-operators were found. Inversion in YN-Qs was found to be exceptionally difficult to judge, which is quite the contrary to the CMHK and CMG subjects; but it is interesting to find that the EMHK subjects also experienced similar diffi-culty with this feature. On the other hand, the classroom lear-ners had difficulty in providing judgment for Q-operators but the native speaking subjects found them the easiest and the errors as designed unacceptable. These findings leads one to ponder whether the underlying competence of native and non-native speakers is similar or not. However, these differences

should be regarded as tentative findings since the classroom learners' IL is developing and has not stabilised yet. Nevertheless, they might suggest that learning the TL in a classroom context might involve some different language acquisition processes.

7.6 Conclusion : Summary of the Main Findings

In this chapter, the performance of the three groups of subjects from different learning contexts was analysed by means of statistical testing of significance and the Rasch model of analysis. In general, the subjects' IL development of the interrogative system displayed a certain degree of systematic variability in terms of TIME, TASK and STRUCTURE. To recapitulate, the main findings were presented as follows:

(a) **TIME (Diachronic Variability)** : The findings confirm that the longer the subjects were exposed to the TL, the better they are in their performance. However, the results also reveal that as the subjects' IL knowledge is nearing the target structure, their rate of development also slows down gradually. This phenomenon is particularly obvious with the EMHK subjects where no significant differences in their performance on either the tasks or the structures were found between the S2 and S4 levels.

(b) **TASK (Synchronic Variability)** : The three groups of subjects are showing significantly different performance on the elicitation tasks, implying that the tasks can be arranged according to degrees of difficulty experienced by the subjects. Moreover, the subjects' performance on either the Q-types or the rules involved in each type of question was shown to be influenced by the different demands imposed by the elicitation tasks.

(c) **Structure** : The results of ANOVA as well as the Rasch analysis indicate that the development of either the Q-types or the rules of the interrogative system is sequential and this phenomenon can be demonstrated by the orders of development established for each

group of subjects.

(d) **Effect of Learning Context on Order of Development**
The orders of acquisition thus established suggest that the three groups of subjects are largely following a similar order of development in most of these tasks. Moreover, the orders established for the OP and DC tasks are generally in congruent with the orders established in the previous studies, implying that the effect of intensive instruction does not seem to have circumvented the universal sequence of development as far as production is concerned. However, differences were found with respect to a few Q-types, which may be attributable to the differences in learning context. Moreover, differences were found between the 'competence' order (as shown by the GJ and CR(E) tasks and the 'control' order (as shown by the OP and DC tasks).

(e) **Qualitative Development of IL Knowledge** : The effect of teaching as embedded in different learning contexts was seen to have played a role in shaping the subjects' qualitative development of IL knowledge. The EMHK subjects' IL knowledge was shown to be relatively more automatic but less analytic than the CMHK and the CMG subjects. However, faster development in terms of articulated knowledge was shown by the CMG subjects than the other two groups of subjects and the EMHK subjects were shown to be rather inadequate in this respect.

CHAPTER EIGHT

INTERPRETATION OF RESULTS AND DISCUSSION

8.0 Introduction: Overall Performance

Having submitted the data to quantitative statistical analysis, the author will now present a qualitative description about the performance of the three groups of subjects. The description includes an overall summary of the subjects' performance on the elicitation tasks, and an analysis of the errors they made, with an attempt to interpret their performance in the context of SLA theory in general and their respective learning environment in particular, which may shed light on our investigation on the interplay between SLA processes and classroom learning environment.

8.1 Overall Performance on the Elicitation Tasks

From the results presented in Section 7.1.3.4., the three groups of classroom learners were generally found to perform better in tasks in which sufficient time was given than tasks which required automatic retrieval of IL knowledge. Within this framework, the correction tasks like correcting errors (**CR(C)**) and untimed judgments (**CR(J)**), and the written dialogue completion (**DC**) task were easier to perform than the oral production (**OP**) and timed grammaticality judgment (**GJ**) tasks; and for all three groups of subjects, explaining the errors (**CR(E)**) was generally found to be rather difficult to perform. As regards the OP and DC tasks which involve situational dialogues but differ in the mode of communication, oral as opposed to written, the t-values between these two tasks as shown in Section 7.1.3.3. reveal that the discrepancy of the subjects' performance was found to be the greatest with the Chinese medium Guangzhou (**CMG**) subjects, followed by the Chinese medium Hong Kong (**CMHK**) subjects, but it was the least with the English medium Hong Kong (**EMHK**) subjects. This finding seems to indicate that the EMHK subjects were better able to retrieve both contextual knowledge and form almost regardless of whether the task is marked by automaticity or not. On the other hand, time is a significant factor for better performance with the two groups of Chinese medium subjects in general.

The following discussion is based on the results which are set out in the tables in Appendix 13a, 13b and 13c, summarising the subjects' performance and their areas of difficulties. In these tables, frequency counts as well as percentages with respect to the various aspects of the subjects' performance are presented. Appendix 14a, 14b and 14c and Appendix 15a, 15b, and 15c display the subjects' performance on the GJ task and CR task respectively.

8.1.1 Grammaticality Judgment Task

The three groups of subjects were generally found to be better at judging grammatical questions than ungrammatical questions where a great deal of variation in the learners' judgment was discovered (see Appendix 14a, 14b and 14c). The pattern of judgment seems to show that, as proficiency increases, there is a gradual shift of the subjects' judgment from judging certain ungrammatical features to be grammatical to locating them systematically down the scale towards absolute ungrammaticality, suggesting that increasing complexity in the subjects' IL knowledge in fact renders the ungrammatical features increasingly unacceptable to the learners. Moreover, it is interesting to find that not all these features approach the ungrammatical end of the continuum at exactly the same rate. Some ungrammatical features such as errors which involve WH-preposing reach the ungrammatical end of the continuum much earlier than the others.

A corollary issue thus arising from this phenomenon is whether all the ungrammatical features would eventually be judged to be absolutely ungrammatical. The author's initial conjecture is that this would not be the case, if we accept the idea that IL is subsumed under the realm of natural languages, the characteristics of which have been captured by Ross's notion of relative grammaticality of native speakers' judgments. These judgments are expressed in terms of 'acceptability hierarchies', in that certain rules of a language are perceived as more acceptable or basic than the others (Ross 1979).

To follow this line of argument, it could be that the IL rules of the interrogative system that are relatively more basic tend to become less indeterminate and more stable in the learner's

judgment earlier than those which are less basic, implying that SL learners would also manifest a hierarchy of acceptability in relation to the rules of the interrogative system. What is at issue here is whether the acceptability hierarchies as established by the three groups of subjects overlap. The results from the Rasch analysis suggest that they are largely similar, though differences were found (Section 7.5.1.1., 7.5.1.2.). However, it is interesting to find that the acceptability hierarchy as established by the native speaking subjects reveal drastic differences, when compared with those of the three groups of subjects.

8.1.1.1 Certainty of Judgment

In general, the subjects were shown to be sure of the judgments they provided in this task, all exceeding 60% and there was a growing tendency towards certainty with proficiency. Nevertheless, instances were found where learners provided incorrect judgments but indicated that they were sure of them, as shown in their judgments on inverted EYN-Qs especially at P6 levels, and vice versa.

Within this framework, differences were also found in the three groups of subjects. Although relatively more accurate judgments were found over time, the EMHK subjects displayed a greater degree of variation in their certainty of judgment than the CMHK and the CMG subjects. In the cases of judging grammatical questions, inversion in simple YN-QS and EYN-QS, the level of certainty dropped at S2 level but resumed at a higher level among the S4 subjects. This fluctuation of their certainty of judgment suggests that they may be undergoing a period in which the development of the rules of the interrogative system becomes more critical, despite the fact that at the surface level, they were able to provide more accurate judgments on these ungrammatical features.

The Chinese medium subjects, especially the CMG subjects, showed a more stable increase in their certainty level with respect to the rules of the simple WH-Qs with proficiency. Nevertheless, as with the EMHK subjects, variation was found in relation to the rules of the simple YN-Qs and EYN-Qs. The S2 subjects from

the CMG environment appeared to be less certain about their judgments on uninverted YN-Qs, at the same time judging more uninverted YN-Qs to be grammatical at this level. This drop of certainty was also found among the CMHK subjects, but at S4 level, they considered uninverted YN-Qs to be more and more ungrammatical. The variability as shown suggests that SL learners do show differences in their perception of grammaticality and the degree of certainty at various stages of their IL development.

To conclude, the CMG subjects were consistently shown to be more certain of their judgments than the CMHK and EMHK subjects. This phenomenon may be explained by the fact that the enormous amount of metalinguistic input to which the CMG subjects were exposed provides a lot of opportunities for them to reinforce their IL knowledge of these rules. The decline of certainty at the S2 level with respect to their incorrect judgment about the ungrammatical features such as +INV-CON and -INV-CON in EYN-Qs could be a result of the 'unavailability' of metalinguistic input of inversion in EYN-Qs at this level (EYN-Qs were taught in S3 in this environment), even though they still regarded inverted EYN-Qs as grammatical.

8.1.2 Error Correction Task

Regarding the CR task, the subjects' metalinguistic development is reflected by their improving ability to judge, locate, correct errors, and, as far as possible, to explain the grammatical rules involved. Within this framework, from the Rasch Partial Credit Analysis when each step was broken down for comparison, it is interesting to find that the first step (i.e. identifying errors) was found to be more difficult than the second (i.e. correcting errors), and success in step one usually entails the ability to correct the errors involved. From these findings, it seems that identifying errors may involve a greater extent of grammatical details than was originally assumed by Bialystok (1981c). Nevertheless, being able to explain grammatical relations was found to be a late achievement and dependent upon the type of learning environment in which the subjects acquired the interrogative system (Heading E of Appendix 15a, 15b and 15c).

Nevertheless, it is not uncommon to discover that while succeeding in locating the errors and attempting to correct them, the learners unknowingly created another type of error, as in the case of correcting uninverted Do-questions where some learners tended to insert a Copula instead of Do before the subject. Moreover, where the grammatical questions were judged to be incorrect, some learners would provide their own 'correct' version, which usually corresponded to a kind of error listed in the study. For instance, some subjects may delete Do in **'When do tourists visit HK usually?'**.

As for the features under examination, unpreposed Wh-words were found to be the easiest to locate and correct, as well as to explain. While the judgments on uninverted YN-Qs among the three groups of subjects were shown to be variable in the GJ task, their performance in the CR task indicates that they were more absolute in their perception of grammaticality of inversion in YN-QS, in that more subjects from all three levels regarded declarative YN-Qs as ungrammatical and offered their correction, indicating that these classroom subjects may have at their disposal two types of knowledge as far as this rule is concerned, metalinguistic knowledge as well as 'acquired' knowledge responsible for meaningful production, but access to these types of knowledge is dependent upon the subjects' development of automatic retrieval processes.

In general, both uninverted YN-Qs and WH-Qs proved to be not as difficult to locate and correct as inverted EYN-Qs. The supply of an inappropriate Q-operator in simple YN-Qs and WH-Qs, which, as with their performance in the GJ task, was consistently judged to be grammatical by some subjects, especially those S2 subjects from the CMHK and CMG environments. However, while inverted EYN-Qs persisted in the IL competence of the CMHK subjects, the CMG(S4) subjects were shown to be better able to judge these sentences to be ungrammatical and correct them adequately (Section C under the heading **EYN-Qs** of Appendix 15a, 15b and 15c).

Although the ability to correct ungrammatical sentences was comparable among the three groups of subjects, there is a stark

contrast in their ability to articulate the grammatical rules involved. In general, few P6 subjects from the three environments were able to demonstrate this kind of ability regardless of years of training in English, suggesting that this specialised form of metalinguistic knowledge is to some extent dependent upon cognitive development. The EMHK subjects' development of explicit metalinguistic knowledge as regards these grammatical features appears to be slowing down with proficiency, as indicated by a similar ability between the S2 and S4 subjects in correcting the ungrammatical sentences. At S4 level, almost no subjects were able to provide an adequate explanation about the grammatical rules, except for the inappropriate placement of Wh-words and inversion in Yn-Qs. Moreover, the ability to explain even the incorrect WH-preposing by the S4 subjects in fact reduced drastically. In fact, some subjects during the experiment were frustrated by their inability to explain the grammatical concepts and complained that they did not need to explain the rules to ask questions, which might reveal the general negative attitude towards grammar learning among this group of subjects.

On the other hand, there appears to be a faster development of this 'specialised knowledge' with the Chinese medium subjects, and the CMG(S4) subjects in particular, some of whom were even capable of explaining the complicated grammatical structures of the EYN-Qs in terms of the grammatical properties of embedded clauses.

In fact, the explanations provided by the three groups of subjects reveal the extent of explicitness and elaboration of their metalinguistic knowledge, which may somehow reflect the degree of explicitness and elaboration in the explanations found in classroom input. It may be worth noting here that the explanations provided by most of the EMHK subjects were 'content oriented'. For example, with the ungrammatical sentence,

***How are the plants get water from the soil? (CR Q.69)**

a considerable number of P6 and S2 subjects said that since it involves an action, one needs to use 'do'. There are other

examples to illustrate the different quality of their explanations. For instance, regarding the sentence,

***When the tram comes every morning? (CR Q.22)**

while most CMG(S4) and some CMHK(S4) were able to say that 'does' was needed as a Q-operator and should be inserted before the subject, some EMHK(S4) subjects could only say that 'does' was needed because it sounded better. Another interesting example is their explanation regarding uninverted YN-Qs, as in:

***Mary can go to the library? (CR Q.117)**

The EMHK subjects consistently claimed that it was not a question but many CMG(S2 and S4) subjects, and limited CMHK(S4) students were able to say that it was only a declarative statement, and to convert it to a question, one should move 'can' to the beginning of the sentence', or in some cases they would say 'before the subject "Mary"'.

Another reflection from the subjects' explanations is that learners do derive their own idiosyncratic rules from the classroom input they receive. One obvious example can be found with respect to inversion, where a significant number of subjects, mostly from the P6 and S2 levels from all three environments claimed that the 'verb', or the 'word,' should be placed after the WH-word, suggesting that they associated the inversion rule more to the WH-words than to the subject of the sentence. The author consulted a number of teachers in the aftermath of the experiment as to whether they would impart this pedagogical 'rule of thumb' to their students, but none of them accepted this explanation. Nevertheless, this strategy at least allows these students some immediate success in their production of grammatical questions. Another anomalous rule involves the use of 'is' as Q-operator for main verb questions, which was expressed as 'placing "is" after the WH-words'. Seliger (1979) suggests that conscious, learner-derived anomalous rules may not be responsible for language performance. However, an analysis of the subject' performance in the other tasks such as the OP and DC tasks reveals that these anomalous rules were to some extent retrieved in a consistent way by some subjects in their

production, which proves that these rules were not invented as a result of hyper-correction to the test but reflected the learner's IL competence.

8.1.3 Oral Production Task

As mentioned above, all three groups of subjects found the OP task more difficult to perform than the DC task and the degree of difficulty varied between the three groups of subjects.

As far as the OP task is concerned, as one would expect, the degree of automatic retrieval of both contextual knowledge and IL knowledge of the interrogatives was the highest among the EMHK subjects. Though no official timing was recorded, the time taken by this group of subjects to complete this task ranged from 15 to 30 minutes, depending on the level of proficiency; and the time they took to plan their utterances was usually very short, sometimes as short as a few seconds. By contrast, this task took the CMG and the CMHK subjects relatively longer time to complete, between 30 and 60 minutes. Moreover, these subjects usually refrained from saying anything until they were sure that what they were going to say was 'correct' and accurate. From the transcriptions, there were considerably more and longer instances of pauses before and during the execution stage, sometimes as long as 1 to 2 minutes, suggesting that very heavy, conscious monitoring was taking place, which unfortunately did not always lead to success in their performance.

For all three groups of subjects, successful manipulation of form in a grammar test such as the CR(C) task does not in general guarantee the ability to recognise the use of these forms in meaningful discourse, especially when the interactional aspect of spoken discourse is involved. This finding supports the results of the studies from Griggs(1986), and Bialystok (1982) regarding variability of IL knowledge and use with respect to the independent relationship between time for retrieval and the level of explicitness of IL knowledge.

With respect to the use of communication strategies among these three groups of subjects, L1 based strategies such as literal translation was commonly found among the CMHK and CMG subjects,

especially with the P6 and some S2 subjects, some of whom may even resort to certain avoidance strategies such as message abandonment during the planning or execution stage. The EMHK subjects, on the other hand, seldom adopted these reduction strategies but attempted to restructure the message whenever possible. This finding suggests that they had greater facility to manipulate their IL communicative resources, despite being under the constraint of time.

8.1.4 Dialogue Completion Task

The demand of retrieving both contextual knowledge and form in an untimed task as such did not in fact pose a serious problem to the three groups of subjects and emerged as one of the easier tasks to perform. Nevertheless, it may also be because of the simplicity of the task itself since it involves only written production at the sentence level even though they had to observe the coherence of discourse.

Given sufficient time to perform this task which encourages some focus on form, it is interesting to find that the CMG(S4) subjects could attain a similar performance to that of the EMHK(S2 and S4) subjects, and even better performance than the CMHK(S4) subjects (Chapter 7, Section 7.1.4.2). This higher accuracy in the written mode can be ascribed to the relatively faster development in terms of the analysed aspect of the IL knowledge among this group of subjects, which enables them to outperform the CMHK subjects or achieve a level of performance comparable to the EMHK subjects. VanPatten (1987) also suggests that traditional classroom learning tends to emphasise written tasks, which may indirectly assist the learner in achieving better grammatical accuracy.

To conclude, these three groups of classroom subjects were seen to perform differently on the four elicitation tasks and these differences could be explained in terms of the type of learning environment as well as the nature of classroom input they have been exposed to.

8.2 Performance on the Interrogative System

8.2.1 Choice of Questions

The following discussion concentrates mainly on the subjects' performance in the OP and DC tasks where the supply of appropriate questions is the major investigation.

8.2.1.1 Simple Yes-No Questions

Asking YN-Qs did not seem to pose a serious problem for most learners of the three learning environments except for a limited group of P6 subjects from the CMG and CMHK environments, who sometimes preceded the uninverted YN-Qs with **'what's'** or **'what is'**, resulting in unacceptable questions such as:

***'What's Japan is a good place to go?' (OP Q.57)**

In fact, the production of this type of 'paratactic constructions' combining a WH-element and a declarative statement for YN-Qs may be a characteristic of elementary classroom learners because rarely does one find this type of question produced by the L2 naturalistic learners. A similar finding was found in Felix's German classroom learners of English who failed, initially, to differentiate simple YN-Qs from WH-Qs in their response to the teacher's question. This finding to some extent provides evidence for the processes involved in production, that is through the use of memorised chunks via the strategy of imitation, especially in the beginning of their IL development of this structure. Moreover, it may also be due to the sequence of presentation in the language syllabus because 'what's' is usually the first pattern which these students would come across. Tagging this element before a declarative statement to form questions might be one of the initial strategies adopted by these learners.

8.2.1.2 Embedded Yes-No Questions

Among the three types of interrogatives under investigation, EYN-Qs were found to be the most difficult to acquire. Though given the prompt **'I'd like to know'** in both the OP and DC tasks, most P6 subjects from the three learning environments and some S2 learners from the CMHK and CMG environments did not recognise that it suggests a speech act requiring an indirect, polite

request for information. It seems that it is the failure of such realisation that causes most of the subjects to turn it into a direct question which requires SV-inversion, thus resulting in the numerous instances of inverted EYN-Qs commonly found in the three groups of subjects, as in:

***'I'd like to know are you a student?' (OP Q.20)**

with rising intonation or a question mark in the DC task, or:

***'I'd like to know that is Mr Lee use the zebra-crossing?' (DC Q.38)**

Another aspect of their performance on this type of question was found among many of the CMG(S4) subjects who consistently inserted a pause after 'if' and inserted a falling intonation at the end, as in:

'I'd like to know if.....you are a student.' (OP Q.20)

It seems that they preliminarily memorised chunks like 'I want to know if...', 'Do you mind if...' , especially 'He asked me if...' and knew that the embedded clause should be in the form of a declarative statement. In fact, some of the subjects at this level gave the explanations that 'if' is necessary after 'I'd like to know'.

Moreover, CMG(S4) was the only group where EYN-Qs were over-extended to simple YN-Qs in the DC task, though not significantly, suggesting that intensive teaching of this structure to some extent induces some adverse effects on the performance of some of these subjects.

8.2.1.3 <u>WH-questions</u>

Another area of difficulty faced by the learners from the CMG and CMHK environments, and to a limited extent from the EMHK environment, especially at their initial stage of IL development, is the omission of Wh-words in WH-Qs, which created some incorrect instances of YN-Qs, inverted or uninverted, with rising intonation (Section 2A. Appendix 13a, 13b and 13c). This phenomenon was more obvious when a modal was required as Q-operator, thereby resulting in inappropriate questions such as:

'Can I ask information about Japan?'
(Who can I ask information about Japan? OP Q.59)

or:

'Should I control my eating habit?'
(How Should I control my eating habits? OP Q.10)

This finding seems to suggest that the subjects regarded modal YN-Qs as a separate type of question and as such, they found it difficult to ask a question which 'combines a modal YN-Q and a WH-word' as shown in the above examples.

On the other hand, where HOW was used to ask about the condition of either people or things, the entire question was replaced by one such as:

'Are the children good or bad?
(How are the children? DC Q.30)

or:

'Is the debate fine?'
(How is the debate? DC Q.6)

It suggests that the subjects avoided using HOW-Qs but tried to paraphrase them with a simple YN-Q. Nevertheless, asking WHICH-Qs and WHOSE-Qs was not as easy as HOW-Qs and in most cases, a declarative statement with rising intonation was recorded, such as:

***'Your son usually like to watch TV programme?'**
(Which TV programme does your son usually like to watch? OP Q.15)

The strategy of semantic over-extension as reported in earlier SLA studies such as Felix(1976), Wode(1978) in English L2, and Lightbown(1979) in French L2 acquisition was also evident in the present subjects' use of the eight Wh-words under investigation (Section 2B. Appendix 13a, 13b and 13c).

WHAT was shown to be a popular substitute for HOW and WHICH at all levels, and sometimes for WHO among the three groups of P6 subjects; and **WHO** was a popular candidate for WHOSE. With HOW, four other expressions which the author would consider as un-

analysed chunks were also used; **HOW ABOUT** and **WHAT ABOUT** were used interchangeably to ask about condition, as in ***'How about the debate?'** for 'How is the debate?' while **HOW TO** and **HOW CAN** were used to encode manner of action. The use of HOW ABOUT and WHAT ABOUT was most prominent with the EMHK subjects, who also produced a lot of instances of **HOW CAN**, such as:

***'How can you show your new design?' (OP Q.30)**

for 'How do you usually show your new design?', not to mention the fact that in some of these instances CAN was emphatically stressed in the OP task though no intention of doubt was expressed in the context of use. Some P6 and S2 subjects of this group in the CR(C) task gave the explanations that it sounded better when 'HOW' was followed by 'can', suggesting that 'HOW CAN' was perceived as an acceptable interrogative phrase for HOW-Qs. By contrast, the CMHK and CMG subjects preferred to use HOW TO after the most popular variant WHAT for questions like:

***'How to find a good tour?'**
(How can I find a good tour? OP Q.60)

Ellis (1982a) comments that the reliance on 'routines and patterns' is a characteristic of his ESL classroom subjects, as the result of the pressure of authentic communication or interaction in the classroom. The EMHK subjects, who acquired the TL in a classroom environment somewhat similar to that in Ellis' study, to some extent relied on this strategy. Nevertheless, the routines as mentioned above which they adopted to encode HOW-Qs in the contexts under investigation reveal their failure of understanding the actual meaning or the underlying speech act of these routines.

As regards WHICH, apart from **WHAT**, **WHO** and **WHERE** were also used instead, depending on whether the specific referent is a person, object or locality, suggesting that many subjects failed to recognise that the semantic function of WHICH, being selective in characteristic, requires a choice from a limited set of references.

With WHOSE, **WHO** and sometimes **WHOM**, or **WHAT** were also used. WHO/WHOM was found to be a more popular candidate than WHAT, which disappeared quickly as the subjects approached S2 and S4. For some P6 subjects who were able to produce WHOSE-Qs, it is interesting to discover that, some of them used WHOSE and WHO'S interchangeably in the DC task, as in:

'Who's house is on fire?' (DC Q.24)

which perhaps was analogous to the possessive " 's " as in "the boy's book". Moreover, the EMHK and to some extent the CMHK subjects appeared to have difficulty in distinguishing WHOSE-Qs from WHICH-Qs, and this confusion persisted at S2 and S4 level. On the other hand, the CMG subjects did not seem to have a great deal of difficulty asking WHOSE-Qs, as could be seen from the total number of WHOSE-Qs scored as appropriate in the OP and DC tasks (Section 1. Appendix 13a, 13b and 13c).

8.2.2 Interim Discussion

8.2.2.1 Semantic Confusion Between the Three Broad Types of Interrogatives

In fact, the subjects' failure in distinguishing between YN-Qs and WH-Qs in production was also reported in first language acquisition studies of Felix(1980), Weeks(1974) and Wode(1975), as well as in a tutored SLA study conducted by Felix who also claimed that, on the contrary, naturalistic learners observe this distinction from the very beginning of the acquisition process (Felix 1981b).

Felix argues that the 'actual problems lies with the syntactic devices that formally mark this distinction....It must be conceptually clear that the distinction was clear to them (the learners).' (Felix 1981b:104) In other words, a student would use a relatively more stable structure typical of early acquisition stages when he is forced to produce L2 sentences for which developmentally he is not yet ready.

Failure to perceive the syntactic distinction between YN-Qs and WH-Qs might be one of the sources of the problem. However, a post-hoc review of the elementary learners' performance in the CR task indicates that it may not necessarily be so. From the

data, no one single instance of such confusion was found in the learners' corrected version of YN-Qs; but only one or two students from the CMHK and CMG environments occasionally omitted the Wh-words in their correction, again usually in HOW + MODAL questions. It suggests that this documented confusion could in fact be a problem of the subjects' inadequate procedural knowledge in production since their performance in the CR task reveals that this syntactic distinction is already apparent for most of the subjects. As a result, elements which have previously become automated may become potential candidates during the retrieval processes whenever the learner does not have adequate knowledge for a target structure or when he is under the constraint of time in production.

8.2.3 Development of the Rules of the Interrogative System

The following discussion includes the results drawn from the analysis of the four elicitation tasks.

8.2.3.1 WH-preposing

Among the rules of the interrogative system, WH-preposing was the easiest structure to acquire. However easy this rule may be, the subjects displayed some initial difficulty with this structure, both in terms of comprehension and production. Results from the GJ and CR tasks indicate that some P6 subjects initially accepted unpreposed WH-Qs as grammatical (see WH-P in Section A, Appendix 14 and 15). Among these WH-Qs, it should be noted that the degree of acceptance varies according to the type of WH-Q judged in both tasks.

In general, unpreposed WH-adverbials like WHEN or HOW were as a rule not accepted while those which acted as object pronouns like WHO, especially WHOSE, were more acceptable. Unpreposed WH-Qs were also found in the subjects' production, either when they supplied appropriate questions in the OP or DC tasks, or when they corrected the ungrammatical questions, but the percentage of this feature was drastically reduced in the CR task (Section 2C. Appendix 13). Moreover, selectivity of unpreposed Wh-questions as mentioned in the GJ and CR(C) is even more prominent in the subjects' production, especially in WHICH-Qs and

WHOSE-Qs where a significant proportion of their initial production of these appropriate WH-Qs was unpreposed.

Although the three groups of subjects displayed this transitional pattern in their IL development, the beginner CMG and to some extent the CMHK subjects also produced a type of unpreposed WH-Qs quite different from the EMHK subjects. It is rare in the literature of L1 or L2 acquisition of the English interrogatives to find inverted questions without wh-preposing, which were produced quite consistently by the CMG and CMHK subjects, like:

***'Is Jane always listen to which story?' (CR Q.93)**

or:

***'Is the daughter play whose piano?' (OP Q.18)**

The fact that this feature is most prominent with the CMG subjects leads one to surmise that the emphasis on inversion right from the beginning does have some adverse effect on the internal acquisition processes. Moreover, another possibility is that it is an interplay of the subjects' knowledge of L1 (WH-preposing is not required) and their perceived patterns of interrogative phrases like 'is Jane', since copula questions are usually the first type of question taught to the subjects.

Previous L1 studies by Klima and Bellugi (1966) and Brown (1968), or L2 studies by Wode (1978) and Ravem (1978), reported that Wh-words are already preposed in the beginning of the developmental continuum. However, the finding in the present study provides strong evidence that previous L1 knowledge does play a role here in the subjects' performance on unpreposed WH-Qs. Since Wh-words in Chinese/Cantonese questions are unpreposed, elementary learners who have not been exposed to adequate data as regards WH-Qs in English may assume that the same system works in English.

Kwan(1986) also found her subject in his simultaneous acquisition of English and Cantonese displaying a stage where WH-words were either preposed or unpreposed in both languages. Moreover, the Spanish subject in Butterworth and Hatch's study revealed a similar phenomenon of transfer in his acquisition of English

(Butterworth and Hatch 1978).

However, it should be mentioned that the subjects here did not depend completely on their L1 knowledge but were selective in their transfer of L1 knowledge; otherwise, one would have discovered that not only Wh-words which serve as an object pronoun were unpreposed, but also WH-adverbials, as in Chinese. In other words, SL learners only select those aspects of their L1 knowledge which are perceived by them as compatible to the TL.

8.2.3.2 Inversion

In general, all the three groups of subjects displayed a non-inversion stage in their development of YN-Qs and WH-Qs, which was later extended to EYN-Qs and became a characteristic feature of the development of this type of question especially at P6 and S2 level.

8.2.3.2.1 Inversion in YN-Qs

From the results of the statistical analysis in Section 7.3.1.3 of the previous chapter, the subjects' performance on inversion was generally better in YN-Qs than in WH-Qs, implying that YN-Qs may provide a more favourable environment for inversion to develop Nevertheless, all three groups of subjects in different degrees demonstrated a transitional stage of non-inversion, which suggests that uninverted YN-Qs might constitute an initial stage of their development of YN-Qs. As far as the OP and DC tasks are concerned, uninverted YN-Qs appear to be a significant feature in the subject's production, as shown by the percentages in Section 2D of Appendix 13. When the subjects' performance on this feature in the GJ and CR tasks was analysed, the same phenomenon was found in which the subjects accepted uninverted YN-Qs as grammatical (see -INV of Section B in Appendix 14 & 15). This consistency in relation to both judgment and production suggests that uninverted YN-Qs constitute the initial stage of the subjects' acquisition of the interrogative system.

Within this framework, differences between the three groups of subjects were found. The **CMHK**(P6) subjects appeared to have great initial difficulty in this feature as they consistently produced uninverted YN-Qs in the OP and DC tasks and judged them

to be grammatical in the GJ and CR tasks, the percentages of which were over 40% (Section 2D of Appendix 13b, Section B of Appendix 14b and 15b under -INV). Despite this rather slow development at P6 level, the CMHK subjects displayed a rapid improvement both in terms of production and comprehension from S2 level onwards.

As for the **EMHK** subjects, their judgment on uninverted YN-Qs in the CR and especially GJ tasks was found to be poorer than in their production, as shown by the higher percentages found in judging uninverted YN-Qs as grammatical (Section B of Appendix 14a and 15a under -INV). In fact, the EMHK subjects were the only ones who assigned higher grammatical status to this structure across the three levels of proficiency, when the extent of shift over time along the scale of grammaticality between the three groups of subjects was compared. In other words, they did not necessarily regard this structure as totally ungrammatical.

The **CMG** subjects, on the other hand, produced uninverted YN-Qs mainly in the OP task (Section 2D of Appendix 13c); and the P6 subjects right from the start did not generally regard uninverted YN-Qs as grammatical, as shown by the lower percentages in the CR and GJ tasks (see -INV in Section B, Appendix 14c and 15c), which is quite unlike the other two groups of P6 subjects. This better performance of the CMG(P6) subjects with respect to the structure discussed may be due to the grammatical input at this level. The presentation of simple questions such as the Copula YN-Qs as well as WHAT+COP and WHERE+COP and follow-up practice to some extent has raised the subjects' consciousness of the grammatical properties of the English interrogatives initially.

However, while they were improving in production, and when the effect of grammatical instruction on this structure eventually waned, some CMG(S2) subjects relapsed into the non-inversion stage of the development of YN-Qs even in their judgments but regained mastery of it again at S4 level. It is shown by a sudden increase in the percentages of judging uninverted YN-Qs as grammatical, at the same time showing a decrease in their

certainty of judgments (see -INV in Section B, Appendix 14c).

This phenomenon of 'backsliding', and in this case, at the level of knowledge, has been documented by Kellerman (1985) as 'U-shape' learning behaviour found in both L1 and L2 acquisition in which reorganisation of previously 'acquired' mental representations of target language (TL) knowledge may be taking place. In the context of pure classroom SL learning, the provision of metalinguistic input and explicit negative feedback at the time of instruction might sensitise the subjects' IL knowledge of the TL, which may provide the basis for subsequent restructuring of IL knowledge.

However, this postulate rests upon the assumption that the subjects are given ample opportunity to put their metalinguistic knowledge into practice. In the case of the CMG subjects, massive drills and practice in terms of sentence transformation or translation which enhances the development of their metalinguistic knowledge may serve as an indirect means to develop their IL knowledge of the TL structure subsequently.

8.2.3.2.2 Inversion in WH-Qs

Where Wh-Qs were scored as appropriate and Wh-words preposed, uninverted WH-Qs appear to be a stage almost inevitable for all three groups of subjects to skip, although each group displayed a different pattern of variation (Section 2D of Appendix 13 for production, see -INV in Section A of Appendix 14 and 15 for judgment and correction).

The general thesis that the development of IL knowledge involves overlapping stages finds proof in the subjects' development of inversion in different Wh-Qs. It was found that inversion was not uniformly applied to all WH-Qs, implying that certain linguistic contexts may trigger the application of the inversion rule more easily while others are more resistant to this development. As mentioned previously, WH-adverbials were preposed much earlier than Wh-words. However, they did not provide a favourable environment for the development of inversion especially in production. Among them, WHY-Qs seem to be more resistent to the development of inversion than the other WH-Qs.

In terms of production among the three groups of subjects, the **CMHK** subjects were consistently shown to be slower in retrieving inversion in most WH-Qs, as shown by a higher number of instances of uninverted WH-Qs at all levels, not just in the OP and DC tasks, but also during their correction of ungrammatical sentences in the CR task (Section 2D of Appendix 13b, Section A of Appendix 15b under -INV).

As regards the **CMG** subjects, the emergence of uninverted WH-Qs in production was the most prominent at S2 level with WHY-Qs, WHEN-Qs, WHOSE-Qs, and WHICH-Qs, followed by a distinctive reduction of the number of instances of this feature as the subjects approached S4 (Section 2D of Appendix 13c). This finding seems to suggest that the rate of developing inversion in WH-Qs was relatively faster with the CMG subjects than with the CMHK subjects, since, within two years, there was a big reduction in the number of instances of uninverted WH-Qs in tasks which measured either or both form and meaning of WH-Qs.

Unlike the CMG and CMHK subjects, the stage of uninverted WH-Qs as shown by the **EMHK** subjects seems to be overcome by the subjects at S2 level and improvement after that slows down gradually (Section 2D of Appendix 13c). This phenomenon is also reflected in their performance in the CR task where considerable improvement in judging uninverted WH-Qs to be ungrammatical was only seen at S2 level, and accurate corrections adequately offered, which reflects the subjects' rather rapid development of their metalinguistic knowledge at this level (Section A of Appendix 15a under -INV).

In terms of the subjects' performance on this feature in the GJ task, the extent of shift towards ungrammaticality as shown by the three groups of subjects is not as distinct as that found in either WH-preposing or inversion in YN-Qs, suggesting that the subjects found the judging of inversion in Wh-Qs comparatively more difficult than the features mentioned. While the three groups of P6 subjects were showing similar difficulty in judging uninverted WH-Qs, a more rapid improvement was found with the EMHK(S2) subjects both in terms of judgment and correction (Section A of Appendix 14a and 15a under -INV).

Although similar degree of difficulty was found at S2 level of the CMG and the CMHK subjects, it was the CMG subjects who were better able to correct and explain the uninverted questions than the CMHK subjects, some of whom could only judge and locate the errors but could not correct them (Section A of Appendix 14b and 14c under -INV). This phenomenon is particularly obvious at the S2 level between these two groups of subjects. Notwithstanding that fact that the CMHK subjects had benefitted from a longer period of instruction than the CMG subjects, by the S2 level, the CMG subjects began to show that they had at least caught up with the CMHK subjects and were even better at explaining the errors than the Hong Kong subjects in general. This finding indicates that there was rapid development in terms of meta-linguistic knowledge of the CMG subjects, which enabled them to outperform the CMHK subjects not only in a task which taps the knowledge of form, but also those which tap both form and meaning as in the DC task.

8.2.3.2.3 Inversion in EYN-Qs

As mentioned previously, a major factor which renders the acquisition of EYN-Qs more difficult than the other two major types of questions is that there is a stage where most subjects failed to distinguish the semantic function of direct questions from indirect questions. Almost all three groups of subjects were initially producing two variants of the same question, i.e. inverted or uninverted EYN-Qs, both without a connective, depending on the amount of attention paid to the form (Section 2E of Appendix 13a, 13b and 13c). However, it is worth mentioning that uninverted EYN-Qs without a connective are more a characteristic of the P6 subjects than those at higher levels, as shown by the decrease in the percentages of this feature with proficiency.

As for the **CMHK**(P6) subjects, almost 50% of their production of EYN-Qs in both OP and DC tasks can be attributed to uninverted EYN-Qs, and the rest is constituted mainly of inverted EYN-Qs (Section 2E of Appendix 13b). This phenomenon is further confirmed by their performance in the GJ and CR tasks where most subjects always regarded these two structures as grammatical and

their certainty level reached well over 70% (Section C of Appendix 14b and 15b under +INV-CON and +INV +I.CON). As proficiency increased, the CMHK subjects consistently produced more and more inverted EYN-Qs such as:

***'I'd like to know are these books Miss Lee's? '**

or:

*** 'I'd like to know that are you a student?'**

However, the second type of EYN-Q occupied a minor proportion in their production. Some even began to judge uninverted EYN-Qs with a connective (i.e. target EYN-Qs) or without a connective (i.e. ungrammatical EYN-Qs) to be ungrammatical and provided an inverted EYN-Qs as far as possible. This phenomenon did not cease even if the subjects approached S4 where inverted EYN-Qs without a connective were usually considered as the norm especially in the OP and DC task, though they began to cast doubt on the grammaticality of inverted EYN-Qs and attempted to provide the correct EYN-Qs only in the CR task.

It seems that at the time of the experiment, the **EMHK**(P6) subjects were approaching the end of their non-inversion stage with respect to this question and on their way to developing inverted EYN-Qs (Section 2E of Appendix 13a). At S2 level, grammatical uninverted EYN-Qs gradually took over as some subjects began to produce grammatically well-formed EYN-Qs and by S4, a majority of subjects showed signs of improvement in this structure. In fact, the results from the GJ and CR tasks suggest that at P6 level, they favoured inverted EYN-Qs more than uninverted EYN-Qs, though both were regarded as possible variants for EYN-Qs. It is only at a later period that greater differentiation was shown between these two features.

The **CMG**(P6) subjects exhibited a slightly different pattern of development. Uninverted EYN-Qs without a connective were increasingly evident in the OP task, occupying 19% at P6 but soaring up to 37% at S2 level; at the same time, well over 50% of their production consisted of inverted EYN-Qs (Section 2E, Appendix 13c). However, this phenomenon of resorting to uninverted EYN-Qs was not found in the DC and CR tasks at S2 level where

inverted EYN-Qs were regarded as the norm, perhaps as a result of metalinguistic influence. Then, there was a swift change of prominence from uninverted EYN-Qs without a connective or inverted EYN-Qs to grammatically well-formed EYN-Qs in most tasks, though less so in the OP task.

In fact, it appears that the ultimate realisation of not inverting EYN-Qs triggers the development of connective, 'if' or 'whether', though the former was very much preferred by a majority of subjects. When they were ready to include target uninverted EYN-Qs in their competence, these subjects seldom reverted to their previous stage of -INV -CON, as in:

***I'd like to know you are a student?**

This finding may be an indication of more advanced syntactic knowledge, from the evolution of paratactic constructions to syntactic constructions which require knowledge of embedding.

To sum up, while both the EMHK and CMHK subjects exhibited an obvious stage of uninverted EYN-Qs which were gradually taken over by inverted EYN-Qs during their process of acquisition, the CMG subjects appeared to adopt both inverted and uninverted EYN-Qs initially while inverted EYN-Qs were considered to be the norm as a result of the opportunity to consult their metalinguistic knowledge. However, this norm was quickly abandoned as the subjects reached S4.

8.2.3.3 Q-operators

As far as these three groups of learners are concerned, their development of inversion seems to be hampered by the almost inevitable confusion with the adoption of appropriate Q-operators at various stages of their IL development.

From the subjects' performance on the GJ and CR tasks, inappropriate Q-operators were found to be as difficult to judge and correct as inversion, as shown by the finding in the GJ task that most of the tokens were clustering towards the grammatical end of the scale, suggesting that these subjects had difficulty in evaluating the grammatical status as put forward by this structure (Section A of Appendix 14 under I. Q-OP). This diffi-

culty is even more obvious in the CR task in which correcting and explaining the inappropriate Q-operators were found to be the most difficult among the rules of the simple interrogatives (Section A of Appendix 15 under I.Q-OP).

To investigate the subjects' performance on the three types of Q-operator further, a reclassification of the subjects' performance in terms of Q-operators required was carried out. The tables showing their performance in the GJ and CR tasks can be found in Appendix 16a and 16b respectively and their areas of difficulty in production are summarised in Section 2F of Appendix 13.

For all three groups of subjects, the failure to recognise Do as a Q-operator for main verb questions, as in:

***'Why is Mary learn tennis?' (CR Q.99),**

is a characteristic feature of their performance in both recognition and production tasks. (Section 2F of Appendix 13, No.1 under 'Types of Errors' for production, Appendix 16a and 16b under 'DO' for the GJ and CR tasks). A similar problem was found in the Modal (Section 2F of Appendix 13, No.5 under 'Types of Errors', Appendix 16a and 16b under 'MODAL'), though its degree of difficulty was not as great as that found in Do in most cases; and the EMHK subjects seemed to perform much better than the other two groups of subjects in this respect.

Since this over-generalisation of the Copula to either Do or Modal in IL production is not only restricted to just the OP and DC tasks but also found in the CR and GJ tasks, it may signify that this feature is part of the subjects' IL competence.

The second type of error, though not as serious as the one mentioned above, is the inappropriate use of Do as a Q-operator for Copula questions. A significant percentage of the subjects' performance in the CR and GJ tasks, especially at P6 level, was made up of judging questions such as **'Why do Mary always late?'** (CR Q.116) as correct, suggesting that intensive teaching of Do has some adverse effects on the subjects development at the level of knowledge. However, it is interesting to find that

this phenomenon is largely restricted to judgment and correction; whereas in the OP and DC tasks, this type of question is not as prominent as the inappropriate use of Copula for main verb questions (Section 2F of Appendix 13, No.2 under 'Types of Errors'). It is only at a later stage of development that the subjects began to extend this dummy auxiliary Do to the Copula and Modal context, as shown by the gradual increase in the percentages with proficiency (Section 2F of Appendix 13, No. 2 & 6 under 'Types of Errors').

This finding seems to suggest that, <u>first</u>, not only did the subjects have to sort out the inversion rule, but also what to invert in forming a question. If this surmise holds true, the development of the interrogative system in fact involves the development of inversion on the one hand, and the subsequent realisation of appropriate Q-operators in order to make inversion possible. <u>Second</u>, intensive teaching of the rules of the interrogative system would first find its effect at the knowledge level, while the subjects' performance may remain relatively unaffected.

As regards the development of individual groups of subjects, the **CMHK** subjects appeared to have great difficulty in this respect, as shown by their relatively poorer performance on this feature in the GJ and CR tasks, and their consistently heavy reliance on the Copula in forming either Do or the Modal questions in production. In fact, when providing explanations in this respect, most of the CMHK subjects tended to say that 'IS' (sometimes 'ARE') should be placed after the WH-words in forming questions, which on the one hand, reflects their 'immature' knowledge of SV-inversion, and on the other, the heavy reliance on the Copula as the only Q-operator.

While exhibiting similar difficulty, the **CMG** subjects appear to have overcome this problem earlier than the CMHK subjects because general improvement in production was shown by S2 level among the CMG, while the development of this error was in full swing among the S2 subjects of the CMHK environment (Section 2F of Appendix 13c, No.1. under 'Types of Errors').

While the CMG and the CMHK subjects were consistently over-extending Copula to Do and subsequently vice versa, the **EMHK** subjects appear to proceed in their IL development in a manner different from the other two groups of subjects. Even though the over-extension of Copula predominates at P6 level, a significant proportion of the over-extension of Do to Copula contexts was also found at the same level in terms of judgment and production, suggesting that the gap between the development of Copula and Do as a Q-operator for inversion may not be as big as that found among the CMG and especially the CMHK subjects.

8.3 General Discussion: The Nature of Classroom SL Development

The statistical analysis in the last chapter as well as the qualitative description above have provided us with some evidence about the IL development of learners acquiring the TL in different classroom learning contexts. The discussion that follows is a attempt, in the light of the findings, to interpret their performance within the framework of SLA theory, both in terms of diachronic variability, as exemplified by the developmental continuum they traversed, and synchronic variability as a result of task differences. Moreover, the role of L1 influence, as well as the interplay between the natural acquisition processes and the effect of classroom instruction will also be brought into the discussion. However, the following interpretation should be taken to be tentative suggestions, since language acquisition is such a complex phenomenon, in that the subjects' performance may be influenced by disparate socio- and psycholinguistic factors and what is presented here will be just some possible factors underlying their performance.

8.3.1 Variability and Systematicity of IL Development

8.3.1.1 Diachronic Variability : Development of IL Over Time

The ANOVA results in the last chapter confirm the hypotheses that the subjects' IL knowledge of the English interrogative system complexifies over time. This diachronic development can be described in terms of overlapping stages in their route of development towards the approximation of the TL system. These overlapping stages have been illustrated by the subjects' development in encoding the various types of interrogatives, as well

as the development of the rules of the interrogative system, which in fact repudiates the previous claims that SL learning involves mainly the accumulation of 'full-grown' knowledge blocks. Before the subjects could master the target structures, be they Q-types or rules, transitional patterns were discovered, which indicates that the subjects did not take in the limited classroom input in toto but were actively creating their own IL subsystems via restructuring their current IL knowledge which then awaits further confirmation or disconfirmation. A typical exemplification of this recurrent structuring of information can be found in the subjects' development of inversion in different Q-types as well as in different Q-operator contexts. However, this restructuring of information is not only restricted to the subjects' syntactic competence, but it is also applied to the restructuring of semantic information underlying each Q-type. A central issue in the context of the present study is whether the three groups of classroom learners, being subject to different types of classroom input, display a different pattern, or order of development in their SL development, either in terms of Q-types or of the rules of the interrogative system.

8.3.1.1.1 Order of Development of Q-types

From the results of the Rasch Partial Credit Analysis in Section 7.5.1.1, the orders of development of Q-types as reflected by the OP and the DC tasks indicate that the three groups of subjects generally showed a similar order in the use of the three main types of interrogatives.

As for the development of the eight WH-Qs under investigation, similarities as well as differences were found in the production of the semantically appropriate and grammatically well formed Wh-Qs between the three groups of subjects.

From the results, as mentioned previously, WHAT-Qs and WHERE-Qs were generally found to be the easiest to produce in both the OP and DC tasks than WHICH-Qs and WHOSE-Qs, which were relatively more difficult; and WHO-Qs, WHY-Qs, WHEN-Qs and HOW-Qs were the intermediate for all three groups of subjects. One reason why WHICH-Qs were relatively more difficult to acquire than most of the other WH-Qs is that, in terms of function, they

are used in a fairly restricted range of meanings, in that a definite reference is required in asking these questions. It may be the case that it is more difficult to ask questions which require definite reference rather than indefinite reference.

The finding that WHAT-Qs, WHO-Qs and WHERE-Qs were overgeneralised to WHICH-Qs as mentioned in Section 8.2.1.3. lends support to this possibility because these potential yet inappropriate variants only involve an indefinite reference. In fact, Wode (1976) reports that his German L1 subjects tend to use 'WO' for 'WHERE' and it was later overgeneralised to mean 'where to' and 'where from' before the emergence of WOHIN and WOHER. This strategy of over-generalisation is also utilised by SL learners who in fact stretch form to encode meaning more extensively than L1 learners do.

As mentioned in Section 8.2.1.3., Felex (1976) claims that this strategy is L2 specific as L1 learners would overgeneralise only within the scope of what he called '**secondary interrogative pronouns**' which is usually language specific, as demonstrated by the Wode's example in German above where there exist a set of interrogative words for locative directions. Nevertheless, it appears that language acquisition involves continuous analysis and reanalysis of semantic information entailed by these Wh-words. Within this operation, it is the language form that is 'reorganised', and the language functions remain fairly constant.

Moreover, as an interrogative determiner, as designed in this study, both WHICH-Qs and WHOSE-QS require a noun, personal or non-personal, to form an interrogative phrase. Apparently, some students from the three environments showed difficulty in this construction, thereby yielding ungrammatical questions such as:

***'Which does she usually sing with singers?'(OP Q.47)**

or:

***'Whose does your partner interested in design?' (OP Q.34)**

These errors indicate that structural complexity could also be one of the factors causing the relatively late acquisition of these two types of questions.

Nevertheless, the orders established were generally parallel to those established in first and naturalistic SLA studies as reported by Huang & Hatch (1978), Butterworth & Hatch (1978), recent studies by Ellis (1984a) and Kwan (1986), suggesting that even classroom learners are largely following certain natural processes of language acquisition in the development of WH-words.

Despite this similarity in the orders of development, as mentioned in Section 7.5.1.1., some differences were found with respect to the order of some types of WH-Qs established by the three groups of subjects. To recapitulate, for the EMHK subjects, WHO-Qs were consistently proved to be relatively more difficult to produce than WHY-Qs and WHEN-Qs in both tasks and than HOW-Qs in the DC task. On the other hand, WHO-Qs occupy a relatively earlier position in the orders established by the CMG subjects. Moreover, the position of WHOSE-Qs in the DC task as established by the CMG subjects suggests that this Q-type is easier for them to produce and is behaving differently as a result of task differences.

A survey of the variants used by the EMHK subjects in place of WHO-Qs was carried out and it was found that WHAT-Qs, WHICH-Qs, and to some extent WHOSE-Qs, were used to replace WHO-Qs in both OP and DC tasks (Section 2B. Appendix 13a). However, while the CMG and CMHK subjects showed greater improvement in the appropriate use of WHO-Qs in the DC task than in the OP task, and while the CMG subjects adopted mainly WHAT-Qs and the CMHK subjects adopted WHAT-Qs and WHICH-Qs for WHO-Qs, the EMHK subjects displayed similar difficulty in both the OP and DC tasks with respect to WHO-Qs and the variants they adopted included WHAT-Qs, and the late acquired WHICH-Qs and WHOSE-Qs. In other words, the EMHK subjects had consistently shown in both tasks greater difficulty in assigning a clear semantic function for WHO-Qs than the other two groups of subjects.

It is very difficult to explain why WHO-Qs were relatively more difficult for the EMHK subjects to perform, when compared with the other types of questions. One explanation is that the effect of teaching occurred unfortunately at a point when the sub-

jects were not ready for taking in the structure. When instruction was no longer available, the subjects had to rely on other means to distinguish the semantic functions of these questions. One of these means may be their L1 knowledge, which in fact, might result in further confusion because WHO, WHICH and WHOSE have a similar or almost identical lexical realisation in Cantonese (see Table 5.2. Chapter 5). On the other hand, intensive teaching seems to have created some positive effect on the acquisition of WHO-Qs with the CMHK and the CMG subjects, particularly at S2 and S4. The improvement in the performance on WHO-Qs with the CMHK subjects, as well as WHO-Qs and WHOSE-Qs with the CMG subjects in the DC task reveals that their knowledge of the semantic functions of these questions was there, provided that they were given enough time to organise their knowledge in production.

Another observation with regard to the difference in the two orders thus established may be attributable to task differences. As mentioned in 7.5.1.2., the position of certain intermediate Q-types varies according to task demands. For instance, more appropriate and accurate production of WHY-Qs was found among the EMHK subjects in the OP than in the DC task. Adverse effect of the intervention of metalinguistic knowledge on the subjects' performance was found in the DC task in which their metalinguistic knowledge of inversion was transferred to EYN-Qs when sufficient time was allowed.

To conclude, the three groups of learners were following a similar order of development of the Q-types under investigation, but some differences were found with respect to certain types of Wh-questions, which may be explained by the effort of teaching imparted to the Chinese medium subjects as well as task differences.

8.3.1.1.2 Orders of Development of the Rules of the Interrogative System

As mentioned in Section 7.5.1.2. (Figure 7.3), the three groups of classroom learners displayed a great deal of similarity in the order of development, though differences were also found which may be traceable to the effect of different learning

contexts and the task demands imposed on the subjects.

The similarities as regards the orders (Section 7.5.1.2.) as well as the errors (Section 8.2.) they made give further evidence that (i) they did go through certain transitional stages universally found among SL learners of the English interrogative system, requiring a stage of non-inversion to precede the subsequent mastery of the inversion rule; and (ii) that the inversion of Do is acquired later than either the Copula or Modal.

With these results in order, one has to accept the autonomy of SL learners who in general rely on certain natural acquisition processes when approaching the TL. Furthermore, the CMG environment, in which the mode of teaching and learning is so widely different from that found in a naturalistic setting, does not have any significant effect on the general developmental sequence, suggesting that metalinguistic knowledge may not be beneficial especially during the initial stage of their IL development.

Within this universal pattern of development, we have to acknowledge the existence of certain differences which may be ascribed to the learner's ability to meet different task demands. The relative position of Q-operator in YN-Qs (Y:QOP) between tasks (Figure 7.3. of Section 7.5.1.2.) can serve as a good example. Supplying a suitable Q-operator as in the early acquired YN-Qs for inversion to take place is quite different from identifying the relevant errors and explaining the intricate grammatical relations involving the Q-operator in the verb phrase.

This difference seems to support Krashen's notion that the knowledge which SL learners retrieve in meaningful production is different from that they rely on in pure grammar tests (Krashen 1985). However, another possibility is that the learner may access the same IL knowledge store but with different degrees of analyticity, which eventually leads to the different position occupied by the Q-operator in the order of development between the two tasks. This possibility is also related to the assumption that the subjects' use of a grammatical structure has no implication that they know the internal relationship of it, a

phenomenon commonly occurred in initial IL development.

Nevertheless, in the light of the results mentioned above, it seems that the different learning environments as identified in the present study do not in any principled way influence the general developmental sequence in the subjects' acquisition of the English interrogative system. Their effects may be seen in the subjects' rate of development, but are nevertheless dependent upon whether the knowledge derived from their respective classroom input is correct or not. However, it does not imply a strict universalist explanation for the IL development of the three groups of subjects. In fact, some of the transitional patterns commonly exhibited among them (e.g. unpreposed Wh-questions, the heavy reliance of Copula as Q-operator) are considered as deviations from the universal acquisition phenomenon and are explainable in terms of L1 influence. In other words, the learner's L1 knowledge is not independent of this universal acquisition process, but plays a significant role in building up his IL competence. In the following section, this interplay between the learner's L1 and the universal acquisition process is discussed in detail.

8.3.1.1.3 <u>Universality of Second Language Acquisition</u>

To recapitulate, these learners were shown to undergo certain transitional stages commonly found among L1 learners or L2 naturalistic learners of the English interrogatives. The fact that these transitional patterns are not normally available, not to mention unacceptable, in a classroom context, as a result of the teachers' strict adherence to the pedagogical principle of 'accuracy in usage', or as far as possible 'accuracy in use', leads one to surmise that certain natural acquisition processes are activated and to some extent are not susceptible to external manipulation.

Earlier proposals have been made to account for this universality of developmental stages which SL learners go through. Corder (1981) postulates that the learner has a **'built-in syllabus'** based on universal cognitive processes, which enables him to acquire a language in his own terms, and to some extent, at his own pace. Researchers of the morpheme studies in the 70s put

forward the 'creative construction' model of SLA, which in essence is similar to Corder's 'built-in syllabus' (cf. Dulay and Burt 1977, Dulay et.al. 1982). Wode argues that language acquisition is based on certain 'linguo-cognitive mechanisms', specifically geared towards language acquisition, with which a learner seems to be invested and which are flexible enough to suit different learning settings (Wode 1981a). Recently, as mentioned in Chapter 2, some SLA researchers who work in the framework of Chomsky's Universal Grammar and the Parameter-Setting Model of language acquisition began to expound their postulate about the availability of these limited set of universal principles in SLA (White 1986, Flynn 1987).

Except for the 'creative construction' hypothesis, most of these models acknowledge the interactive role played by the learners' L1 in shaping their IL development. In other words, SLA is viewed as the interplay between certain universal principles and the learners' previous L1 knowledge. Based on his L2 data, Wode (1984) argues that transfer is an integral part of how L2s are acquired. As he notes,

> '..transfer was not random but systematic, that it occurs in developmental sequence only under specific conditions, and that the structure to be transferred from the L1 into the target L2 had to be crucially similar to the respective L2 structure before the L1 structure could be transferred to the L2.'
>
> (Wode 1984:175)

The qualitative description as presented in the beginning of this chapter, apart from showing that there exists a universal route of development in the subjects' acquisition of the English interrogative system, does reveal that in certain stages of the subjects' IL development, L1 influence is in operation. In the following, the author will attempt to interpret the subjects' IL development in terms of both universal acquisition processes from a typological perspective and the role played by the learner's L1. Such an interpretation rests on the assumption that learners are endowed with certain universal 'developmental principles', as suggested by Wode (op.cit), which in the present study are reflected by the orders of development similar not just among the three groups of classroom learners, but also to

those established by L1 and L2 naturalistic learners. According to Wode, these developmental principles, derived from certain linguo-cognitive mechanisms, somehow interact with the properties of the TL rules that have to be acquired, and at various stages, the rules of his previous knowledge of L1.

8.3.1.1.3.1 SLA: From a Typological Perspective

Typological Distinction between Cantonese and English

The structural distinctions between Cantonese and English have been introduced in Chapter 5. The following discussion concentrates mainly on the typological properties of the two systems.

Despite sharing the same SVO canonical word order, these two languages display a different propensity for marking semantic-syntactic relations manifested in the function of word order. Li and Thompson (1976) and Thompson (1978) argues that English is based on **Grammatical Word Order** whereas Chinese is based on **Pragmatic Word Order.** In effect, English manipulates subject-predicate order to denote or signal some essentially grammatical relations such as question formation, embedding, etc.:

> 'English is a language in which basic grammatical relations are signalled by word order, especially, that it is a language in which there must be a noun phrase immediately preceding the verb in main clause and that noun phrase (if unmarked) is the subject.'
>
> (Thompson 1978:25)

According to Li and Thompson(1976), Chinese is similar to English by virtue of the presence of some subject-predicate constructions (thus yielding the same canonical word order in basic sentences). However, in Chinese, pragmatic factors such as presenting **theme-rheme, given-new information, topic-comment** relations may determine the position of word order in a sentence. To comply with this discourse pattern, the topic usually remains in sentence initial position. However, the discourse 'topic' may or may not be the grammatical subject of a sentence, as emphasised in traditional linguistic analysis usually structured in terms of subject, verb and object.

> 'In Tp (Topic-prominent) languages, it is the topic, not the subject, that plays a more significant role in sentence con-

> struction. Any noun phrase can be the topic of a sentence without registering anything on the verb.....in an Sp (Subject-prominent) language, a subject may be needed whether or not it plays a semantic role.'
>
> (Li and Thompson 1976:467)

A prime contrast between English and Chinese in terms of subject and topic may be manifested in the following sentences:

(a) English: It is raining heavily.

(b) Chinese: 雨 落 得 好 大
rain fall particle very heavy
(topic) (comment)

In (a), a dummy grammatical subject 'it' which does not have any semantic role is required, whereas in (b), it is the topic, not the subject, that plays a significant role in sentence construction. However, it is not to say that in **Tp** languages, one cannot identify subjects, or that **Sp** languages do not have topics. According to L1 and Thompson (op.cit), all the languages they have investigated, including English, have the topic-comment constructions, and although not all languages have the subject-predicate constructions, there appear to be ways of identifying subjects in most **Tp** languages. In their opinions, languages such as Chinese may be more insightfully analysed within a topic-comment framework.

From the perspective of language universals, Li and Thompson (op.cit) succinctly argue that topic-comment sentences are naturally basic and not transformationally derived because the topic constituent is already built into the basic syntactic structure of the sentence.

To conclude, Chinese is a language the sentential constituents of which are usually guided by pragmatic principles (**theme** and **topic** have much in common and **theme/topic** must come first in a sentence). As a result, it is interesting to note that the form-meaning, or semantic-syntactic, relationships in Chinese are more direct or transparent than in English. Rutherford (1987) comments that in English, the form-meaning relationships are more indirect than in Chinese and other well-known languages, a reference drawn from Hawkins (1985):

'English allows a looser linear relationship between meaning and grammatical form than do most other languages.'
(Hawkins 1985 in Rutherford 1987)

SLA: Acquisition of the Typological Characteristics of English

Placing the above discussion into the perspective of IL development of Cantonese learners as in the present study, it is reasonable to assume that their acquisition process involves what Rutherford calls '**Process of grammaticisation**':

'..where the learner gradually (and unconsciously) reanalyses topic-comment as target-language subject-predicate...by means of extra grammatical 'machinery'.'

(Rutherford 1987:43)

In fact, evidence from L1 acquisition studies such as Scollon (1974) and Keenan(1974) also found that children prior to sophisticated syntactic development do observe the given-new principle in their verbal interactions in that children usually get their listener's attention, with some acknowledgment of the topic, before they add new information. This pattern of information construction in relation to topic (given) and comment (new) between two twin boys, aged 2;9, was recorded in Keenan (1974):

David: [alarm clock rings] Oh oh oh, bell.
Toby : Bell.
David: Bell. It's Mommy's.
Toby : [mumbles indistinctly]
David: Was Mommy's alarm clock. Was Mommy's alarm clock
Toby : Alarm clock.
David: Yeah. Goes ding dong. Ding Dong.

(cited in Clark and Clark 1977:319)

In the dialogue above, the listener repeats the first utterance thereby acknowledging the topic, and the speaker gradually adds his comments. The topic, in this case the subject, is always built into the syntactic structure of the sentences and is sometimes absent but recoverable from the context.

To extract from the discussion above, it is reasonable to assume that the English interrogative system is more marked than that in Cantonese. English utilises a more rigid word order to de-

note grammatical relations than Cantonese. As mentioned previously, this realisation can be found in the consistent grammatical manipulation of word order such as SV-inversion, WH-preposing in question formation in English. On the other hand, in Cantonese, the word order is the same between the interrogative and its counterpart declarative sentences, the construction of which is guided by pragmatic principles, so that the discourse pattern or the close semantic-syntactic relations can be maintained. In order to maintain the same word order, as mentioned in Chapter 5, Cantonese makes use of sentence final Q-particles, the sentence internal A-not-A constructions in YN-Qs and the Wh-phrase is not preposed in WH-Qs. For EYN-Qs, the entire YN-Q is tagged onto the main clause.

Ultan (1978) observes that inversion in English is linguistically more marked as a result of its limited distribution. Furthermore, evidence from L1 and L2 acquisition studies also suggests that inversion may be psycho-linguistically more marked than declarative questions, as shown by the results that subjects do go through a non-inversion stage, an unmarked stage signalled by declarative word order. This phenomenon has also been captured by Rutherford (1984) in his discussion about the data on WH-Qs in Burt and Dulay (1974b).

Recalling the previous argument that SLA is viewed as a kind of cognitive development guided by a set of universal acquisition principles which at various stages of its development may interact with the learners previous knowledge, how did these Cantonese learners tackle their learning task, particularly when the input they received was mainly from the classroom?

It seems that the initial hypothesis set up by these learners is that English questions may follow the same canonical word order as in Cantonese, because the preliminary input in relation to English declarative sentences usually manifests the SVO order and the subject-predicate and topic-comment relations are almost transparent. This may lead the learner into assuming that Cantonese and English follow the same word order in basic sentences and they may project this principle to their acquisition of English questions. In fact, Zobl (1986) comments that the

'topic-comment traits' in the SL learner may initially permit him to parse subjects as topics.

This initial hypothesis, as set up by the learner, seems to be compatible with the universal developmental processes (non-inversion precedes inversion in developing the English interrogatives defined according to the nature of the TL rule), thereby resulting in the almost inevitable non-inversion stage in the subjects' initial IL development of the simple and embedded questions. In the case of YN-Qs, they are marked by rising intonation, a universal feature commonly found among learners.

This interplay of universal developmental principles and the learner's previous knowledge is not restricted only to production, but is also found in their judgments, timed or untimed, indicating that this phenomenon is part of their early IL competence, a rebuttal of the creation construction hypothesis in which L1 transfer is regarded as a production strategy.

One could argue that this non-inversion stage as found in Cantonese learners is solely the masterpiece of universal developmental principles and the learner's L1 knowledge is not involved. However, the concomitant occurrence of unpreposed Wh-words in uninverted WH-Qs like ***'Miss Wong always help who? (DC Q.58)** in early IL development, before the emergence of uninverted Wh-Qs but preposed Wh-words, does provide some evidence that it is a result of this interaction, recalling the fact the universal developmental sequence of English interrogation established previously makes no provision for unpreposed Wh-words in the early stage of language development, first or second (Brown 1968, Ravem 1978).

However, this language specific acquisition phenomenon does not violate the universal principles as people do make use of highly marked **echo questions** structured in terms of uninverted WH-Qs with unpreposed WH-words and rising intonation like **'You go where?'** in certain contexts, though its use is more to do with request for confirmation or expression of surprise (Brown & Miller 1980:374). However, it should be pointed out that the intervention of metalinguistic knowledge at the subjects' ini-

tial stage of development did result in a type of ungrammatical WH-Q (i.e. inverted questions with an unpreposed Wh-word) which is at variance with the natural acquisition processes. Moreover, this acquisition phenomenon is commonly found among the CMHK and CMG subjects (Section 8.2.3.1), which suggests that these types of learning contexts may trigger the use of some strategies not specifically geared towards language acquisition. This finding in fact lends support to the proposal of the Competition Model of SLA put forward by Felix (1987).

The discussion above is also in congruence with the interpretation of early IL development within a functional framework put forward by Givon (1979, 1984) who argues that early SL learners may display systematic features which can be classified under the **pragmatic/pre-syntactic** mode naturally observed in early child acquisition, pidgins and informal register. To name a few, these features include topic-comment structures, loose conjunctions, or word order being governed by pragmatic principles between old and new information.

In fact, the subsequent syntactic development as found in the present study, namely WH-preposing, also embodies a high functional load. Halliday (1970) in his interesting discussion about theme/rheme distinctions in an information unit emphasises that the free morphemes in the English interrogatives, the finite element of the verb in YN-Qs and the Wh-elements, are thematic and occupy the initial position of a sentence. Givon (1979:217) also points out that in WH-Qs, the focus is in the interrogative element and the rest of the question is presupposed, therefore, semantically, there is no reduction of meaning between inverted and uninverted WH-Qs.

The phenomenon thus described, in which the learner assumes from the outset that questions in English follow a declarative word order, characterises the early IL development of these Cantonese learners who consistently attempted to let the relationship of form and meaning be as direct as possible, or in Rutherford's terms, a closer '**semantic-syntactic distance**' (Rutherford 1987).

The trigger of the whole unconscious process of grammaticisation seems to lie in the development of WH-preposing and inversion in YN-Qs. As mentioned previously, the subjects soon realised from the input that WH-preposing is necessary in forming the English interrogatives, which gave them the first hint that question formation in English might require a change of word order. Another hint of the change of word order is found in their realisation that inversion is required in YN-Qs, one form of which may be shrouded by the teacher's 'rule of thumb': 'To form a question, move X to the front of the sentence.' If the learner operates with the fundamental assumption that word order is meaningful, to maintain this assumption in their development of English, he will realise that a certain grammatical manipulation of word order is necessary for forming the English interrogatives. This realisation which involves a gradual reanalysis of the function of word order lays the path for further development of inversion in WH-Qs and non-inversion in EYN-Qs. As a result, it entices the learner to the process of 'grammaticising' his IL knowledge of the English interrogatives, thus pulling their concept of the relationship of the form and meaning farther and farther apart from each other.

Nevertheless, the data seem to show that the learners did not abandon their initial hypothesis altogether in the face of the input they received. In fact, during the course of their IL development, the tension of keeping a close semantic-syntactic distance recurred in their development of simple and embedded questions at various stages, suggesting that they were consistently restructuring their IL knowledge in order to proceed to the next feature in the development sequence. A prime example can be found in a type of ungrammatical questions commonly found, along with uninverted WH-Qs with preposed Wh-words, where a copula is consistently used as Q-operator for the Do and Modal contexts, resulting in ungrammatical sentences like:

***Why is Tom go swimming everyday? (DC Q.17)**

or:

***Is John always cheat?'(DC Q.5)**

or:

***What is I should prepare? (OP Q.54)**

Nevertheless, with the increase in proficiency, Do was sometimes used in the Modal context, though to a less extent, yielding ungrammatical sentences like:

***'Why do you can use these models?' (OP Q.32)**

With respect to the latter feature, a similar phenomenon was found in War (1984) but it was the Q-operator Do which her subjects over-generalised. War argues that her classroom learners were adopting the problem solving strategy of 'slot-filling', thereby resulting in the numerous instances like:

***Do you are fool?**

or:

***When does you can go to Gauhati?'**

War attributes these errors to the intensive drilling of Do as Q-operator.

The situation is somewhat different in the present study in that the over-generalisation of 'Do you..', or 'What do....' patterns occurred much later than the overuse of Copula in main verb questions, despite the intensive drilling of Do at primary level, especially in the Hong Kong context. Chen's study on Chinese adult learners also discovered this characteristic phenomenon which he regards as Do-Be confusion, a relatively more advanced error than inversion (Chen 1986).

If we follow War's interpretation, this learning difficulty may be an outcome of the learner's initial imitation or 'slotting' of previously acquired feature such as 'What is' or 'Is she' in subsequent acquisition. It is probable particularly when this is the only feature they were presented in the input. However, the fact that this initial transitional feature persisted in their IL competence for a time span of four to five years does beg a better explanation, or the classroom environment as identified in the present study should be called into question.

From the data, it seems that it is the outcome of the learner's persistent propensity for topic-comment constructions, which marks the declarative constituents in the questions (i.e. Tom

go swimming everyday in *'**Why is Tom go swimming everyday?**'), and the learner's realisation of WH-preposing in forming questions in English. Further support may be found in Huebner's interpretation of his Hmong subject's in which he frequently used a sentence medial **is(a)** as a topic-comment boundary marker (Huebner 1983). It is possible that this strategy is also adopted in forming interrogative sentences by these Cantonese learners. In other words, the Copula is used as a bridge to link the Wh-element, a thematised topic, and the presupposed information that follows.

In fact, an explanation commonly provided among the subjects before they could verbalise the grammatical relation of SV-inversion, which is 'to insert "is" after the WH-word.', seems to suggest that they might perceive the pattern of English questions in this way. The persistence of this incorrect pattern across the three levels of proficiency suggests that it is more difficult to eradicate than WH-preposing. Until the subjects have developed adequate syntactic knowledge to refute this hypothesis, this incorrect feature is going to remain in their repertoire.

The development of syntactic knowledge may involve the subjects' awareness of SV-inversion, which is to extract AUX from the verb phrase and place it before the subject, plus the concomitant development of the various Q-operators. From the data, this development was first manifested by the gradual disappearance of Copula in the Modal context; and at the same time, an improvement in the subjects' performance on the inversion of Modal. The emergence of 'do', a dummy Q-operator to fulfil the grammatical requirement for forming English questions, can be taken as a sign of the learners' advanced syntactic knowledge. In fact, it is roughly at this stage that a more adequate explanation with respect to SV-inversion is found.

To conclude, the acquisition of English questions by Cantonese learners can be explained by the psycholinguistic process of grammaticisation wherein the learner is guided by some universal developmental principles which interact with his previous knowledge at various stages of his IL development. This process

involves not just the gradual realisation on the part of the learner of the typological distinctions between English and Cantonese, but also the interaction between the learner's knowledge of L1 and the developmental structures gradually unfolding to him. This development is reflected by the subjects' improvement in utilising grammatical devices instead of linear order to maintain the necessary links between form and meaning. Where the L1 possesses a feature which has a very close counterpart in the developmental feature of an L2 acquisition sequence, it is prone to be integrated into the subjects' IL subsystems and may have a prolonged effect on the learner's progress on the developmental continuum.

8.3.1.2 The Role of Instruction in SLA

One central aim of this study is the investigation of the effect of different learning contexts on SLA. The thrust of the investigation rests on the assumption that embedded in these learning contexts is the crucial variable of instruction, imparted with different degrees of frequency and elaboration or explicitness (cf. Chapter 6). Moreover, the fact that the CMG subjects, and to some extent the CMHK subjects, were pure classroom learners, without the benefit of informal exposure of any kind, urges us to look more closely into the role of formal instruction, particularly when it is the only form of input these learners received.

From the results, instruction seems to have little effect on shaping the learner's developmental sequence which by and large resembles the universal developmental sequence established previously; at least not at the initial stage of the subjects' IL development where their propensity for constructing a topic-comment information unit seems to be strong enough to override the effect of instruction on namely SV-inversion. Nevertheless, a reasonable analysis of the effect of instruction on SL development should take into account not just how, but also when instruction takes place.

A corollary question is whether the order of development as established in the present study reflects the teaching order. The following is the sequence of teaching points found in the

textbooks used by the subjects:

EMHK/CMHK

Active English Today
WHAT's..?
COPULA YN-Qs
HOW are you? HOW many..?
WHERE's...?
MAY I...?
CAN I..?
WHERE can I..?
WHO's..?
WHICH book is..?
WHOSE birthday is ..?
Must I..?/Should I..?
WHEN can I..?
WHY is...?
DO you..?
WHERE do you..?
I don't know what...
He asked me if...

Integrated English/Access
Can you tell me how...
Please tell me if...

CMG

English
WHAT's..?
WHERE's..?
COPULA YN-Qs
HOW are you?/HOW old..?
WHOSE book is..?
WHO's...?
CAN I..?
DO you...?

English
WHAT's..?
IS this...?
WHOSE room is..?
WHO's....?
HOW old are..?
WHERE's...?
WHICH jacket is..?
Does she..?
WHEN do..?
WHY is...?
CAN you..?/Must I..?/
Should I..?
Do you know who..
Can you tell me where..
Could you tell me if...

The sequence of teaching points as presented above suggests that, while largely conforming to the order of development in terms of the three broad types of interrogatives and the syntactic structures observed in the present study, there are areas of discrepancy between the teaching order and the order of development with respect to WH-Qs. For instance, HOW, WHICH and WHOSE were presented before WHEN and WHY in the Hong Kong context. In the Guangzhou context, it is interesting to find that WHO and WHOSE were selected for presentation in their primary years and reintroduced again at secondary level before WHEN, WHICH, and WHY. This intensive teaching of WHO and WHOSE particularly with respect to their semantic distinction seems to have exerted some influence in the subjects' relatively better performance on these two Q-types in the written DC task, though their position in the spoken OP task are similar to the other two groups of subjects.

Another observation that can be made from this sequence is that in the Hong Kong context, the bulk of the interrogative system is presented to these students at the primary level. In fact, during the interviews with the secondary English language teachers, they asserted that, except for embedded questions, they no longer concentrated on this structure. One of them went further to claim that 'it (the teaching of the simple interrogatives) is the job of the primary teachers, not ours!'.

In the Guangzhou context, on the other hand, the teaching of this language system was extended up to secondary three when embedded questions were taught. This difference, incidentally, opens up another parameter of SLA investigation, which is the relationship between age and metalinguistic input, an issue we will come back to during the discussion. In the Hong Kong context, although EYN-Qs were found at Primary 6 level, at the time of the study, it had not been taught to the subjects yet. Nevertheless, the early presentation of EYN-Qs at Primary 6 and Secondary 1 level did not seem to have exerted any immediate effect on the subject's mastery of this structure. From the data, some subjects, especially those from the CMHK contexts, had the tendency of embedding an inverted YN-Qs without a connective to the main clause.

As mentioned previously in this chapter, the **EMHK** subjects fared better than the other two groups in most of the tasks and the grammatical features under investigation, suggesting that some implicit instruction and access to informal school, or limited outside school, exposure to the TL is facilitative in SL development.

The crux of this facility, it seems, lies not only in the availability of positive evidence, but also the opportunity to negotiate meaning in informal interactions, which indirectly creates more chance of receiving negative input in the school context. Schachter (1983) argues that comprehensible input is necessary for language learning to take place, but negative input, ranging from the most explicit correction to clarification requests or indication of failure of understanding, may signal the learner that the hypothesis he sets up previously may be incorrect.

Despite that, for this group of subjects, a plateau of learning mainly with respect to the development of inversion in some Q-types such as WHY-Qs was found when they were approaching the 'end state' of their IL development of this language system, suggesting that this group of subjects gradually failed to perceive the discrepancy between their IL and the TL. According to Klein (1986), it could be that most of these rules have lost their 'criticalness' or they could satisfy the subjects' communicative needs even though they might realise that they were using deviant forms.

As for the **CMHK** subjects, persistent difficulty in reaching the TL structures was found among them. It is shown by the lack of significant improvement between S2 and S4, and sometimes between P6 and S2, in the OP and DC tasks. In fact, for this group of subjects, IL development over time, if there is any, is found mainly in their metalinguistic knowledge, as revealed by their relatively better performance in the correction tasks, among all others.

This fairly long and stable plateau of learning is exemplified by the difficulty in eradicating their incorrect hypotheses, perhaps derived either from their metalinguistic knowledge or L1 knowledge, thereby leading to the production of uninverted questions in some WH-Qs, inappropriate use of Copula in the Do and Modal contexts, and inverted EYN-Qs. The lack of sufficient informal school exposure may be one of the factors. Another reason may be the insufficient classroom input or the teacher's explanations are not explicit enough to sensitise the subjects to the grammatical relations.

If one accepts the present finding that the metalinguistic explanations provided by these subjects in the CR(E) task reflect at least indirectly their IL knowledge, it gives some hints that it may be too dangerous to assume that metalinguistic knowledge is grammatical and 'mature' knowledge, reflecting one's explicit understanding of the language system, as some researchers do. It may be true in some cases, perhaps among advanced learners. Moreover, the results also suggest that these internalised in-

correct hypotheses are found to be more recalcitrant to subsequent reformulation, particularly when the subjects had little opportunity to test them.

In fact, initial IL development, especially for classroom learners, might involve two types of hypotheses. The first type are those which are subconsciously derived by the natural acquisition processes (reflected by the uninverted WH-Qs with already preposed Wh-words). The second type of hypotheses are those which learners set up possibly by means of some problem solving strategies in the face of metalinguistic input in the classroom. It seems that the second type of hypothesis, if incorrect, are more difficult to eradicate than the first. Sorace (1985) cites a few studies which suggest that internalised metalinguistic knowledge may encourage a stronger internal consistency between knowledge and production in L2 learners, thereby reducing the natural permeability of IL subsystems and making them more impervious to new information.

Like the CMHK subjects, the **CMG** subjects' IL development depended very much on classroom input; but unlike them, the greater intensity of explicitness and elaboration embedded in formal instruction appears to have speeded up the rate of development of the CMG subjects. This is supported by the generally significant ANOVA results between the three levels of proficiency and the tendency that these subjects could catch up with their Chinese medium Hong Kong counterparts by S2 level and surpassed them by S4 (Section 7.1.4.2., Section 7.3.2.5.2.).

A prime example to illustrate this faster rate of development can be found in their development of EYN-Qs. Recalling the fact that this Q-type was introduced in P6 and S1 in the CMHK context and in S3 in the CMG context, by S4, over 70% of the production of the CMHK subjects were still composed of inverted EYN-Qs. On the other hand, this incorrect feature constituted just 22% and 8% respectively in the OP and DC task performed by the CMG subjects. One may argue that this is due to the sustained effect of teaching among the CMG subjects. However, this reason does not hold because EYN-Qs were taught in the beginning of their third year and the experiment was carried out in the mid-

dle of S4.

When the bulk of the interrogative system was presented to Hong Kong students at primary level, it seems that explicit formal instruction did not create any significant learning effect on the CMHK subjects because the results suggest that the subjects somehow had missed the input. One possible reason is that explicit metalinguistic input is only beneficial when the subjects have developed certain more sophisticated cognitive mechanisms to be able to analyse, independent of meaningful contexts, the internal organisation of the language system.

Another explanation is that this type of input is not beneficial especially during early IL development, as suggested by VanPatten (1987,1988) in which he argues that grammar instruction and error correction cannot suppress the initial natural processes which a learner utilises subconsciously in the face of the input he receives. It is only when he has acquired some grammatical knowledge of the TL that explicit focus on form will become useful. When explicit grammar instruction and language practice on most of the rules of the interrogative system are no longer available at the secondary level, to promote IL knowledge on this structure or to refute previous incorrect hypotheses may be very difficult for this group of subjects; particularly when the chance of receiving negative input is to some extent minimised by the fact that these learners tend to be very passive in the classroom.

One of the reasons which may help to explain the relatively better performance of the CMG subjects as opposed to the CMHK subjects is that formal explicit instruction, which began at primary level, was reinforced again with greater intensity at secondary level. Swain (1981) finds that late immersion learners benefit more from instruction than early starters whose progress tended to become stabilised much earlier, suggesting that age might be a reason for the positive effect of instruction on SL development.

Felix (1985a, 1987) argues that, with the onset of formal operations, learners are able to approach the learning task via some

problem solving strategies, which according to him are more prominent in foreign language learning situations where the TL is only available in the classroom. However, he stresses that the knowledge derived from these strategies is limited in its creative capacity in language use (Felix 1987:159).

It is possible that the foreign language learners (i.e. the CMG subjects) as identified in the present study were approaching the learning task with some problem-solving strategies. However, to assume that the knowledge thus derived is distinct and separate from the tacit knowledge made possible by the natural acquisition processes does not find proof in the results of the present study. Gradual improvement was found not only in the metalinguistic tasks, but also those which tap the coordination of form and meaning in the written and spoken mode, suggesting that what they learned consciously in the classroom can be integrated into their tacit knowledge.

While these learners had no exposure at all outside the classroom and little classroom interaction was observed among the teacher and students, the author suspects that the heavy emphasis on translation exercises, oral and written, at least provides them with some opportunity for employing their IL knowledge in encoding meaning with form, however restrictive in scope. It might be that this frequent comparison between Cantonese and English has promoted their grammatical awareness of the TL, which indirectly activates the process of grammaticisation mentioned previously.

Nevertheless, it does not imply that teachers should revert to grammar translation in the classroom. However explicit their knowledge was shown to be, as exemplified by their better performance on the CR(E) task, there always exists a bigger discrepancy between their performance in the metalinguistic tasks as opposed to tasks requiring the coordination of form and meaning, especially in the spoken mode. The key to bridge this gap seems to lie in the opportunity for 'comprehensible output', for negotiations of meaning in informal contexts.

To conclude, even though formal instruction does not circumvent the sequence of development of the Cantonese learners, it appears to facilitate SLA by speeding up its rate of development. At least, it is found to be beneficial when the learner does not have any chance of exposing himself to positive input. White (1987a) and Schachter (1986) argue that if positive evidence is not available as a result of the lack of informal exposure, structural grammar teaching or negative feedback may provide an alternative.

As far as this study is concerned, from an SLA perspective, some degree of structural grammar teaching may assist learners in dropping non-target intermediate structures derived from over-generalisation, thereby speeding up the pace with which a learner traverses the developmental path. However, it seems that it would become facilitative, if and only if it was given at a stage when the learner is ready for it. Where informal exposure is available, it is interesting to find that learners will not be disadvantaged by the lack of explicitness in instruction. This observation suggests that informal exposure to the TL is a necessary condition for SLA, but it may not be sufficient, especially in the type of learning context found in the present study where the bulk of exposure stems from the textbooks of other content subjects, or where the interlocutors are mainly non-native speakers.

8.3.1.3 Synchronic Variability: The Subjects' Performance in Different Task Situations

The results from the present study give some evidence that the development of learner language is systematic. This systematicity can be seen from two perspectives: the manner in which the different rules of the interrogative system develop in different linguistic contexts and the way in which the subjects perform under different task conditions.

Previous studies on variability indicate that learner development can be traced according to the linguistic environment in which an IL rule is applied. For example, Dickerson (1975) for the development of /z,r,l/ in certain phonological environment, Hyltenstam (1977, 1978) for the morphological development of

negator and syntactic development of SV-inversion in Swedish, and Ellis (1988) for morphological markers of third person singular and the copula in English. These studies are attempts to demonstrate that certain linguistic environments induce the development of either IL or TL rules, which results in the application or non-application of these rules in some contexts but not others.

Within the framework of the present study, the findings as regards the development of inversion in different Q-types and Q-operators may shed light on the effect of linguistic context on the development of this rule. With respect to Q-types, it is interesting to discover that, while YN-Qs and some other WH-Qs like WHAT and WHERE provide a favourable environment to develop inversion, WHY-Qs are more recalcitrant to such development, in terms of both judgment and production, despite improvement in proficiency over time (Appendix 13. Section 2D).

Ellis claims that the application of inversion is 'more likely in WH-Qs that employ Wh-words whose meaning the learner has a clear understanding of' (Ellis 1984a:144). Clearly the meaning of WHY poses no problem to the learners, but the development of inversion is very much slower in WHY-Qs than the other WH-words.

With respect to Q-operators, the findings suggest that inversion first finds its favourable environment in the Copula or the Modal context, and is later extended to the main verb environment. However, intensive teaching of Do as Q-operator in the Chinese medium context seems to have created adverse effect on the subsequent development, not so much in inversion, but in the application of Q-operators in inversion, as shown by the increasing number of instances of the use of Do in Copula questions over time (Section 2F of Appendix 13. No.2 under 'Types of Errors')

This finding seems to suggest that the linguistic environment in which a rule can be applied is always regarded as a testing ground for the learner at various stages of his IL development, who may, under certain circumstances, 'retest' the feasibility of new rule application in some formerly established environ-

ments. If that is the case, it seems that a longitudinal study is more apt for any detailed investigation on the effect of linguistic environment on IL variability. A linguistic context which entices better performance with respect to a grammatical structure may not be the first which 'settles' in their competence. A lot of factors, individual, socio-psychological, cross-linguistic, can interact with the subsequent development of the structure in that context.

Another aspect of systematicity of IL development is observed through the subjects' performance under different task situations. From the results, the subjects within each learning context displayed variable performance according to their ability to meet task demands. As in the results of Ellis' study on the difference in performance between planned and unplanned discourse (Ellis 1989), better performance among classroom learners was shown in planned discourse as designed in the DC task which permits the retrieval of metalinguistic knowledge. Moreover, even better performance was shown among the CMG subjects when the task is untimed and encourages attention to form (Section 7.1.3.2.).

These results suggest that metalinguistic knowledge underlies the performance of classroom SL learners and retrieval of this knowledge does depend on time. However, this finding does not lend support to a strict non-interface position between a learner's tacit as well as metalinguistic knowledge as proposed by Krashen et. al. (1982).

Results from the correlational analysis do reveal that elementary learners from the Chinese medium context may initially rely heavily on metalinguistic knowledge in their performance, as shown by the relatively higher correlations between the metalinguistic tasks and the OP and DC tasks (cf Section 7.1.3.1.). However, with improvement in proficiency, these two tasks no longer correlate strongly with each other, suggesting that the subjects' performance on these two tasks may not depend any more on the analysed aspect of their knowledge.

In fact, the EMHK subjects were the first group to achieve a fairly strong correlation between these two tasks as proficiency improves. The metalinguistic knowledge thus transferred may retain its analytic quality but may not be utilised by advanced subjects. If it is claimed that there is no transfer of knowledge between these two knowledge stores, particularly when these subjects have no or insufficient informal exposure outside the school context, it would be difficult to explain the results of the present study.

8.3.1.4 Variability due to Learning Environment

The thesis that learning environment influences the qualitative development of IL knowledge, both in terms of analyticity and automaticity as proposed by Bialystok (1981b), is evident in the variability of the subjects' performance on the different elicitation tasks.

The results from the correlational analysis on task performance (Chapter 7. Section 7.1.3.1.) within each group reveal that the qualitative development of the IL knowledge of SL learners begins with the 'unmarked' aspect, and progress along these two continua depends very much on the type of learning context in which they acquire the target structure. Within this framework, not only do relatively more advanced learners know more in terms of the amount of IL knowledge they have developed, but their IL knowledge has qualitatively different characteristics from that of the less advanced learners. As a result, it is only the advanced learners who are responding differently to test situations which vary in their demands; and consequently, are succeeding in some tasks and not others. The less advanced learners, whose qualitative aspects of their IL are unmarked on both factors, do poorly overall, but performance in all tasks are correlated in a majority of cases.

To investigate the results further, it seems that it is the 'marked' qualitative aspect of the test situations which triggers this differential response between the subjects at different levels. In other words, learners do systematically advance in their ability to perform tasks requiring an increasingly marked qualitative aspect of their IL knowledge.

Having analysed the qualitative demands imposed by each task and the extent to which the three groups of subjects meet these demands effectively, an order of task difficulty could be established. It in fact signifies the type of learning environment in which they acquire the target structure.

Figure 8.1. Orders of Task Difficulty Demonstrated by the Learners of the Three Learning Environments

```
          -Difficult                                          +Difficult
         ------------------------------------------------------------>
EMHK     : DC --> CR(J) --> CR(C) --> OP --> GJ --> CR(E)
CMHK     : DC --> CR(J) --> CR(C) --> GJ --> OP --> CR(E)
CMG      : CR(J) --> CR(C) --> DC --> GJ --> CR(E) --> OP
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The different orders as shown suggest that there is some effect of learning context on the subjects' IL development. Learners from different types of environment can be identified according to which qualitative aspect of their IL knowledge is relatively more 'marked' than the other. Furthermore, the varied combination of the degrees of analyticity and automaticity as manifested by the three groups of subjects reflects the relative nature of formal instruction and degree of exposure to the TL they experienced.

However, this conclusion does not imply a straightforward mapping between formal learning and the development of analysed knowledge, nor between informal exposure and automatic retrieval. Rather, these two qualitative aspects should be viewed independently of any learning environment because even the EMHK(S4) subjects, who have had some informal exposure in the school environment but little explicit instruction, are capable of achieving comparable performance with the CMHK and CMG subjects at S4 levels on metalinguistic tasks such as the CR(C) task (Chapter 7. Section 7.1.4.2). This implies that the degree of analyticity, as far as this task is concerned, between the three groups of subjects is in fact similar.

To conclude, the three groups of subjects display systematic variability in their ability to perform different types of tasks which are marked by either or both qualitative aspects of auto-

maticity and analyticity. As they are classroom learners of a certain kind, tasks which allow sufficient time to perform ensure better performance than timed task such as the OP and the GJ task. However, the learning environment somehow shapes their development along the two continua. The opportunity to utilise IL knowledge in informal interactions within the school context promotes the development of automaticity of the EMHK subjects while the heavy emphasis on deciphering the language system as found in the CMG subjects promotes development on the analyticity continuum.

8.4 Summary and Conclusion

In this chapter, we have described the performance of the subjects both in terms of their performance on the elicitation tasks and the rules of the interrogative system. In Chapter 4, we mentioned that Long in two of his review articles addresses the issue of whether instruction makes a difference in second language learning and acquisition (cf. Long 1983d, 1988). To recapitulate, the tentative conclusions in his second review essay are that, while instruction does not seem to change the sequence of learning certain grammatical items, 'formal SL instruction has positive effect on SLA processes, on the rate at which learners acquire the language, and on their ultimate level of attainment' (Long 1988:135).

The results of the present study lend further support to Long's suggestions about the effect of instruction on SLA. Despite being immersed in contrived classroom input, the three different types of classroom learners as identified in the present study were shown to traverse similar stages in their development of the English interrogative system. It suggests that their IL knowledge was internally rule-governed, thereby manifesting internal consistency, synchronically speaking; at the same time displaying gradual external consistency towards its approximation to the TL. During the process of development, these 'transitional competence(s)' were shown to be always in a state of flux, subject to 'invasion' by the learners' knowledge of Cantonese and metalinguistic knowledge.

Nevertheless, some differences traceable to the type of instruc-

tion imparted to the learners were found. Where informal exposure is not available, grammatical input at appropriate points of the subjects' IL development and with a certain degree of explicitness seems to have created some positive effect in helping the learners to traverse the IL continuum. It may indirectly speed up their language development, especially when they have no other alternative but to acquire the TL in an 'acquisition-impoverished' context.

The results of the relatively more rapid development of inversion and Q-operator supply by the CMG(S2) to CMG(S4) subjects seem to suggests that explicit instruction at a later stage of their IL development is beneficial. However, an adverse effect was also found in this type of learning context in which a significant number of primary 6 subjects of the CMHK and CMG environment produced inverted WH-Qs but with unpreposed WH-words at the initial stage of learning.

CHAPTER NINE
CONCLUSION

9.0 Introduction

In this chapter, two issues will be discussed by way of conclusion. The first issue deals with some pedagogical implications derived in the light of the findings as discussed in the previous chapter. The second issue is some reflections, in hindsight, upon the experimental design and method adopted in the current study, with the hope of contributing to our understanding of SLA research methodology.

9.1 Pedagogical Implications

Lightbown (1985), in response to Pienemann's **Teachability Hypothesis** (Pienemann 1984,1985), drops a note of caution to language teaching 'philanthropists' against the rigid assumption that the teaching order should follow the 'natural order', although she agrees that to some extent, instruction may be beneficial to SL development. Her comments also raise the consciousness of SL teachers as regards any straight-forward mapping between what is taught onto what is learned and acquired. In fact, the results of the present study imply that this is not necessarily the case. As Lightbown puts it, considering the present state of SL research, it may be 'too early a stage in our understanding of how natural acquisition sequences can or should be related to teaching sequences to make specific recommendations on "grading" or sequencing' (Lightbown 1985 :103).

It may be too early a stage to assert the pros and cons of instruction in SLA, considering the scarcity of research which attempts to tease apart the different nature of the instructional variables such as the frequency and sequence of grammatical input on the one hand, and the degree of elaboration and explicitness in the explanations on the other. However, what one can study at this stage is the overall effect of instruction as against informal exposure, while accepting the fact that SL learners are bound to make 'developmental errors'.

From the results of the study, pedagogically speaking, it seems that a combination of instruction and informal exposure can lead

to a better learning effect. This observation is based on the relatively better performance of the EMHK subjects in most of the tasks, suggesting that these subjects are developing at a relatively faster rate than their Chinese medium counterparts.

Moreover, it is interesting to note that while the EMHK(P6) subjects could achieve a higher degree of accuracy in production, their performance on the CR(C) task was shown to be a lot poorer than the OP and DC task (Section 7.1.1. Chapter 7), suggesting that these subjects did not depend initially on metalinguistic knowledge for accuracy in production. It might be due to the lack of 'metalinguistic influence' at the initial stage of their development, which indirectly kept them away from the adverse effect metalinguistic input might create, thereby allowing them to explore, during their daily school interactions, whatever natural acquisition strategies they could bring into the task of communication.

Moreover, the availability of negative feedback as defined by Schachter (1984), and 'in-comprehensible input' as suggested by White (1987a) may raise the grammatical consciousness of these learners, which leads to a subsequent improvement in their metalinguistic knowledge. Trevise and Noyau (1984) have provided some evidence that learners might have multiple levels of metalinguistic awareness, which allow them to shift to more formal usage when they are attending to the form, even if they cannot articulate the rules they are varying. If the ultimate goal of language teaching is not to train learners to be linguists, to be able to articulate rules independent of contexts of use, but to be able to communicate appropriately and accurately, these EMHK subjects to some extent have met the teacher's expectations. Nevertheless, the lack of genuine, informal exposure, particularly interactions with native speakers of English, is still considered as a stumbling block to their development, recalling the fact that they might adopt 'inappropriate formulaic speech' such as ***How about the debate?** in their communication.

The lack of informal school exposure of any kind but the relatively heavier emphasis on formal instruction does not seem to

have created any significant learning effect on the CMHK subjects. Some of the factors have been mentioned in the previous chapter, among them, the relationship of age and metalinguistic input seems to be one of the causes of their poor performance.

Krashen et. al. (1982) claim that formal instruction is only beneficial at the initial stage of development. While it may be true especially for adult SL learners, probably as a result of more advanced cognitive capacities, imparting any explicit metalinguistic information as found in the present study as early as primary 5 or 6 does not seem to benefit the CMHK subjects particularly. It seems that the conscious effort of the teacher is somehow wasted owing to the primary subjects' inadequate cognitive maturity as well as the lack of opportunity to test the hypotheses via classroom interactions.

The linear language syllabus which these subjects were undergoing also plays a part in widening the mismatch between teaching and learning (the simple English interrogatives are introduced at primary levels and will not become the focus of teaching again at secondary level), thus resulting in the potential danger of falling into a plateau of learning much earlier than the EMHK subjects, a stage well before they could attain the target level. Another factor is that the kind of formal instruction they went through was not explicit enough to help them avoid making wrong hypotheses, recalling the fact that teachers in Hong Kong would put more emphasis on the training of language skills at secondary levels than structural grammar teaching, to prepare the subjects for the forthcoming public examination. In order to 'de-fossilise' the IL competence of these subjects, some explicit instruction and a more cyclical language syllabus is deemed necessary.

Even though they started late in learning English, the CMG subjects were shown to progress at a relatively faster speed than the CMHK subjects; and in some tasks, comparable performance was found between them and the EMHK subjects. However, without the benefit of informal exposure, the subjects were shown to have failed to retrieve their IL competence in the oral task, which suggests that a greater extent of analyticity of IL knowledge

is no guarantee of success in oral proficiency. It also repudiates the 'learners as linguists' assumption in language teaching. Their accuracy in producing EYN-Qs by S4 level, could be a result of what the author would consider as one of the 'flaws' of the design. Since a prompt was provided in the first place, which encourages the subjects to associate it with the 'patterns and routines' they learned in the classroom, thereby helping them to achieve greater grammatical accuracy. However, it is not certain if they can produce these patterns on their own initiative in spontaneous meaningful contexts.

Having discussed the pros and cons of the effect of instruction and informal exposure on the three groups of subjects, and considered the limitations each learning context may have on the subjects' SL development, what is the best alternative for them?

In these three contexts in which informal exposure is either nil or inadequate, incorporating the real world into the classroom via the adoption of the 'communicative syllabus', one form of which encourages the 'chit-chat' mode of classroom behaviour, does not seem to be a good alternative for this type of SL development. On the other hand, one must not ignore the potential learning effect one can gain through using the TL meaningfully in communicative contexts. Rutherford and Sharwood Smith (1985) argue that consciousness-raising as a teaching and learning strategy is beneficial particularly when the learner's input is mainly from the classroom. However, they do claim that consciousness-raising is not a sufficient condition for acquisition to take place. According to them,

> 'C-R (consciousness raising) is considered....as a potential facilitator for the acquisition of linguistic competence and has nothing directly to do with the use of that competence for the achievement of specific communicative objectives, or with the achievement of fluency---i.e. automatic control of structure'
>
> (Rutherford & Sharwood Smith 1985:280)

These comments may provide an explanation for the performance of the CMG subjects. Also, it implies a role for formal instruction in SLA, though its effect may be indirect.

Rutherford (1987) proposed a **process** model for the teaching of

grammar, in which the learner should be made cognizant of the extra-grammatical factors (i.e. the discourse or contexts of use) which determine the choice of one grammatical feature over the others. This concept is important in the sense that the responsibility of SL teachers is not simply to tell their students how simple or embedded questions are formed, but also to arouse their awareness as regards which type of question is more apt for what context.

This model of grammar teaching can easily be implemented into the classroom context via the adoption of various types of exercises which may range from the most formal, for the sake of grammatical accuracy, to relatively more meaningful and communicative use of the TL, with an aim to improving the automatic coordination of form and meaning in 'make-shift' social contexts in classroom practice. In a sense, it is language acquisition through 'comprehensible output', as suggested by Swain, which, 'by producing the target language, triggers the learner to pay attention to the means of expressions needed in order to successfully convey his or her own intended meaning' (Swain 1985:249). This model, as suggested, might provide an answer to the SL development of the learners in this study.

9.2 A Reflection on SL Research Methodology

Traditional SLA research can largely be classified according to whether individual learners are traced over time (**longitudinal** studies); or whether a group of subjects are analysed at a particular point in time, with the hope that the phenomenon thus found would mirror individual development, hence are considered as **cross-sectional** studies. Both types of methods have their own strengths and weaknesses. Individual longitudinal studies have been criticised as lacking in generalisability while cross-sectional studies such as those found in the morpheme studies tend to equate the overall order of difficulty in performance with the order of appearance or development (cf. Meisel et.al. 1981 for discussion).

The present study is cross-sectional by construct. However, instead of one level of proficiency, the subjects were randomly chosen from three levels of proficiency, thereby forming a deve-

lopmental continuum on its own. The advantage of this design is that the problem of the lack of generalisability in longitudinal studies may be overcome because group trends rather than individual development are reported.

However, it seems that this kind of design is by no means perfect, particularly when one is interested in investigating variability which has arisen as the result of the constraint of linguistic environment on IL rule development. The results reported in the present study can only be seen as answering the research question as to how linguistic environments affect the subjects' development of a rule; but not how this rule evolves from these contexts, which can be aptly captured by a longitudinal study. Huebner's study on the development of form-function relationship by a Homng speaker does provide interesting evidence concerning the advantage of carrying out SL research under a variability model.

Studies attempting to describe IL developmental continua have been proliferating in the last twenty years. An area of interest which evolves from this discipline is an effort to compare different learning phenomena , either from a pedagogical perspective, as in the present study, or from a linguistic perspective, such as a recent revival of interest in directionality of transfer, which usually involves two or more groups of subjects of different L1 backgrounds. When more than one group of subjects from different learning contexts are included, one needs to set up some criteria in order to render these groups of subjects comparable because they are bound to bring with them some intrinsic facets which represent their background. Two variables on which one usually tries to exert some control are proficiency and learning context.

As the present study is an attempt to study the effect of learning context on SLA, some control over this variable is deemed necessary. To recapitulate, the EMHK subjects are benefiting from both informal school, or some very limited outside school exposure and implicit instruction whenever possible. The CMHK and especially the CMG subjects are pure classroom learners, but differ in the extent of explicitness in grammatical explanation

while the frequency of input per week was similar.

The present study, by means of randomly selecting subjects from three levels of proficiency, has managed to trace independently, their IL development both in terms of the order and the rate of development between stages in their respective learning context. However, analysis as such implies some implicit comparison between the three groups of subjects, which may not be justifiable as a result of the difference in proficiency between them. It seems that there always exists a dilemma between the choice of learning context and proficiency in experimental studies as described above.

The EMHK and the CMHK subjects are said to be comparable in certain respects, as they both start learning English at the same time, receiving a similar amount of time of English instruction both at the primary and secondary levels, following the same syllabus, and using textbooks of similar sequence of presentation. What differentiates them from each other are the degree of explicitness in formal grammar teaching and the availability of informal exposure. However, as Hong Kong is such a cosmopolitan city, implicit informal exposure of some kind may be possible, despite the claims from the subjects, especially the CMHK subjects that they seldom resorted to it as a means to improve their English. Therefore, the CMG subjects were brought into the study as they were representatives of pure classroom learning situations. The inclusion of a completely different context has indeed brought a lot of insights in our understanding of the relationship between classroom input and SLA. However, it also created the problem of controlling for proficiency in the experiment, recalling the fact that the CMG subjects only started to learn English from primary four onwards.

Despite this problem with the present study, interesting results were found in individual group performance and in some tentative inter-group comparisons. The results thus found, however provisional they may be, can serve as the basis for subsequent and more detailed research in classroom language development.

Another important aspect in an experiment is the data we collect, which we hope can best reflect the subjects' underlying competence. Selinker (1972) claims that natural data collected from meaningful performance situations is the only useful observable data for IL analysis. Subsequent development in SLA research has seen a change in the view on what the best data should be for tapping the acquisition phenomenon. Some researchers propose to make a distinction between what a learner knows and how he performs on the basis of his underlying competence (Corder 1981, Fillmore 1979), while some others rely on grammaticality judgments as the sole source of information, though experimentally the distinction between intuitions and metalinguistic knowledge is not always clearly defined. Whether grammaticality judgment can really reflect the underlying competence is still a controversial issue. Nevertheless, studies have shown that there is consistency between judgment and performance (Bialystok 1982, Sorace 1985).

In the present study, the adoption of a variety of tasks, including timed and untimed judgments, is an attempt to investigate the relationship between, at the general level, competence and performance, in an experimental condition. As such, Selinker's proposal of using natural data was not observed, though attempts were made to elicit the oral data as naturally as possible.

As regards the grammaticality judgment task, it seems that the internal consistency between judgement and production, as argued strenuously by Sorace (1985, 1986), is made possible at least initially, by the subjects' metalinguistic knowledge, as shown by the relatively stronger correlational relationship between the CR(J) task and the other production tasks like the OP and DC task, while the relationship between the GJ task and these tasks is relatively weaker (cf. Section 7.1.3.1.1. Chapter 7). This phenomenon may be a result of the subjects' lack of knowledge, or the restructuring of information within the IL grammar, which leads to more indeterminacy and 'variable intuitions', as suggested by Sorace. However, it is also interesting to note that with an increase in proficiency, a better, though still weak, relationship was found between the GJ and the CR(J)

tasks on the one hand, and on the other the production tasks largely among the three groups of subjects.

At any rate, it raises the issue yet again whether we should rely on grammaticality judgments as the sole source of data, particularly when SL learners' competence is characterised by a greater degree of indeterminacy than in native speaker's competence which is relatively more stable and less indeterminate. It seems that it is empirically difficult to ascertain whether the learner is retrieving his intuitions or his metalinguistic knowledge in these two types of judgment tasks. As a consequence, unless some independent measures are set up to check the relationship between judgment and production, the sole reliance on grammaticality judgments, especially those tapping 'intuitions' or 'feel', may not be able to yield reliable data in our analysis on SL development.

To conclude, the present experimental study is an attempt to investigate the effect of different learning contexts on SLA. The results suggest that the three groups of classroom learners are largely following a similar order of development, despite environmental differences. However, when compared with the 'universal sequence of development' as established in previous studies, one has to accept the fact that this sequence may vary according to the subjects' L1 knowledge as well as the type of metalinguistic knowledge derived from classroom input.

The empirical distinction between the development of knowledge and control as designed in the present study yields interesting results. In terms of the orders of development between these two levels of investigation, it is interesting to discover that they may not coincide with each other, as suggested in Section 8.3.1.1.2. Moreover, the order of development established at the knowledge level (i.e. GJ task) was also found to be strikingly different from that of the native speaking subjects.

In view of this, a follow-up classroom oriented research is deemed necessary because these differences may be the outcome of certain instructional effects. Therefore, an in-depth study taking into account not just the learner's IL development but

also the actual classroom features may be insightful for our understanding of formal learning context in SL development.

BIBLIOGRAPHY

Adams, M.A. (1978) "Methodology for Examining Second Language Acquisition" in Hatch, E. (ed) (1978)

Adjemian, C.(1976) "On the nature of Interlanguage Systems" in Language Learning 26:297-320.

Al-Jumaily, A.A.J. (1982) "A Developmental Study of the Acquisition of Certain Syntactic Features of English by Arabic Speaking Learners" Unpublished Ph.D. Thesis. University of Edinburgh.

Allwright,R.(1984) "The Analysis of Discourse in Interlanguage Studies: the Pedagogical Evidence" in Davies et.al. (eds) (1984).

Bailey,N.,Madden, C. & Krashen,S. (1974) "Is there a Natural Sequence in Adult Second Language Learning?' in Language Learning 24:235-243.

Bardovi-Harlig, K. (1987) "Markedness and Salience in SLA" in Language Learning 37/3: 385-407.

Beebe,L.M.(1980) "Sociolinguistic Variation and Style-shifting in Second Language Acquisition" Language Learning 27/2: 433-447.

Beebe,L.M. (ed) (1988) Issues in Second Language Acquisition: Multiple Perspectives. Newbury House. Rowley, Mass.:

Bialystok, E. (1978a) "Theoretical Model of Second Language Learning" in Language Learning 28: 69-84.

Bialystok,E. (1979) "Explicit and Implicit Judgments of L2 Grammaticality" in Language Learning 29/1: 89-103.

Bialystok, E. (1981a) "A Psycholinguistic Framework for Exploring the Basis of SL Proficiency" Paper presented at the BAAL Seminar, Lancaster 1981.

Bialystok, E. (1981b) "Some Evidence for the Integrity and Interaction of Two Knowledge Sources" in Andersen, R.(ed) New Dimensions in Second Language Acquisition Rowley Mass.: Newbury House.

Bialystok, E. (1982) "On the Relationship Between Knowing and Using Forms" in Applied Linguistics 3/3: 181-206.

Bialystok, E. & Ryan,R. (1983) "Two Dimensions in the Development of Metalinguistic Ability" Paper presented in the Symposium in Metacognition: Development of Metalinguistic and Cognitive Skills." at the Biannual meeting of the Society for Research on Child Development, Detroit,1983.

Bialystok, E. (1983) "On Learning Language Form and Language Function" in Interlanguage Studies Bulletin 2/3:54-67.

Bialystok, E. & Sharwood Smith, M. (1985) "Interlanguage is not a State of Mind: An Evaluation of the Construct for Second Language Acquisition" in Applied Linguistics 6/2:101-118.

Bley-Vroman,R. (1983) "The Comparative Fallacy in IL Studies: the Case of Systematicity" Language Learning 33:1-17.

Bley-Vroman,R. Felix,S.W. & Ioup,G.L. (1988) "The Accessibility of Universal Grammar in Adult Language Learning" in Second Language Research 4/2:1-32.

Bolinger,D. (1978) "Yes-No Questions are not Alternative Questions" in Hiz,H. (ed) Questions Dordrecht:Reidel.

Borland,H. (1984) "The Acquisition of some Features of English Syntax by Four Groups of Adolescent Migrants to Australia" Unpublished Ph.D Thesis, University of Edinburgh.

Brown, J. & Miller,E.K. (1980) A Linguistic Introduction to Sentence Structure London: Hutchinson.

Brown, R.(1968) "The Development of Wh-Questions in Child Speech" in Journal of Verbal Learning and Verbal Behaviour 7: 279-290.

Brown,R. (1973) A First Language Cambridge, Mass.: Harvard University.

Burt,M. & Dulay,C. (1980) "On Acquisition Orders" in Felix,S.(ed) Second Language Development: Trends and Issues Tübingen:Günter Narr.

Butterworth, G. & Hatch,E. (1978) "A Spanish-Speaking Adolescent's Acquisition of English Syntax" in Hatch, E.(ed) (1978).

Cancino, H. Rosansky,E.J. & Schumann,J. (1978) "The Acquisition of English Negatives and Interrogatives by Native Spanish Speakers" in Hatch, E. (ed) (1978).

Cazden, C. Cancino, H. Rosansky, E. & Schumann,J. (1975) "Second Language Acquisition Sequences in Children, Adolescents and Adults" Final Report, United States Department of Health, Education and Welfare.

Chao, Y.R. (1947) Cantonese Primer Cambridge, Mass.: Harvard University.

Chaudron, C. (1983) "Research on Metalinguistic Judgments: A Review of Theory, Methods & Results" in Language Learning 33:343-77.

Chen, J.P. (1986) "An Investigation of the Patterns of Learning English Interrogative Structures by EFL Learners in China" unpublished M. Phil Thesis, The Chinese University of Hong Kong.

Cheng,P.W. (1985) "Restructuring Versus Automaticity: an Alternative Accounts of Skill Acquisition" Psychological Review 92:214-23.

Cheng R.L. (1984) "Chinese Question Forms & Their Meaning" in Journal of Chinese Linguistics 12/1: 86-144.

Chomsky, N. (1965) Aspects of the Theory of Syntax Cambridge, Mass.: MIT Press.

Chomsky, N. (1969) The Acquisition of Syntax in Children from Five to Ten Cambridge, Mass.: MIT Press.

Chomsky, N. (1980) Rules and Representation Oxford:Basil Blackwell.

Chomsky, N.(1981) Lectures on Government and Binding Dordrecht: Foris Publications.

Chomsky, N. (1986) Knowledge of Language: Its Nature, Origin, and Use New York:Praeger.

Clark,H.H. & Clark,E.V. (1977) Psychology and Language New York: Harcourt Brace Jovanovich.

Clahsen,H. (1985) "Parameterised Grammatical Theory and Language Acquisition: a Study of the Acquisition of Verb-Placement and Inflection by Children and Adults." Paper presented at the Conference on Linguistic Theory and Second Language Acquisition, MIT.

Cohen,A.D.(1987) "Studying Learner Strategies: How we Get the Information" in Wenden,A. & Rubin,J. (eds) (1987) Learner Strategies in Language Learning London:Prentice-Hall International.

Comrie,B. (1984) "Why Linguists need Language Acquirers?" in Rutherford,W. (ed) Language Universals and Second Language Acquisition Amsterdam: John Benjamins.

Cook,V.J. (1988) Chomsky's Universal Grammar Oxford: Basil Blackwell.

Coppieters, R. (1987) "Competence Differences Between Native and Fluent Non-Native Speakers" Language 63:544-73.

Corder,S.P.(1967) "The Significance of Learners' Errors" in Corder S.P. (1981).

Corder,S.P.(1972) "The Role of Interpretation in the Study of Learners' Errors" in Corder, S.P. (1981).

Corder,S.P.(1973) "Idiosyncratic Dialects and Error Analysis" in Corder, S. P. (1981).

Corder,S.P.(1977) "Language Continua and the Interlanguage Hypothesis" in Corder,S.P. (1981).

Corder,S.P. (1981) Error Analysis and Interlanguage Oxford: Oxford University Press.

Corder,S.P. (1983) "A Role for the Mother Tongue" in Gass,S. & Selinker,L. (eds) (1983).

Curme,G. (1931) A Grammar of the English Language Vol. 3: Syntax Boston: Heath.

Davies,A. Criper,C. & Howatt,A.P.R. (eds) (1984) Interlanguage Edinburgh: Edinburgh University Press.

Dickerson, L. (1975) "The Learner's Interlanguage as a System of Variable Rules" in TESOL Quarterly 9:401-407.

Dryer,M. (1980) "The Positional Tendencies of Sentential Noun Phrases in Universal Grammar" Canadian Journal of Linguistics 25: 123-95.

Dulany,D.,Carlson, R.A. & Dewey,G.I. (1984) "A Case of Syntactic Learning and Judgment: How Conscious and How Abstract?" in Journal of Experimental Psychology 113:541-555.

Dulay,H.& Burt,M. (1973) "Should We Teach Children Syntax?" in Language Learning 23: 245-58.

Dulay,H. & Burt,M. (1974a) "You can't learn without Goofing" in Richards.J. (ed) (1974).

Dulay,H.& Burt,M. (1974b) "Natural Sequences in Child Second Language Acquisition" in TESOL Quarterly 8:37-53.

Dulay,H. & Burt,M. (1977) "Remarks on Creativity in Language Acquisition" in Burt,M.,Dulay,H. and Finocciaro,M. (eds) Viewpoints on English as A Second Language New York: Regents.

Dulay,H.& Burt,M. Krashen,S. (1982) Language Two Oxford:Oxford University Press.

Eckman,F.R. (1977) "Markedness and the Contrastive Analysis Hypothesis" Language Learning 27:315-30.

Eckman,F.R.(1981) "Markedness and Degree of Difficulty in Second Language Learning" in Savard,J.E.& Laforge,L. (eds) Actes du 5 Congres de L'Association Internationale de Linguistique Appliquee, Les Pressess de L'universite Laval.

Eckman,F.R. (1984) "Universals, Typologies and Interlanguage" in Rutherford,W. (ed) Language Universals Second Language Acquisition Amsterdam: John Benjamins.

Eckman,F.R.,Bell,L. & Nelson,D. (1988) "On the Generalisation of Relative Clause Instruction in the Acquisition of English as a Second Language" Applied Linguistics 8:1-20.

Elliott, D.E. (1965) "Interrogation in English & Mandarin Chinese" Ohio State University, Columbus, Research Foundation June 1965.

Ellis, R. (1982a) "The Origins of Interlanguage" in Applied Linguistics 3:207-23.

Ellis, R. (1984a) "Can Syntax be Taught? A Study of the Effects of Formal Instruction on the Acquisition of WH-Questions by Children" in Applied Linguistics 5/2: 138-155.

Ellis,R. (1984b) Classroom Second Language Development Oxford:Pergamon Press.

Ellis, R. (1985a) Understanding Second Language Acquisition Oxford:Oxford University Press.

Ellis,R. (1985b) "A Variable Competence Model of Second Language Acquisition" in International Review of Applied Linguistics 13: 47-59.

Ellis,R. (1987a) "Contextual Variability of SLA: Relevance of Language Teaching" in Ellis,R. (ed) Second Language Acquisition in Context London:Prentice Hall International.

Ellis,R. (1987b) "Interlanguage Variability in Narrative Discourse: Style-shifting in the use of the Past Tense" in Studies in Second Language Acquisition 9/1 :1-20.

Ellis,R. (ed) (1987c) Second Language Acquisition in Context London:Prentice-Hall International.

Ellis, R. (1988) "The Effect of Linguistic Environment on Second Language Acquisition of Grammar rules" in Applied Linguistics 9/3: 257-274.

Ellis,R.(1989) "Sources of Intra-Learner Variability in Language Use and their Relationship to Second Language Acquisition" in Gass et.al. (eds) (1989) Variation in Second Language Acquisition : Psycholinguistic Issues Clevedon:Multilingual Matters, Ltd.

Faerch,C., Haastrup,K., & Phillipson,R. (1984) Learner Language and Language Learning Clevedon:Multilingual Matters Ltd.

Faerch, C.(1985) "Meta-Talk in Foreign Language Classroom Discourse" in Studies in Second Language Acquisition 7: 184-199.

Faerch,C. (1986) "Rules of Thumb and Other Teacher-Formulated Rules in the Foreign Language Classroom" in Kasper, G.(1986).

Faerch,C. & Kasper,G.(1986) "Cognitive Dimensions of Language Transfer" in Kellerman,E. & Sharwood Smith,M. (eds) Cross-Linguistic Influence In Second Language Acquisition Oxford:Pergamon Press.

Fathman, A. (1975) "The Relationship Between Age and Second Language Productive Ability" in Language Learning 25: 245-53.

Fathman, A.(1978) "ESL & EFL Learning: Similar or Dissimilar?" in On Tesol' 1978 Washington, DC.

Felix, S.(1976) "WH-Pronouns and Second Language Acquisition" in Linguistische Berichte 44/76:52-64.

Felix,S. (1977) "Repetitive Orders of Acquisition in Child Language" in Lingua 41:25-51, North Holland Publishing Company.

Felix, S. (1978) "Some Differences Between First and Second Language Acquisition"in Waterson, N. and Snow,C. (eds) (1978).

Felix, S.(1980) "Cognition & Language Development: A German Child Acquisition of Question Words" in Nehls, D.(ed) in Studies in Language Acquisition Heidelberg:Julius Groos.

Felix, S(1981a) "On the (IN)Applicability of Piagetian Thought to Language Learning" in Studies in Second Language Acquisition 3/2: 179-92.

Felix, S.(1981b) "The Effects of Formal Instruction on Second Language Acquisition" in Language Learning 31/1: 87-112.

Felix, S. (1985a) "More Evidence on Competing Cognitive Structures" in Second Language Research 1:47-72.

Felix,S. & Hahn,A. (1985b) "Natural Processes in Classroom Second Language Learning" in Applied Linguistics 6/3: 223-238.

Felix,S. (1987) Cognition and Language Growth Dordrecht: Foris Publications.

Ferguson,C.A. (1984) "Repertoire Universals, Markedness, and Second Language Acquisition" in Rutherford, W. (ed) Language Universals and Second Language Acquisition Amsterdam: John Benjamins.

Fillmore C.J. (1979) "On Fluency" in Fillmore, W., Kempler & Wang,W.S. (eds) Individual Differences in Language Ability & Language Behaviour New York: Academic Press.

Flynn,S. (1984) "A Universal in L2 Acquisition Based on A PBD Typology" in Eckman, F.R. (ed) Universals of Second Language Acquisition Rowley,Mass.: Newbury House.

Flynn,S. & Espinal,I.(1985) "Head-initial/Head -Final Parameter in Adult Chinese L2 Acquisition of English" in Second Language Research 1/2: 93-117.

Flynn,S. (1987) A Parameter-Setting Model of L2 Acquisition: Experimental Studies in Anaphora Dordrecht: Reidel Publishing Company.

Foder,J. (1983) The Modularity of the Mind Cambridge, Mass.: MIT Press.

Frawley,W. (1981) "The Complement Hierarchy: Evidence for Universals from L2" Paper presented at Winter LSA.

Fries, C. (1945) Teaching and Learning of English as a Foreign Language Ann Arbor: University of Michigan Press.

Gass.S. (1979) "Language Transfer and Universal Grammatical Relations" in Language Learning 29: 327-44.

Gass, S.(1982) "From Theory to Practice" in Rutherford, W. & Hines,M. (eds) On TESOL'81 Washington DC: TESOL.

Gass,S. (1983) "The Development of L2 Intuitions" in TESOL Quarterly 17:273-91.

Gass, S.& Selinker,L.(eds) (1983) Language Transfer in Language Learning Rowley Mass.:Newbury House.

Gass,S. & Ard,J. (1984) "The Ontology of Language Universals." in Rutherford,W. (ed) Language Universals and Second Language Acquisition Amsterdam: John Benjamins.

Gass,S. (1984) "The Empirical Basis for the Universal Hypothesis in Interlanguage Studies" in Davies et.al. (eds) (1984).

Gass,S. (1985) "An Integrative Model of Second Language Acquisition" Unpublished Manuscript.

Gass, S. (1986) "An Interactionist Approach to L2 Sentence Interpretation" in Studies in Second Language Acquisition 8.

Givon,T. (1976) "Topic, Pronoun, and Grammatical Agreement." in Li,C. (ed) Subject and Topic New York: Academic Press.

Givon, T. (1979) On Understanding Grammar New York:Academic Press

Givon,T. (1984) Syntax:a Functional-Typological Introduction Amsterdam: John Benjamins.

Greenberg, J. (1966) Universalsof Language Cambridge,Mass.: MIT Press.

Gregg, K. (1984) "Krashen's Monitor and Occam's Razor"in Applied Linguistics 5: 79-100.

Griggs,J.(1986) "The Effects of Task, Time & Rule Knowledge on Grammar Performance for Three English Structures" in Working Papers 5/1 University of Hawaii at Manoa.

Hakuta,K. (1974) "A Preliminary Report on the Development of Grammatical Morphemes in a Japanese Girl Learning English as a Second Language." in Hatch,E. (ed) (1978).

Hakuta,K. (1975) "Learning to Speak a Second Language: What Exactly Does the Child Learn?" Paper Presented at the 26th Annual Georgetown Roundtable, Washington.

Halliday, M.A.K. (1970) "Functional Diversity in Language." Paper presented at the Yale Linguistic Club, 1970.

Halliday,M.A.K. (1985) An Introduction to Functional Grammar London: Edward Arnold.

Hammarberg, B. (1985) "Learnability & Learner Strategies in Second Language Syntax and Phonology" in Hyltenstam,K. & Pienemann,M. (eds) (1985).

Hatch, E. (ed) Second Language Acquisition: A Book of Readings Rowley,Mass.: Newbury House.

Hatch, E. & Farhady,H. (1982) Research Design and Statistics for Applied Linguistics Rowley,Mass.: Newbury House.

Hatch,E. (1983) Psycholinguistics Rowley,Mass.:Newbury House.

Hawkins, J.(1985) The Unity of English German Contrast London: Croom Helm.

Huang, J. & Hatch,E. (1978) "A Chinese Child's Acquisition of English" in Hatch, E.(ed) (1978).

Huddleston, R. (1971) The Sentence in Written English Cambridge Studies in Linguistics: 3, Cambridge: Cambridge University Press.

Huebner, T.(1979) "Order of Acquisition Vs Dynamic Paradigm: A Comparison of Method in Interlanguage Research" in TESOL Quarterly 13: 21-28.

Huebner, T.(1983) "Linguistic Systems and Linguistic Change in an Interlanguage" in Studies in Second Language Acquisition 6/1: 33-53.

Hulstijn,J.H.& Hulstijn,W. (1984) "Grammatical Errors As A Function of Processing Constraints and Explicit Knowledge" in Learning Language 34/1:23-33.

Hyams,N.M. (1986) Language Acquisition and the Theory of Parameter Dordrecht: Reidel Publishing Co..

Hyltenstam, K. (1977) "Implicational Patterns in IL Syntax Variation" in Language Learning 27:383-411.

Hyltenstam, K. (1978) "Variability in IL Syntax." Phonetics Laboratory Working Papers 18: 1-79, Lund University, Sweden

Hyltenstam,K. (1984) "Language, Typologies, Language Universals, Markedness and Second Language Acquisition" Paper presented at the Second European-North American Workshop of Second Language Research, Gohrde,Germany.

Hyltenstam, K. (1985) "L2 Learner's Variable Output and Language Teaching" in Hyltenstam,K. & Pienemann, M. (eds) (1985).

Hyltenstam, K. & Pienemann,M. (eds) (1985) Modelling and Assessing Second Language Acquisition Multilingual Matters 18, Clevedon: Multilingual Matters Ltd.

Ioup,G. (1984) "Testing the Relationship of Formal Instruction to the Input Hypothesis" in TESOL Quarterly 18: 345-50.

Jespersen, O. (1933) Essentials of English Grammar George Allen & Unwin Ltd.

Jespersen, O. (1961) Modern English Grammar Volume 5 George Allen & Unwin Ltd.

Kasper,G. (ed) (1986) Learning, Teaching and Communication in the Foreign Language Classroom Aarhus University Press.

Keenan,E.O. (1974) "Again and Again: the Pragmatics of Imitation in Child Language." Paper presented at the 73rd meeting of the American Anthropological Asso., Mexico City, November.

Keenan, E. & Comrie,B. (1977) "Noun Phrase Accessibility and Universal Grammar" Linguistic Inquiry 8:63-100.

Kellerman,E. (1983) "Now You See it, Now You Don't." in Gass,S. & Selinker,L. (eds) (1983).

Kellerman,E. (1984) "Empirical Evidence for the Influence of the L1 and IL." in Davies et.al. (eds) (1984).

Kellerman, E. (1985) "If you first succeed...." in Gass, S. et.al. (eds) Input: Second Language Acquisition Rowley, Mass.: Newbury House.

Kellerman, E. & Sharwood Smith, M. (1986) Cross-Linguistic Influence in Second Language Acquisition Oxford:Pergamon Press.

Klein, W. (1986) Second Language Acquisition Cambridge: Cambridge University Press.

Klima,E.S.& Bellugi,U. (1966) "Syntactic Regularities in the Speech of Children" in Lyons, J. & Wales, R.J.(eds) Psycholinguistics Papers Edinburgh: Edinburgh University Press.

Kohn,K. (1982) "Beyond Output: The Analysis of IL Development" in Studies in Second Language Acquisition 4: 137-52.

Kohn,K. (1986) "The Analysis of Transfer" in Kellerman,E. and Sharwood Smith, M. (eds) (1986).

Krashen,S. & Seliger, H.(1975) "The Essential Contributions of Formal Instruction in Adult Second Language Learning " TESOL Quarterly 9/2:173-83.

Krashen,S., Sferlazza,V., Feldman,L. & Fathman, A. (1976) "Adult Performance on The Slope Test: More Evidence for a Natural Sequence in Adult Second Language Acquisition" in Language Learning 26: 145-51.

Krashen,S. (1976) "Formal and Informal Linguistic Environments in Language Acquisition and Language Learning." TESOL Quarterly 10: 157-168.

Krashen, S., Zelinski,S., Jones, C. & Usprich,C. (1978) "How Important Is Instruction?" in English Language Teaching Journal 32: 257-261.

Krashen, S. (1979) "Response to McLaughlin's" in Language Learning 29:151-67.

Krashen, S. (1982) Principles and Practice in Second Language Acquisition New York:Pergamon Press.

Krashen,S., Long,M. & Scarcella, R. (1982) "Age, Rate, and Eventual Attainment in Second Language Acquisition." in Krashen,S., Scarcella,R., & Long, M. (eds) Child-Adult Differences in Second Language Acquisition Rowley,Mass.: Newbury House.

Krashen,S. & Terrell,T. (1983) The Natural Approach: Language Acquisition In The Classroom Oxford: Pergamon.

Krashen, S. (1985) The Input Hypothesis London:Longman.

Kwan, A.(1986) "The Acquisition of Word Order in English and Cantonese Interrogative Sentences: A Singapore Case Study" in RELC Journal 17/1: 14-39.

Labov,W. (1969) "Contraction, deletion and inherent variability of the English copula." in Language 45/4.

Lado, R. (1957) Linguistic Across Cultures Ann Arbor: University of Michigan Press.

Lamendella, J. (1977) "General Principles of Neurofunctional Organization and Their Manifestations in Primary and Non-Primary Language Acquisition" in Language Learning 27: 155-96.

Lamendella, J. (1979) "The Neurofunctional Basis of Pattern Practice" TESOL Quarterly 13: 5-19.

Larsen-Freeman,D. (1975) "The Acquisition of Grammatical Morphemes by Adult ESL students." in TESOL Quarterly 9:409-419.

Lee, W. (1968) "Thoughts on Contrastive Linguistics in the Context of Language Teaching." in Alatis,J. (ed) Contrastive Linguistics and its Pedagogical Implications Washington, D.C., Georgetown University.

Lenneberg,E. (1967) Biological Foundations of Language New York: Wiley and Sons.

Li, C. (1976) Subject and Topic New York: Academic Press.

Li, C. & Thompson, S. (1976) "Subject and Topic: a new typology of language." in Li,C. (ed) Subject and Topic New York: Academic Press.

Li, C.& Thompson,S. (1981) Mandarin Chinese: A Functional Reference Grammar University of California Press.

Liceras,J.M. (1985) "The Role of Intake in the Determination Learner's Competence" in Gass,S. & Madden, C.G.(eds) (1985) Input in Second Language Acquisition Rowley,Mass.:Newbury House.

Lightbown, P. (1979) "Question Form & Meaning in the Speech of Young Children Learning French" in Working Papers on Bilingualism 18: 103-129, Ontario, Canada.

Lightbown, P. Spada, N. & Wallace,R. (1980) "Some Effects on Instruction on Child and Adolescent ESL Learners" in Scarcella, R. & Krashen,S. (eds) Research in Second Language Acquisition Rowley,Mass.:Newbury House.

Lightbown,P. (1980) "The Acquisition of Questions by French L2 learners" in Felix, S.(ed) Second Language Development: Trends & Issues 151-176, Munich: Wilhelm Fink.

Lightbown,P. (1983) "Exploring Relationships Between Developmental and Instructional Sequences in L2 Acquisition" in Seliger,H.W. & Long,M. (eds) Classroom Oriented Research Rowley,Mass.: Newbury House.

Lightbown, P. (1985) "Can Language Acquisition be Altered by Instruction?" in Hyltenstam,K. & Pienemann, M. (eds) (1985).

Lightbown, P.& White, L.(1988) "The Influence of Linguistic Theories on Language Acquisition Research: Description Explanation" in Language Learning 37/4: 483-510.

Lococo,V. (1975) "An Analysis of Spanish and German Learner's Errors." Working Papers on Bilingualism 7:96-124 Ontario, Canada.

Long,M. (1981b) "Questions in Foreigner Talk Discourse." in Language Learning 31:135-157.

Long,M. (1983b) "Native Speaker/Non-native Speaker Conversation and the Negotiation of Comprehensible Input" in Applied Linguistics 4/2:126-41.

Long, M. (1983d) "Does Second Language Instruction Makes A Difference? A Review of Research" in TESOL Quarterly 17: 359-82.

Long,M. & Sato,C. (1983) "Input and Second Language Theory" Paper presented at the Tenth University of Michigan Conference on Applied Linguistics.

Long,M. & Sato,C. (1984) "Methodological Issues in IL Studies: an Interactionist Perspective." in Davies et.al.(eds) (1984).

Long, M. (1988) "Instructed Interlanguage Development" in Beebe,L. (ed) Issues in Second Language Acquisition: Multiple Perspectives New York: Newbury House.

Lyons, J. (1977) Semantics 2 Cambridge:Cambridge University Press.

Makino,T.(1979) "English Morpheme Acquisition Order of Japanese Secondary School Students" in TESOL Quarterly 13: 428-439.

Mazurkewich,I. (1984) "Dative Questions and Markedness" in Eckman,F.,Bell,L. & Nelson,D. (eds) Universals in Second Language Acquisition Rowley,Mass.: Newbury House.

McLaughlin,B. (1978) "The Monitor Model: Some Methodological Considerations" in Language Learning 28: 309-22.

McLaughlin,B., Rossman,T., & McLeod,B. (1983) "Second Language Learning: an Information Processing Perspective" in Language Learning 33: 135-157.

McLaughlin,B. (1984) Second Language Acquisition in Childhood Vol.I: Pre-school Children. Hillsdale, NJ: Lawrence Erlbaum.

McLaughlin, B. (1987) Theories of Second Language Learning London: Edward Arnold.

McLeod,B., & Mclaughlin,B. (1986) "Restructuring or Automaticity? Reading in a Second Language" Language Learning 36 : 109-123.

McNeill,D. (1966) "Developmental Psycholinguistics" in Smith,F. & Miller,G.A.(eds) The Genesis of Language: A Psycholinguistic Approach 15-84, Cambridge, Mass: MIT Press.

Meisel,J.,Clahsen, H. & Pienemann,M. (1981) "On Determining Developmental Stages in Naturalistic SLA" in Studies in Second Language Acquisition 3/2:109-35.

Morrison,D.M. & Low,G. (1983) "Monitoring and the Second Language Learner." in Richards,J. & Schmidt,R. (eds) Language and Communication London: Longman.

Nation, R. & McLaughlin, B. (1986) "Novice & Experts: An Information Processing Approach to the Good Language Learner Problem" in Applied Psycholinguistics 7/1.

Nemser,W. (1971) "Approximative Systems of Foreign Language Learners" in Richards,J.C. (ed) Error Analysis (1974).

Nicholas, H.(1985) "Learner Variations and The Teachability Hypothesis" in Hyltenstam,K. and Pienemann,M. (eds) (1985).

Odlin,T. (1986) "On the Nature and Use of Explicit Knowledge." in International Review of Applied Linguistics 24:123-44.

Pavesi, M. (1986) "Markedness, Discoursal Modes and Relative Clause Formation in a Formal and Informal Context" in Studies in Second Language Acquisition 8/1: 38-55.

Perkins, K. & Larsen Freeman,D.L. (1975) "The Effect of Formal Language Instruction on the Order of Morpheme Acquisition" in Language Learning 25: 237-43.

Pica,T. (1983a) "Adult Acquisition of English as a Second Language Under Difference Conditions of Exposure" in Language Learning 33: 465-97.

Pica,T. (1983b) "Review Article: the Role of Language Context in Second Language Acquisition" in Interlanguage Studies Bulletin 8:101-123.

Pica,T. (1985) "The Selective Impact of Classroom Instruction on Second Language Acquisition" Applied Linguistics 6: 214-223.

Pienemann,M. (1984) "Psychological Constraints on the Teachability of Languages" in Studies in Second Language Acquisition 6/2:186-213.

Pienemann, M. (1985) "Learnability and Syllabus Construction" in Hyltenstam,K. & Pienemann,M. (eds) (1985).

Pollitt,A. & Hutchinson,C. (1987) "Calibrating Graded Assessments: Rasch Partial Credit Analysis of Performance in Writing." in Language Testing 4/1 :72-92.

Porter,R. (1977) "A Cross-Sectional Study of Morpheme Acquisition in First Language Learners" in Language Learning 27: 47-62.

Quirk,R., Greenbaum,S., Leech, G. & Svartvik,J. (1985) A Comprehensive Grammar of The English Language London:Longman.

Ravem, R.(1974) "The Development of WH-Questions in First & Second Language Learners" in Richards, J. (ed) Focus on The Learners Rowley,Mass.: Newbury House.

Ravem, R. (1978) "Two Norwegian Children's Acquisition of English Syntax" in Hatch, E. (ed) (1978).

Richards,J.C. (ed) (1974a) Error Analysis London:Longman.

Richards, J.C. (1974b) "A Non-Contrastive Approach to Error Analysis." in Richards,J.C. (ed) (1974a).

Richards, J.C. (1986) The Contexts of Language Teaching Cambridge: Cambridge University Press.

Ringbom,H.(1980) "On the Distinction between Second Language Acquisition and Foreign Language Learning" in Language Learning and Language Acquisition 28: 37-44.

Rosansky,E. (1976) "Methods and Morphemes in Second Language Acquisition" in Language Learning 26: 409-425.

Ross, J.R. (1979) "Where's English?" in Fillmore,C.J. et. al. (eds) Individual Differences in Language Ability and Language Behaviour New York : Academic Press.

Rutherford, W. (1982) "Markedness in Second Language Acquisition" in Language Learning 32/1: 85-107.

Rutherford,W. (1983) "Language Typology and Language Transfer" in Gass,S. & Selinker,L. (eds) Language Transfer Language Learning Rowley, Mass.:Newbury House.

Rutherford, W. (1984) Language Universals & Second Language Acquisition Amsterdam:John Benjamins.

Rutherford, W.& Sharwood Smith, M. (1985) "Consciousness-Raising and Universal Grammar" in Applied Linguistics 6/3:274-82.

Rutherford,W. (1986) "Grammatical Theory and L2 Acquisition: a Brief Overview" in Second Language Research 2/1:1-15.

Rutherford, W. (1987) Second Language Grammar: Learning & Teaching London: Longman.

Sachs,J. (1977) "The Adaptive Significance of Linguistic Input to Prelinguistic Infants" in Snow,C. & Ferguson,C (eds) (1977) Talking to Children Cambridge: Cambridge University Press.

Sajavaara, K. (1978) "The Monitor Model & Monitoring in Foreign Language Speech Communication" in Gingras (ed) (1978) in Second Language Acquisition and Foreign Language Teaching Arlington VA: Centre for Applied Linguistics.

Sajavaara, K. (1981) "The Nature of First Language Transfer: English as L2 in a Foreign Language Setting" Paper Presented at the First European-North American Workshop on Second Language Acquisition research. Lake Arrowhood CA.

Schachter, J. (1974) "An Error in Error Analysis." in Language Learning 24:205-14.

Schachter,J. & Celce-Murcia,M. (1977) "Some Reservations Concerning Error Analysis." in TESOL Quarterly 11:441-51.

Schachter, J. (1983) "Nutritional needs of Language Learners" in Clark,M.A. & Handscombe,J.(eds) On TESOL '82 Pacific Perspectives on Language and Teaching. Washington,DC: TESOL.

Schachter, J. (1984) "A Universal Input Conditions" in Rutherford, W. (ed) Language Universals and Second Language Acquisition Amsterdam: John Benjamins.

Schachter, J. (1986) "Three Approaches to the Study of Input" in Language Learning 36/2:211-225.

Schachter,J. (1988) "Second Language Acquisition and its Relationship to Universal Grammar" in Applied Linguistics 9/3: 219-235.

Schumann,J. (1978) "Second Language Acquisition: The Pidginization Hypothesis" in Hatch, E.(ed) Second Language Acquisition: A Book of Reading Rowley,Mass.:Newbury House.

Schumann,J. (1982) "Simplification, Transfer, and Relaxification as Aspects of Pidginization and Early Second Language Acquisition." in Language Learning 32: 337-66.

Scollon,R.T. (1974) "One Child's Language from One to Two: the Origin of Construction." Unpublished doctoral dissertation, University of Hawaii.

Seliger,H.W. (1979) "On the Nature & Function of Language Rules in Language Teaching" TESOL Quarterly 13/3: 359-69

Seliger,H.W. (1982) "On the Possible Role of the Right Hemisphere in Second Language Acquisition" in TESOL Quarterly 16/2: 307-14.

Seliger,H.W. (1983a) "The Language Learner as Linguist: On Metaphors and Realities." Applied Linguistics 4: 179-191.

Seliger,H.W. (1984) "Processing Universals in SLA" in Eckman, F.R., Bell, L.H. & Nelson,D. (eds) Universals of Second Language Acquisition Rowley,Mass.: Newbury House.

Selinker, L.(1969) "Language Transfer" in General Linguistics 9:67-92

Selinker, L.(1972) "Interlanguage" in IRAL Vol. X/3 (Reprinted in Richards,J.C. (ed) Error Analysis (1974) London:Longman).

Selinker,L., Swain,M. & Dumas,G. (1975) "The Interlanguage Hypothesis extended to Children" in Language Learning 25:139-91.

Selinker,L. (1984) "The Current States of IL Studies : an Attempted Critical Summary" in Davies et.al. (eds) (1984).

Sharwood Smith,M. (1979) "Optimalizing Interlanguage Feedback to Foreign Language Learner" Studies in Second Language Acquisition 2/2 17-26.

Sharwood Smith,M. (1980) "The Competence-Performance Distinction in the Theory of Second Language and the Pedagogical Grammar Hypothesis." Paper Presented at the Contrastive Linguistics Conference, Boszkowo, December.

Sharwood Smith, M. (1981a) "Consciousness Raising and the Second Language Learners" in Applied Linguistics 2/2: 159-168.

Sharwood Smith,M. (1983) "Cross-Linguistic Aspects of Second Language Acquisition" in Applied Linguistics 4/3 : 192-231.

Sharwood Smith,M. & Kellerman,E. (1986) "The Competence/Control Model: Cross-linguistic Influence and the Creation of New Grammars" in Kellerman,E. & Sharwood Smith,M. (eds) (1986).

Sharwood Smith,M. (1986) "Comprehension Versus Acquisition Two Ways of Processing Input" in Applied Linguistics 7/3.

Sinclair,A. Javella, R.J. & Levelt,W.J.M. (eds) (1978) The Child's Conception of Language Springer-Verlag

Skinner, B.F.(1957) Verbal Behaviour New York: Appleton-Century-Crofts.

Snow,C. & Ferguson, C. (eds) (1977) Talking to Children Cambridge: Cambridge University Press.

Sorace, A. (1984) "Connaissance et Usage dans L'apprentissage d'une Langue Seconde: Une Interpretation de la Variabilit'e in Travaux Neuchatelois de Linguistique Vol. 7, Oct. 1984.

Sorace, A.(1985) "Metalinguistic Knowledge & Language Use in Acquisition Poor Environments" in Applied Linguistics 6/3: 239-254.

Sorace, A. (1986) "The Development of Linguistic-Intuitions in Adult SLA: A Research Project" in Pasegna Italiana Di Linguistics Applicata

Spolsky,B. (1985) "Formulating a theory of Second Language Learning." Studies of Second Language Acquisition 3: 269-288.

Spolsky,B. (1989) Conditions for Language Learning: Introduction to a General Theory Oxford: Oxford University Press.

Stevick E.W. (1980) Teaching Language: A Ways & Ways Rowley Mass: Newbury House.

Stockwell,R.,Brown, J. & Martin,J. (1965) The Grammatical Structures of English and Spanish Chicago: Chicago University Press.

Stowell,T. (1981) "Origins of Phrase Structure." Unpublished Ph.D Theses, MIT.

Strevens,P. (1970) "Two Ways of Looking at Error Analysis" in ERIC : ED 037 714.

Swain, M. (1981) "Time and Timing in Bilingual Education" in Language Learning 31/1:1-16

Swain,M. (1985) "Communicative Competence: Some Roles of Comprehensible Input and Comprehensible Output in its Development" in Gass, S. & Madden,C.G. (eds) (1985).

Tarone,E. (1974) "A Discussion of the Dulay and Burt Studies." in Working Papers on Bilingualism 4:57-70, Ontario Canada.

Tarone,E. (1983) "On the Variability of Interlanguage Systems" Applied Linguistics 4/2: 143-63.

Tarone, E. (1985) "Variability in IL Use: A Study of Style-Shifting in Morphology and Syntax" in Language Learning 35/3: 373-395.

Tarone, E. (1988) Variability in Interlanguage London: Edward Arnold.

Taylor, I. (1975) "Adult Language Learning Strategies and Their Pedagogical Implications." in TESOL Quarterly 9:391-99.

Thompson,S. (1978) "Modern English From A Typological Point of View: Some Implication of the Function of Word Order" in Linguistische Berichte 54: 19-35.

Tollefson,J.W. Jacobs,B. & Selipsky,E.J. (1983) "The Monitor Model and Neurofunctional Theory: An Integrated View" in Studies in Second Language Acquisition 6/1: 1-16.

Trevise, A. & Noyau, C.(1984) "Adult Spanish Speakers & the Acquisition of French Negation Forms: Individual Variation Linguistic Awareness" in Andersen,R.W. (ed) SLA: A Cross-Linguistic Perspective Rowley, Mass.: Newbury House.

Turner,D. (1978) "The Effect of Instruction on Second Language Learning & Second Language Acquisition" Paper Presented at the 12th Annual TESOL Convention: Mexico City.

Tyack,D. & Ingram,D. (1976) "Children's Production and Comprehension of Questions." in Journal of Child Language 4:211-224.

Ultan, R. (1978) "Some General Characteristics of Interrogative System" in Greenberg, J.(ed) Universals in Human Language 4: Syntax. Stanford, California.

Van Baalen,T. (1983) "Giving Learner's Rules: a Study into the Effect of Grammatical Instruction with Varying Degrees of Explicitness." in Interlanguage Studies Bulletin 7/1:71-100.

Van Patten, B. (1987) "Classroom Learners' Acquisition of ser and estar: Accounting for Developmental Patterns." in Van Patten,B. et.al.(eds) Foreign Language Learning: A Research Perspective Harper Row: Newbury House.

Van Patten, B. (1988) "Review Essay: How Juries Get Hung. Problems with the Evidence for a Focus on Form in Teaching" in Language Learning 38/2:243-260.

de Villiers,J. & de Villiers,P. (1973) "A Cross-Sectional Study of the Acquisition the Grammatical Morphemes." in Journal of Psycholinguistic Research 2:267-78.

Wagner-Gough,J. (1978) "Comparative Studies in Second Language Learning" in Hatch,E. (ed) (1978).

War,J. (1984) "Some Aspects of the Learning of English in English Medium & Non-English Medium Schools in India" Unpublished Ph. D Thesis, University of Edinburgh.

Wardhaugh, R. (1970) "The Contrastive Analysis Hypothesis" TESOL Quarterly 4:123-30.

Waterson, N. & Snow,C. (eds) The Development of Communication New York: John Wiley & Sons.

Weeks, T.H. (1974) The Slow Speech Development of a bright Child Cambridge: Mass.: Lexington Books.

White, L. (1985a) "The Pro-Drop Parameter in Adult Second Language Acquisition" in Language Learning 35: 47-62.

White,L. (1985b) "Is there a logical problem of Second Language Acquisition" in TESL Canada 2:29-41.

White, L. (1985c) "The Acquisition of Parameterised Grammars : Subjacency in Second Language Acquisition" in Second Language Research 1/1:1-17.

White,L. (1986) "Implications of Parametric Variation for Adult Second Acquisition: An Investigation of the Pro-Drop Parameter" in Cook,V.J. (ed) Experimental Approaches to Second Language Acquisition Oxford: Pergamon Press.

White, L. (1987a) "Against Comprehensible Input" in Applied Linguistic 8:95-110.

White,L. (1987b) "Markedness & SLA: The Question of Transfer" in Studies in Second Language Acquisition 9/3: 261-286.

Widdowson,H.(1984) Learning Purpose and Language Use Oxford: Oxford University Press.

Wode,H. (1975) "Some Stages in the Acquisition of Questions by Monolingual Children" in Word: Special Issue Vol. 27: 261-310.

Wode,H. (1976) "Developmental Sequences in Naturalistic L2 Acquisition" in Working Papers on Bilingualism 11: 1-13 Ontario, Canada.

Wode, H. (1978) "The L1 Vs L2 Acquisition of English Interrogation" in Working Papers on Bilingualism 15: 37-57 Ontario, Canada.

Wode, H. (1981a) Learning A Second Language: An Integrated View of Language Acquisition Tubingun: Gunter Narr.

Wode, H. (1981b) "Language-Acquisitional Universals : A Unified View of Language Acquisition" In Wintz,H. (ed) Native and Foreign language Acquisition, Annals of the New York Academy of Sciences, Vol.379.

Wode, H. (1984) "L2 Acquisition Research and the Grammar of Interlanguages" in Davies et. al. (eds) (1984).

Woods,A.,Fletcher, P. & Hughes, A. (1986) Statistics in Language Studies Cambridge : Cambridge University Press.

Zobl,H.(1980a) "The Formal & Developmental Selectivity of L1 Influence on L2 Acquisition" in Language Learning 30/1:43-57

Zobl,H.(1980b) "Developmental and Transfer Errors: Their Common Bases and (Possibly) Differential Effects on Subsequent Learning" in TESOL Quarterly Vol. 14/4:469.

Zobl,H.(1982) "A Direction for Contrastive Analysis: The Comparative Study of Development Stages" in TESOL Quarterly 16/2: 169-183.

Zobl,H. (1983) "L1 Acquisition, Age of L2 Acquisition, and the Learning of word order." in Gass,S & Selinker,L. (1983) Language Transfer and Language Learning Rowley Mass.:Newbury House.

Zobl,H. (1984) "Cross-language Generalisations and the Contrastive Dimension of the Interlanguage Hypothesis." in Davies et.al. (eds) (1984).

Zobl,H. (1985) "Grammars in Search of Input and Intake." in Gass,S. & Madden,C. (eds) Input and Second Language Acquisition Rowley,Mass.: Newbury House.

Zobl,H.(1986) "A Functional Approach to the Attainability of Typological Targets in L2 Acquisition" in Second Language Research 2/1: 16-32

APPENDICES

A. CONTENT

B. Keys:

(1) Learning Contexts:

EMHK: English Medium Hong Kong
CMHK: Chinese Medium Hong Kong
CMG : Chinese Medium Guangzhou, Mainland China

(2) Year of Learning

P6: Primary Six
S2: Secondary Two
S4: Secondary Four

The division of the sample population and the age range are presented as below:

	EMHK	CMHK	CMG	AGE GROUP
PRIMARY 6	15	15	15	11-12
SECONDARY 2	15	15	15	13-14
SECONDARY 4	15	15	15	15-16
TOTAL:	45	45	45	

(3) Tasks

OP : Oral Production
DC : Dialogue Completion
CR(J) : Correction (Untimed Judgments)
CR(C) : Correction (Correcting Errors)
CR(E) : Explaining the grammatical relations
GJ : Grammaticality Judgments (timed)

(4) Specifications in the CR and GJ tasks

CR TASK

0 = unable to identify the error
1 or J/L = able to identify and locate the error but unable to correct it
2 or C = able to identify, locate and correct the error, but unable to provide any adequate explanation
3 or E = able to do all of the above and to give an adequate explanation

GJ TASK

1 = absolutely ungrammatical
2 = seriously ungrammatical
3 = moderately ungrammatical
4 = just slightly ungrammatical
5 = totally grammatical

Certainty of Judgment

S : Sure
NS : Not Sure

(5) Types of Questions:

G : Grammatical Questions
UG : Ungrammatical Questions

WH-Qs : Wh-Questions
YN-Qs : Yes-No Questions
EYN-Qs: Embedded Yes-No Questions

(6) Grammatical Features:

COP : Copula
MOD : Modal
DO : Dummy Auxiliary 'DO'

WH-P : WH-preposing
INV : Inversion
Q-OP : Q-operator
I. Q-OP : an Inappropriate Q-Operator
CON : Connective in EYN-Qs
I. CON : Supply of an Inappropriate Connective
-INV : Non-inversion in EYN-Qs
PIMC : +INV-CON
PIC : +INV+Inappropriate CON
MIMC : -INV-CON

Appendix 1a

The Role-play situations for the Oral Production Task

Situation 1

You are a student and you are talking to an English tourist on the bus. Since you plan to go to Britain next summer, you want to know the following:

1. the time of the tourist season?
2. English people friendly?
3. the place students can stay?
4. the English products?
5. the things tourist often buy?
6. the reason why they buy the things mentioned above?

Situation 2

You are a vert fat man, and you begin to worry about your health. So, you consult a doctor:

1. fat people always haye health problems?
2. should lose weight?
3. should eat less?
4. the way you should control your eating habit?
5. for the two slimming classes, the one that you should join is?
6. should join whose fitness class?

Situation 3

Your are doing a family visit, you want to find out the leisure activities of children. Mrs Chan has a son and a daughter, and you want to know the following from her:

1. her children always stay at home?*
2. the things her son usually does at home?
3. Among the TV programmes, the one he loves to watch?
4. the reason why he loves this programme?
5. the things her daughter can do?
6. she plays whose piano?
7. the time that the children begin to watch TV?

Situation 4

You are a fresh cadet and you have just moved into a training college. You are talking to someone who is reading a newspaper and you want to know the following:

1. he is a student?*
2. the time that students should get up?
3. the whereabouts of the kitchen and the bathroom?
4. the students can go out?*
5. the place where students should put their gun?
6. opinions about the teachers?
7. the one that the students should report to?
8. PC Chen very strict?*
9. the time that he can meet PC Chen?

Situation 5

You are a reporter, and you are interviewing a fashion designer. You want to know the following:

1. the reason why his design is so colorful?
2. the way in which he usually introduces his new design?
3. the models he always uses?
4. the reason why he can always use these models?
5. the people that he usually works with?
6. this partner is interested in whose design?
7. the place this partner usually works?
8. this partner usually comes to HK?*

Situation 6

You are a policeman, you are interrogating a suspect who has robbed a goldsmith. You want to know the following:

1. the reason why there are so many gold bars in his house?
2. whose gold bars?
3. the boss is?
4. he can help the police to catch the boss?
5. the way in which the boss contacts him usually?
6. the telephone number of the boss?
7. the boss always sees him alone?
8. the place where he usually meets the boss?

Situation 7

You are a reporter and you are interviewing the manager of Anita Mui, a famous singer.

1. the time of the concert every year?
2. the guest singers are?
3. Between Alan Tam and Leslie Cheung, the one she likes to sing with?
4. Among all her old songs, those in the programme are?
5. she can use whose dancers?
6. the people she learns music from?
7. the time she usually practises singing?
8. his opinions on the new record?
9. the place of the studio?

Situation 8

It is the first time you go travelling alone, you are asking your friend the following:

1. the things you should prepare?
2. you should buy travel insurance?
3. Among the Asian countries, the one that you can go?
4. Japan is a good place to go?
5. the person whom you can ask information about Japan?
6. the travel agent that the people usually go?
7. the way to find a good tour?

* (Please start the question with I'd like to know.....)

Appendix 1b

Distribution of the Q-operators for the Oral Production and Dialogue Completion Tasks

Q-TYPE	WH-Q								YN-Q	EYN-Q
	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE		
COPULA										
IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS
ARE	ARE	ARE	ARE	ARE	ARE	ARE	ARE	ARE	ARE	ARE
MODAL										
CAN	CAN	CAN	CAN	CAN	CAN	CAN	CAN	CAN	CAN	CAN
SHOULD	SHOULD	SHOULD	SHOULD	SHOULD	SHOULD	SHOULD	SHOULD	SHOULD	SHOULD	SHOULD
`DO'										
DOES	DOES	DOES	DOES	DOES	DOES	DOES	DOES	DOES	DOES	DOES
DO	DO	DO	DO	DO	DO	DO	DO	DO	DO	DO
NO.OF ITEMS:										TOTAL
OP TASK:	6	6	6	6	6	6	6	6	6	60
DC TASK:	6	6	6	6	6	6	6	6	6	60

Appendix 2a

The Test Paper for the Dialogue Completion Task

Please fill in the blanks with an appropriate(適合), complete(完正) question.

FORM:_____
NAME:_____

(A) 陳太十分担心，因為Mary还未回家
电話来了，原来是 Mary
陳太便問Mary在何度。
原来Mary正在Jane家学電腦
陳太便问Jane是否放假(on holiday)。

Mary : Hello, mum, it's Mary here.
Mrs Chan : Hello, Mary,(1)_____
Mary : I'm at Jane's. She's teaching me how to play the computer.
Mrs Chan : (2)_____
Mary : Yes, She is.

(B) Mary想開一日生日會
Peter問 mary原因
原来這是為Peter開的生日會，他忘記了自己的生日

Mary : Peter, I want to hold a party next week.
Peter : (3)_____
Mary : You have forgotten your own birthday.

(C) Mary問Jane, Miss Wong憤怒的原因
原来John又在測驗作弊。
Mary再問John經常作弊(cheat)

Mary : (4)_____
Jane : John is cheating in the test again.
Mary : (5)_____
Jane : Yes, he does.

(D) Mr Chan在礼堂外碰到Peter
他問Peter辯論會(debate)怎樣
他再問 Peter支持(support)的隊伍(team)
他並問這隊的隊員(members)是誰

Mr Chan : Peter, (6)_____
Peter : It's very exciting.
Mr Chan : (7)_____
Peter : I support Team A.
Mr Chan : (8)_____
Peter : The members are Tom, John, and Mary.

(E) Mrs Lee帶 Mrs Chan去參觀她的後園，並
告訴 Mrs Chan她種了幾株果木树
Mrs Chan便問那些是什麼果樹

Mrs Chan : Your house is very big indeed.
Mrs Lee : Not really, but I love the back garden.
I'm growing some fruit trees there.
(Mrs Lee takes Mrs Chan to the back garden)
Mrs Chan : Oh, What a lovely garden! (9)_____
_____
Mrs Lee : These are apple and mango trees.

(F) 校長正講解電腦房的規則。
他正說有兩位老師負責這房及將会有電腦班。
Miss Wong問学生(students)可不可以放学後
用(use)電脑房。
Miss Wong再問如果電腦壞，学生應該
告訴(tell)哪一位老師。
Miss Wong最後問電腦班在何時。

Principal: I hope you understand the rules of the computer room.
Mr Wong and Mr Lee will take care of the room and
the computer courses.
Miss Wong: Excuse me, Mr Chan,(10)_____
_____
Principal: Yes,they can,if they promise to take care of the computers.
Miss Wong: If the computers break down,(11)_____
_____
Principal: They should tell Mr Lee. He is responsible for contacting
the shops.
Miss Wong: (12)_____
Principal: Next month.

(G) Tom想知道一些有關圖書館的資料。
他問管理員每日圖書館開門時間。
他並问他可以在哪一層找到(find)
英文故事書(English books)。

Tom : Good morning, I'd like to ask you about the library.
(13)_____
Librarian: It closes at 9pm every day.
Tom : (14)_____
Librarian: The third floor.

(H) Mary正拿着一本功課簿(exercise books)對
老師說。
她問Miss Lee她應該把功課簿放(put)到
哪兒。
她這想知道是否所有老師都叫(ask)班長(monitor)收(collect)功課簿。

Mary : Miss Lee, (15)_____
Miss Lee : On the book shelf over there,please.
Mary : Miss Lee,(16)I'd like to know_____
_____
Miss Lee : Well, some teachers do, but some don't.

(I) Mr 同Mrs Wong正在吃早餐。
Mr Wong問Tom(兒子)每日都去游泳(go swimming)的原因。
Mrs Wong再問下一星期游泳比賽在何時。

Mr Wong : (17)_____
Mrs Wong : Because he wants to win the swimming competition.
Mr Wong : (18)_____
Mrs Wong : It is next month.

(J) Mrs Chan 見到一幅名畫。
她問店員這幅畫是否一件古董(antique)。
她這問這幅畫是名子(name)。

Mrs Chan : (19) I'd like to know_____
Sales : Yes,it is.
Mrs Chan : (20)_____
Sales : 'Sun Rise'

(K) Mr Chan 向Peter講及北極的事。
Peter問北極熊是否很危險(dangerous)。
Peter再問北極熊通常吃什麼。

Mr Chan : There're a lot of interesting things about the Arctic Circle.
Peter : (21)_____
Mr Chan : Yes, they are but you don't often meet them.
Peter : (22)_____
Mr Chan : They eat a lot of fish.

(L) 校長及老師正討論学校規則。
李老師問学生也要早退,学生應該做什麼。

Principal: I hope you're now clear about the school rules.
Mr Lee : Excuse me,if the students want to leave early,
(23)_____
Principal: They should come and ask me for permission.

(M) 「火呀!火呀!」
陳太問誰人的屋子起火3(on fire)。
陳太這問陳生他們應否報警(call the police)

FIRE! FIRE!
Mrs Chan : Oh!
Mr Chan : Wait a minute. I'll go and see.
Mrs Chan : (24)_____
Mr Chan : It's Mr Ho's house.
Mrs Chan : (25)_____
Mr Chan : Of course,we should.

(N) Mrs Lee 正替Mary找舞蹈班(dance classes)。
Mrs Lee問Miss Chan,Mary應該上(join)誰人的舞蹈班。
Mrs Lee這問Mary在哪兒可以找到資料(find the information)。

Mrs Lee : Miss Chan, Mary wants to learn dancing.
(26)_____
Miss Chan: She should take Jean Wong's classes.
Mrs Lee : (27)_____
Miss Chan: She can get it at the Art Centre.

(O) Peter 和 Tom 正討論新老師。
Tom問Peter他的中文老師(Chinese teacher)是誰。

Peter : I'm pleased to have Mrs Lee to be my English teacher.
Tom : (28)_____
Peter : It's Miss Ho.
Tom : Ha..., she is very strict.

(P) Mary 十分担心英文考試。
Miss Lee叫她不用担心。
Mary便問 Miss Lee她应何應該考(take)課程乙(Syllabus B)。
人人都說課程甲容易多3。

Mary : Miss Lee, I'm a bit worried about the English examination.
Miss Lee : You shouldn't worry about it.
Mary : There's something which I don't understand.
(29)_____
People say Syllabus A is much easier.

(Q) 李醫生到兒童病房巡視。
他問兒童們(children)怎樣。
見到有很多家長在房內,他便再問護士家長應該何時離開病房(leave the room)。
正在這時,一名家長走上前問李醫生她的兒子(son)應否整日留在床上(stay in bed all day)

Dr Lee : Good morning! (30)_____
Nurse : They're fine.
Dr Lee : The parents are still around.(31)_____
_____
Nurse : They should leave the room at 7 o'clock.
Parent : Excuse me, doctor, (32) I'd like to know_____
_____

(I) Peter 準備去旅行。Mary 說他需要一部相机。
Peter 說自己沒有。
他問 Mary, 他可以用(use)誰人的相机。

Mary : Peter, you need a camera for your holiday.
Peter : I don't have one.(33)_____
Mary : You can use Tom's camera. I know he has two cameras.

(J) 家長正問校長她的兒子(son)可不可
請(study)這間学校。
校長便問她的兒子对哪一科(subject)
感兴趣(interested in)。
校長最後問他們住在哪兒。

Parent : Mr Ho,(34)I'd like to know_____
Principal: Well, he certainly can. (35)_____
_____
Parent : He's interested in English and music.
Principal: (36)_____
Parent : We live in North Point.

(K) Mr Lee 正問 Tom 應該怎樣横過馬路(cross the road)。
Tom 答完後, Peter 問 Tom, Mr. Lee 點已用(use)斑馬線。

Mr Lee : OK! Let's talk about road safety rules, Tom,(37)_____
_____
Tom : By the zebra-crossing.
Peter : Hey Tom,(38) I'd like to know_____
Tom : Don't be naughty.

(L) Mr Ho 和 Tom 正談及学校的学会(clubs)。
Tom 問是否有很多学生都参加学会(join the clubs)。
Tom 也問学会(clubs)通常在何時舉行活動(hold activities)。

Mr Ho : I'm glad you like this school, Tom.
Tom : It's a very nice school and there're lots of clubs.
(39)_____
Mr Ho : Many of the students do.
Tom : (40)_____
Mr Ho : Usually after school.

(M) Tom 是新同学, 他和 Peter 正討論選班長的事。
Tom 問 Peter, 学生今年可以選(choose)誰。
Tom 又問学生們(students)通常怎樣選班長(choose their monitor)。

Peter : We'll choose a new monitor soon.
Tom : (41)_____
Peter : They can choose either Jack or Mary.
Tom : (42)_____
Peter : By raising their hands.

(N) Peter 和 Tom 正討論打網球。
Tom 問 Peter 跟誰打網球。
Peter 說他和 John 打; 但是他自己是沒有球拍的
於是 Tom 便問 Peter 用(use)誰人的球拍(racket)。

Peter : I love playing tennis.
Tom : (43)_____
Peter : I play with John, he is very good, but, I don't have a racket.
Tom : (44)_____
Peter : Jack's.

(O) Miss Lee 和班長正談管理班房的事。
班長问每天可以在何時開(open)班房門。
班長並問應該把匙(key)交回(return)誰。

Monitor : Miss Lee,(45)_____
Miss Lee : You can open it at 8am every morning.
Monitor : (46)_____
Miss Lee : You should return it to Mrs Ho in the general office.

(P) Mr Lee 見 Tom 最近上課不留心, 便找 Tom 的姐姐-
Mary-來問問。
Mr. Lee 問 Mary, Tom 放学後通常做什麼。
他並問 Tom 怎樣返学。

Mary : Good morning, Mr. Lee.
Mr Lee : Mary, I'm a bit worried about Tom. He doesn't pay attention in class lately.(47)_____
Mary : He watches TV after school.
Mr Lee : (48)_____
Mary : By bus.

(Q) 学校將舉行慈善義賣。
Tom 問 Mrs Chan 可以給(give)学校什麼。
Mrs Chan 提議 Tom 小時玩的兩部淨車。
Tom 十分贊成, 但是他問 Mrs Chan, 他
怎樣才可以把單車攜(take)回校。

Tom : Mum, the school is going to hold a charity sale.
(49)_____
Mrs Chan : um...you had two bicycles when you were young; they're too small for you now.
Tom : That's a good idea, but (50)_____
_____
Mrs Chan : Don't worry. We can ask daddy for help.

(2A) Mrs Chan在自己房內找到兩本舊書。
她便問Mary和Tom這兩本是誰人的書。
可是無人認領。
Mrs Chan感到很奇怪，並問Mary和Tom
為何這兩部書在她房內。

Mrs Chan : Hey,children,(51)_____
Mary : Not mine!
Tom : Not mine either!
Mrs Chan : Oh,that's interesting.(52)_____

(2B) Mr. Lee和Peter正談及学校的筹款演唱会。
Peter說很渴望請幾位歌星回校。
Mr. Lee便問Peter渴望請(eager to invite)
哪位歌星。

Mr Lee : Peter, Mary says you want to see me about the concert.
Peter : We really hope to invite a few HK singers.
Mr Lee : (53)_____
Peter : Leslie Cheung and Anita Mui.

(2C) Miss Lee見到John很不開心，便和他談談。
John問Miss Lee為何Peter可以參加(join)
劍擊会(fencing club)而他不可以。

Miss Lee : John, you look so unhappy.
John : Yes, indeed. Miss Lee ,(54)_____
_____
Miss Lee : It's because the fencing club only accepts members who are over 18.
John : I see.

(2D) Mary在教室內拾得兩本教科用書。
Mary便去問Miss Chan兩本書是否她的。
原來這兩本書不是Miss Chan,而是Miss Lee的。
Mary便在Miss Lee在那裏。

Mary : Excuse me,Miss Chan,(55) I'd like to know_____
_____
Miss Chan: No, they aren't. I think they're Miss Lee's.
Mary : (56)_____
Miss Chan: She's having a class now.

(2E) Tom和Peter正討論Miss Wong.
Tom問Peter, Miss Wong喜歡教(like to teach)
哪一班。
Peter說Miss Wong教2B及常常幫她的学生。
Tom最後問Miss Wong常常幫(help)誰。

Tom : (57)_____
Peter : Well,she likes to teach Form 2B.She is a very good teacher and always helps her students.
Tom : (58)_____
Peter : She always helps Jack,he is a poor student.

(2F) Mary作一採訪，找到韋詠倫(Alan)的經理人。
她問韋詠倫每年開演唱会(hold his concerts)的地点。
Mary最後問韋詠倫通常唱誰人的歌。

Mary : (59)_____
Manager : At the Hong Kong Stadium.
Mary : (60)_____
Manager : He usually sings Mr Ho's songs, but sometimes he sings his own.

Appendix 3a

I. The Test Items for the Grammaticality Judgment and Error Correction Tasks

1. Why the students should keep the key?
2. Who is your English teacher?
3. Whose friend Tom is angry with?
4. Which country do Mr.Chan happy to visit?
5. When are the birds fly to the south every year?
6. Can the pupils leave school now?
7. Does Mrs.Chan take who to school every day?
8. Are the boys fond of whose cat?
9. Why is Mary so angry?
10. Do the pictures cheap?
11. Who the girls in the garden are?
12. Are the shops close at 11pm?
13. I'd like to know if Mary likes chocolate.
14. Which restaurant can Mary go?
15 When do people visit Japan usually?
16. Which story the boys are happy to tell?
17. Should the teacher punish who?
18. Whose car the woman washes every week?
19. What are Peter and Mary do every day?
20. How do your parents?
21. When Christmas is usually?
22. When the bus come every morning?
23. Are the songs how?
24. Is Mary happy to see which film?
25. What do the namesp of these people?
26. I'd like to know does the clock work properly.
27. Where the class can meet?
28. How the water is?
29. Who is Mary play tennis with?
30. I'd like to know that is the letter in the box.
31. Do the rich give what to the poor?
32. Why does the man go to the bank every day?
33. Whose test do the pupils happy about?
34. Do the shops when close?
35. Where people do exercise every morning?
36. When is Jane can come to my party?
37. I'd like to know the students should follow the rules.
38. Do the students visit whose son every month?
39. Susan gets up early every morning?
40. Whose flowers do the boys water every day?
41. What the students should prepare at home?
42. Can Mary where buy this book?
43. Can Mr.Chan make what?
44. Where is Peter go at weekends?
45. What is the headmaster can show us?
46. Who does Mary meet every morning?
47. How do the teachers help their students?
48. I'd like to know can John jump over the wall.
49. Why is Mary can study in this school?
50. Does Miss Wong teach which book?
51. How should Jane write this letter?
52. Are the numbers of these cars what?
53. The map is on the table?
54. Do the snakes enter the house how?
55. Where does Tom usually park his car?
56. Which library does Mary visit usually?

57. I'd like to know that does Miss Wong teach English.
58. When should Mr.Lee see the doctor?
59. Where the school boys are?
60. Which game the children like?
61. Do the children should listen to their parents?
62. Is the church where?
63. Whose dance class are the girls take every week?
64. I'd like to know if Peter can join this club.
65. What are the stories about?
66. Is Tom why so unhappy?
67. Whose key should Mary keep?
68. What do people like to eat now?
69. How are the trees get water from the soil?
70. Who can the teacher help?
71. Where is the picture of the school building?
72. Does grandpa why get up early every morning?
73. How Mr.Lee can enter the house?
74. Does Mary live where?
75. Are the footballers in Japan when?
76. Which book the boy can read?
77. Can Peter how finish his homework?
78. Whose children are the girls angry with?
79. Who do the winner of the game?
80. When are the next two meetings?
81. I'd like to know the children are hungry.
82. Whose club is Tom can join?
83. Where do the Lee Cinema?
84. Should the man use which car?
85. How are the children of this room?
86. Can the farmers why use this river?
87. Why the buses are late?
88. When Jack can use your bicycle?
89. Is this road for cars only?
90. I'd like to know if Mary is at home?
91. Who the students meet every day?
92. Can John return whose bicycle to the shop?
93. Which story is Mary always listen to?
94. Why the people think he is a thief?
95. Which bicycle is Tom can borrow?
96. How is Mary should talk to the teacher?
97. Should Peter when start his new job?
98. When do the next two tests?
99. Why is Tom learn football?
100. Where is the pupils should put the key?
101. How a cat catch a bird usually?
102. Is behind you who?
103. Who is Tom can find in his room?
104. Where can Tom keep his money?
105. I'd like to know the singers come here every Sunday.
106. Which camera is Tom happy to use?
107. I'd like to know that can this bird sing beautifully.
108. I'd like to know is Tom your son.
109. Who the boys can see in the picture?
110. Whose lesson Mary should take?
111. What should Tom do in a fire?
112. Why can Tom join this club?
113. What the price of this car is?
114. Does Mary do her homework every day?
115. What Peter practise every afternoon?
116. Why do Jane always late?
117. Mrs.Wong can cook nice food?

II. Instructions for the Grammaticality Judgment Task

Instructions: This test is about the judging of grammaticality of questions in English. There will be just one question flashing on the screen each time. After you have read it, please judge it according to its degree of grammaticality on a 5-point scale given for each question. The scale is from 1 to 5, the bigger the number, the higher the degree of grammaticality.

1 = absolutely ungrammatical
2 = seriously ungrammatical
3 = moderately ungrammatical
4 = just slightly ungrammatical
5 = totally grammatical

For example : **A soldier he is?** 1 2 3 4 5

After giving your judgment, please indicate whether you are sure or not sure of your judgment in the second column beside the scale of grammaticality.

S = I'm sure of my judgment and I have no doubt about it.
NS = I'm not quite sure whether my judgment is correct or not.

Practice:

1. She goes to Japan does?
2. Does he happy?
3. Tom who is?

Appendix 3b

The Answer Sheet for the Grammaticality Judgment Task

1 = The Question is absolutely ungrammatical
2 = The Question is seriously ungrammatical
3 = The Question is moderately ungrammatical
4 = The Question is slightly ungrammatical
5 = The Question is absolutely grammatical

(1) 1. 2. 3. 4. 5. < S > < NS >
(2) 1. 2. 3. 4. 5. < S > < NS >
(3) 1. 2. 3. 4. 5. < S > < NS >
(4) 1. 2. 3. 4. 5. < S > < NS >
(5) 1. 2. 3. 4. 5. < S > < NS >
(6) 1. 2. 3. 4. 5. < S > < NS >
(7) 1. 2. 3. 4. 5. < S > < NS >
(8) 1. 2. 3. 4. 5. < S > < NS >
(9) 1. 2. 3. 4. 5. < S > < NS >
(10) 1. 2. 3. 4. 5. < S > < NS >
(11) 1. 2. 3. 4. 5. < S > < NS >
(12) 1. 2. 3. 4. 5. < S > < NS >
(13) 1. 2. 3. 4. 5. < S > < NS >
(14) 1. 2. 3. 4. 5. < S > < NS >
(15) 1. 2. 3. 4. 5. < S > < NS >
(16) 1. 2. 3. 4. 5. < S > < NS >
(17) 1. 2. 3. 4. 5. < S > < NS >
(18) 1. 2. 3. 4. 5. < S > < NS >
(19) 1. 2. 3. 4. 5. < S > < NS >
(20) 1. 2. 3. 4. 5. < S > < NS >
(21) 1. 2. 3. 4. 5. < S > < NS >
(22) 1. 2. 3. 4. 5. < S > < NS >
(23) 1. 2. 3. 4. 5. < S > < NS >
(24) 1. 2. 3. 4. 5. < S > < NS >
(25) 1. 2. 3. 4. 5. < S > < NS >
(26) 1. 2. 3. 4. 5. < S > < NS >
(27) 1. 2. 3. 4. 5. < S > < NS >
(28) 1. 2. 3. 4. 5. < S > < NS >
(29) 1. 2. 3. 4. 5. < S > < NS >
(30) 1. 2. 3. 4. 5. < S > < NS >

(31) 1. 2. 3. 4. 5. < S > < NS >
(32) 1. 2. 3. 4. 5. < S > < NS >
(33) 1. 2. 3. 4. 5. < S > < NS >
(34) 1. 2. 3. 4. 5. < S > < NS >
(35) 1. 2. 3. 4. 5. < S > < NS >
(36) 1. 2. 3. 4. 5. < S > < NS >
(37) 1. 2. 3. 4. 5. < S > < NS >
(38) 1. 2. 3. 4. 5. < S > < NS >
(39) 1. 2. 3. 4. 5. < S > < NS >
(40) 1. 2. 3. 4. 5. < S > < NS >
(41) 1. 2. 3. 4. 5. < S > < NS >
(42) 1. 2. 3. 4. 5. < S > < NS >
(43) 1. 2. 3. 4. 5. < S > < NS >
(44) 1. 2. 3. 4. 5. < S > < NS >
(45) 1. 2. 3. 4. 5. < S > < NS >
(46) 1. 2. 3. 4. 5. < S > < NS >
(47) 1. 2. 3. 4. 5. < S > < NS >
(48) 1. 2. 3. 4. 5. < S > < NS >
(49) 1. 2. 3. 4. 5. < S > < NS >
(50) 1. 2. 3. 4. 5. < S > < NS >
(51) 1. 2. 3. 4. 5. < S > < NS >
(52) 1. 2. 3. 4. 5. < S > < NS >
(53) 1. 2. 3. 4. 5. < S > < NS >
(54) 1. 2. 3. 4. 5. < S > < NS >
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(56) 1. 2. 3. 4. 5. < S > < NS >
(57) 1. 2. 3. 4. 5. < S > < NS >
(58) 1. 2. 3. 4. 5. < S > < NS >
(59) 1. 2. 3. 4. 5. < S > < NS >
(60) 1. 2. 3. 4. 5. < S > < NS >

1 = The Question is absolutely ungrammatical
2 = The Question is seriously ungrammatical
3 = The Question is moderately ungrammatical
4 = The Question is slightly ungrammatical
5 = The Question is absolutely grammatical

(61) 1. 2. 3. 4. 5. < S > < NS >
(62) 1. 2. 3. 4. 5. < S > < NS >
(63) 1. 2. 3. 4. 5. < S > < NS >
(64) 1. 2. 3. 4. 5. < S > < NS >
(65) 1. 2. 3. 4. 5. < S > < NS >
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(67) 1. 2. 3. 4. 5. < S > < NS >
(68) 1. 2. 3. 4. 5. < S > < NS >
(69) 1. 2. 3. 4. 5. < S > < NS >
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(73) 1. 2. 3. 4. 5. < S > < NS >
(74) 1. 2. 3. 4. 5 < S > < NS >
(75) 1. 2. 3. 4. 5. < S > < NS >
(76) 1. 2. 3. 4. 5. < S > < NS >
(77) 1. 2. 3. 4. 5. < S > < NS >
(78) 1. 2. 3. 4. 5. < S > < NS >
(79) 1. 2. 3. 4. 5. < S > < NS >
(80) 1. 2. 3. 4. 5. < S > < NS >
(81) 1. 2. 3. 4. 5. < S > < NS >
(82) 1. 2. 3. 4. 5. < S > < NS >
(83) 1. 2. 3. 4. 5. < S > < NS >
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(85) 1. 2. 3. 4. 5. < S > < NS >
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(90) 1. 2. 3. 4. 5. < S > < NS >
(91) 1. 2. 3. 4. 5. < S > < NS >
(92) 1. 2. 3. 4. 5. < S > < NS >
(93) 1. 2. 3. 4. 5. < S > < NS >
(94) 1. 2. 3. 4. 5. < S > < NS >
(95) 1. 2. 3. 4. 5. < S > < NS >
(96) 1. 2. 3. 4. 5. < S > < NS >
(97) 1. 2. 3. 4. 5. < S > < NS >
(98) 1. 2. 3. 4. 5. < S > < NS >
(99) 1. 2. 3. 4. 5. < S > < NS >
(100) 1. 2. 3. 4. 5. < S > < NS >
(101) 1. 2. 3. 4. 5. < S > < NS >
(102) 1. 2. 3. 4. 5. < S > < NS >
(103) 1. 2. 3. 4. 5. < S > < NS >
(104) 1. 2. 3. 4. 5. < S > < NS >
(105) 1. 2. 3. 4. 5. < S > < NS >
(106) 1. 2. 3. 4. 5. < S > < NS >
(107) 1. 2. 3. 4. 5. < S > < NS >
(108) 1. 2. 3. 4. 5. < S > < NS >
(109) 1. 2. 3. 4. 5. < S > < NS >
(110) 1. 2. 3. 4. 5. < S > < NS >
(111) 1. 2. 3. 4. 5. < S > < NS >
(112) 1. 2. 3. 4. 5. < S > < NS >
(113) 1. 2. 3. 4. 5. < S > < NS >
(114) 1. 2. 3. 4. 5. < S > < NS >
(115) 1. 2. 3. 4. 5. < S > < NS >
(116) 1. 2. 3. 4. 5. < S > < NS >
(117) 1. 2. 3. 4. 5. < S > < NS >

Appendix 3c

Distribution of the Q-operators in the Grammaticality Judgment and Error Correction Tasks

Q-TYPES	WH-Q																		YN-Q		EYN-Q	
	WHO		WHAT		WHERE		WHEN		WHY		HOW		WHICH		WHOSE							
	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG			G	UG	G	UG
COPULA IS ARE	IS	1.IS 2.ARE 3.IS	ARE	1.ARE 2.IS 3.ARE	IS	1.IS 2.ARE 3.IS	ARE	1.ARE 2.IS 3.ARE	IS	1.IS 2.ARE 3.IS	ARE	1.ARE 2.IS 3.ARE	IS	1.IS 2.ARE 3.IS	ARE	1.ARE 2.IS 3.ARE	IS	—	IS	4.IS 5.ARE 6.IS
MODAL CAN SHOULD	CAN	1.SHD 2.CAN 3.CAN	SHD	1.CAN 2.SHD 3.CAN	CAN	1.CAN 2.CAN 3.SHD	SHD	1.SHD 2.CAN 3.CAN	CAN	1.CAN 2.SHD 3.CAN	SHD	1.CAN 2.CAN 3.SHD	CAN	1.SHD 2.CAN 3.CAN	SHD	1.CAN 2.SHD 3.CAN	CAN	—	CAN	4.CAN 5.SHD 6.CAN
'DO' DOES DO	DOES	1.DOES 2.DO 3.DOES	DO	1.DO 2.DOES 3.DO	DOES	1.DOES 2.DO 3.DOES	DO	1.DO 2.DOES 3.DO	DOES	1.DOES 2.DO 3.DOES	DO	1.DO 2.DOES 3.DO	DOES	1.DOES 2.DO 3.DOES	DO	1.DO 2.DOES 3.DO	DOES	—	DOES	4.DOES 5.DO 6.DOES

NO. OF ITEMS:

	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG
GJ:	3	9	3	9	3	9	3	9	3	9	3	9	3	9	3	9	3	9	6	3	9
CR:	3	9	3	9	3	9	3	9	3	9	3	9	3	9	3	9	3	9	6	3	9

TOTAL NO. OF ITEMS: GJ=117
CR=117

KEYS

G =grammatical
UG=ungrammatical
1 =Wh-placemant
2 =Non-inversion
3 =inappropriate auxillary
4 =+inversion -connective
5 =-inversion -connective
6 =+inversion +inappropriate connective

Appendix 4a

The Test Paper for the Error Correction Task

甲: 以下都是有關英文疑問句(Questions), 請逐一試它們在語句上有沒有錯。

沒有錯的句子, 請在句子旁寫上 "C"

有錯的句子, 請在錯的地方劃一直線

例如: A soldier he is ?

乙: 請重新把錯誤的句子寫一遍, 改正錯誤。

(沒有錯誤的句子, 你不要重複它們)

例如: Is he a soldier?

丙: 請你解釋這些錯誤的句子在文法上比什麼錯

你可以用中文或英文作答。

1.	Why the pupils should return the key?	1.	1.	
2.	Who is your Chinese teacher?	2.	2.	
3.	Whose uncle Tom is angry with?	3.	3.	
4.	Which programme do Mrs.Chan happy to see?	4.	4.	
5.	When are snakes hide in holes every year?	5.	5.	
6.	Can the girls leave school now?	6.	6.	
7.	Does Mr.Chan take who to school every day?	7.	7.	
8.	Are the girls fond of whose cat?	8.	8.	
9.	Why is John so angry?	9.	9.	
10.	Do the vases cheap?	10.	10.	
11.	Who the boys in the garden are?	11.	11.	
12.	Are the cleaners come every Friday?	12.	12.	
13.	I'd like to know if Tom likes ice-cream.	13.	13.	
14.	Which restaurant can Jack go?	14.	14.	
15	When do tourists visit Hong Kong?	15.	15.	
16.	Which story the girls are eager to tell?	16.	16.	
17.	Should the headmaster punish who?	17.	17	
18.	Whose car the man wash every week?	18.	18.	
19.	What are the children do every day?	19.	19.	
20.	How do the children?	20.	20.	
21.	When Easter is usually?	21.	21	
22.	When the tram come every morning?	22.	22.	
23.	Are the tests hov?	23.	23.	
24.	Is John happy to see which film?	24.	24.	
25.	What do the names of these people?	25.	25.	
26.	I'd like to know does the door bell work properly.	26.	26.	
27.	Where the clerks can meet?	27.	27.	
28.	How the film is?	28.	28.	

29. Who is Tom play tennis with every Sunday?
30. I'd like to know that is the cup on the table.
31. Do the parents give what to their children?
32. Why does the man go to the hotel every day?
33. Whose child do the people angry with?
34. Do the stores when close?
35. Where the students meet every morning?
36. When is Jack can come to my party?
37. I'd like to know the pupils should follow the rules.
38. Do the students visit whose parents every month?
39. Tom gets up early every morning?
40. Whose plants do the children water every day?
41. What the children should prepare at home?
42. Can Tom where buy this book?
43. Can Miss Wong make what?
44. Where is Mary go at weekends?
45. What is the teacher can show us?
46. Who does Tom meet every morning?
47. How do the parents help their children?
48. I'd like to know can Mr.Chan jump over the wall.
49. Why is Jack can study in this room?
50. Does Miss Chan teach which school?
51. How should John write this letter?
52. Are the names of these cars what?
53. The cup is on the table?
54. Do the dogs enter the gate how?
55. Where does Mary usually park her car?
56. Which shop does Jane visit usually?
57. I'd like to know that does Mr.Chan teach English.
58. When should Mr.Lee see the dentist?

甲：以下都是英文問句(questions)，請你一句一句看它們在這句上有沒有錯。

沒有錯的句子，請在句號寫上 "C"

有錯的句子，請在錯的地方劃一直線

例如：A soldier he is?

59. Where the singers are?
60. Which story the girls like?
61. Do the boys should listen to the doctor?
62. Is the kitchen where?
63. Whose swimming lessons are the boys take usually?
64. I'd like to know if Mary can join this club.
65. What are the files about?
66. Is Mary why so unhappy?
67. Whose house should John keep?
68. What do people like to do nowadays?
69. How are the plants get water from the soil?
70. Who can the policeman catch now?
71. Where is the picture of the old hall?
72. Does grandma why get up early in the morning?
73. How John can enter the house?
74. Does Tom live where?
75. Are the singers in Japan when?
76. Which book the girl can read?
77. Can Mary how finish her homework?
78. Whose children are the boys angry with?
79. Who do the driver of the car?
80. When are the next two lessons?
81. I'd like to know the babies are hungry.
82. Whose club is Jack can join?
83. Where do the Jade Restaurant?
84. Should the man use which car?
85. How are the parents of this class?

乙：請重新把錯誤的句子重新寫一遍，並更正錯誤。

(沒有錯誤的句子，你不需要理會它們)

例如：Is he a soldier?

59 ________
60 ________
61 ________
62 ________
63 ________
64 ________
65 ________
66 ________
67 ________
68 ________
69 ________
70 ________
71 ________
72 ________
73 ________
74 ________
75 ________
76 ________
77 ________
78 ________
79 ________
80 ________
81 ________
82 ________
83 ________
84 ________
85 ________

丙：請你解釋這些錯誤的句子在文法上出了什麼錯。

你可以用中文 或 英文作答

59 ________
60 ________
61 ________
62 ________
63 ________
64 ________
65 ________
66 ________
67 ________
68 ________
69 ________
70 ________
71 ________
72 ________
73 ________
74 ________
75 ________
76 ________
77 ________
78 ________
79 ________
80 ________
81 ________
82 ________
83 ________
84 ________
85 ________

86. Can the workers why come so late?
87. Why the trains are late?
88. When John can ride your bicycle?
89. Is this bridge for cars only?
90. I'd like to know if Tom is at home.
91. Who the boys meet every day?
92. Can Mary ride whose bicycle?
93. Which story is Jane always listen to?
94. Why the students think he is a thief?
95. Which bicycle is Mary can borrow?
96. How is Jack should talk to the teacher?
97. Should Mary when start her job?
98. When do the next two tests?
99. Why is Mary learn tennis?
100. Where is the students should return the books to?
101. How a dog catch a mouse usually?
102. Is in front of you who?
103. Who is Mary can find in her room?
104. Where can Mary keep her money?
105. I'd like to know the dancers come here every Sunday.
106. Which song is the singer happy to sing?
107. I'd like to know that can this fish live on land.
108. I'd like to know is Mary your daughter.
109. Who the students can find in the picture?
110. Whose lesson Jack should take?
111. What should Mary do in a fire?
112. Why can Mary join this club?
113. What the size of this car is?
114. Does Tom drink six cups of tea every day?
115. What Mary practise every day?
116. Why do Mary always late?
117. Mary can go to the library?

Appendix 5a

The Original Distribution of the Q-operators in the Oral Production and Dialogue Completion Tasks

Q-TYPE	WH-Q								YN-Q	EYN-Q
	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE		
COPULA IS ARE	IS ARE	IS ARE	IS ARE	IS ARE	IS ARE	IS ARE	IS ARE	IS ARE	IS ARE	IS ARE
MODAL CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD	CAN SHOULD
'DO' DOES DO	DOES DO	DOES DO	DOES DO	DOES DO	DOES DO	DOES DO	DOES DO	DOES DO	DOES DO	DOES DO

NO.OF ITEMS:													TOTAL
OP TASK:	6	6	6	6	6	6	6	6	6	6	6	6	72
DC TASK:	6	6	6	6	6	6	6	6	6	6	6	6	72

APPENDIX 5b

The Original Distribution of the Q-operators for the Grammaticality Judment and Error Correction Tasks

Q-TYPE	WH-Q														YN-Q		EYN-Q	
	WHO		WHAT		WHERE		WHEN		WHY		HOW		WHICH		WHOSE					
	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG
COPULA IS ARE	IS ARE	1.IS 2.ARE 3.IS	IS ARE	1.ARE 2.IS 3.ARE	IS ARE	1.IS 2.ARE 3.IS	IS ARE	1.ARE 2.IS 3.ARE	IS ARE	1.IS 2.ARE 3.IS	IS ARE	1.ARE 2.IS 3.ARE	IS ARE	1.IS 2.ARE 3.IS	IS ARE	1.ARE 2.IS 3.ARE	IS ARE	— 2.IS 3.ARE	IS ARE	4.IS 5.ARE 6.IS
MODAL CAN SHOULD	CAN SHD	1.SHD 2.CAN 3.CAN	CAN SHD	1.CAN 2.SHD 3.CAN	CAN SHD	1.CAN 2.CAN 3.SHD	CAN SHD	1.SHD 2.CAN 3.CAN	CAN SHD	1.CAN 2.SHD 3.CAN	CAN SHD	1.CAN 2.CAN 3.SHD	CAN SHD	1.SHD 2.CAN 3.CAN	CAN SHD	1.CAN 2.SHD 3.CAN	CAN SHD	— 2.CAN 3.SHD	CAN SHD	4.CAN 5.SHD 6.CAN
'DO' DOES DO	DO DOES	1.DOES 2.DO 3.DOES	DO DOES	1.DO 2.DOES 3.DO	DO DOES	1.DOES 2.DO 3.DOES	DO DOES	1.DO 2.DOES 3.DO	DO DOES	1.DOES 2.DO 3.DOES	DO DOES	1.DO 2.DOES 3.DO	DO DOES	1.DOES 2.DO 3.DOES	DO DOES	1.DO 2.DOES 3.DO	DOES DOES	— 2.DOES 3.DO	DO DOES	4.DOES 5.DO 6.DOES

NO.OF ITEMS:																				
	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG	G	UG
GJ :	6	9	6	9	6	9	6	9	6	9	6	9	6	9	6	9	6	9	6	9
CR :	6	9	6	9	6	9	6	9	6	9	6	9	6	9	6	9	6	9	6	9

TOTAL NO. OF ITEMS: GJ=147
CR=147

KEYS G =grammatical
UG=ungrammatical
1=WH-placement
2=Non-inversion
4=+Inversion -Connective
5=-Inversion -Connective
6=+Inversion +Inappropriate Connective

Appendix 6a

Table (2) The Mean Raw Scores of the Elicitation Tasks

		OP T=214	DC T=214	GJ T=468	CR(E) T=261	CR(C) T=174	CR(J) T=87
EMHK		153.35	170.90	288.22	133.80	126.37	64.86
	P6	122.93	137.60	247.26	87.73	77.80	40.33
	S2	162.20	179.13	301.46	155.26	145.75	74.86
	S4	174.93	195.20	315.93	158.40	155.60	79.40
CMHK		117.95	145.44	262.04	125.55	105.11	56.46
	P6	89.20	112.80	227.93	83.00	63.93	39.00
	S2	121.86	151.86	261.13	120.73	107.53	58.93
	S4	142.80	171.66	297.06	172.93	138.86	71.46
CMG		106.15	135.48	276.62	139.31	112.13	60.42
	P6	52.66	68.13	240.83	69.06	62.56	38.53
	S2	112.00	151.13	255.46	149.66	117.80	62.00
	S4	153.80	187.20	306.53	199.20	156.06	80.73

Appendix 7a

Table (10a). Mean Percentage Scores of Q-types in the Oral Production and the Dialogue Completion Tasks

(I) ORAL PRODUCTION

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK		79.16	86.20	92.59	87.63	89.53	65.64	46.94	36.01	81.11	58.51
	P6	63.61	75.27	87.22	74.58	80.83	55.83	22.50	19.44	69.44	30.74
	S2	81.11	89.16	96.38	92.50	92.77	75.83	48.33	39.16	87.22	63.70
	S4	92.77	94.16	94.16	95.83	95.00	65.27	70.00	49.44	86.66	81.11
CMHK		67.77	74.90	80.27	73.75	71.38	43.42	25.27	25.74	61.66	30.24
	P6	55.55	61.66	71.66	60.41	56.38	18.05	5.55	9.72	51.11	36.29
	S2	67.50	79.72	77.22	72.50	76.66	45.27	26.38	33.88	67.77	25.18
	S4	80.27	83.33	91.94	88.33	81.11	66.94	43.88	33.61	66.11	29.25
CMG		60.46	73.51	77.22	49.44	50.27	27.77	20.46	38.33	60.18	41.60
	P6	39.44	61.66	60.55	4.16	4.72	0.00	1.66	11.94	41.66	21.11
	S2	60.27	76.11	78.33	62.91	65.83	29.16	19.16	36.94	65.00	35.18
	S4	81.66	82.77	92.77	81.25	80.27	54.16	40.55	66.11	73.88	68.51

(II) DIALOGUE COMPLETION

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK		80.64	94.53	92.96	90.69	83.98	84.07	57.40	70.83	84.62	59.87
	P6	60.55	87.22	85.27	79.16	71.38	67.22	36.11	53.88	75.00	28.51
	S2	84.72	97.50	95.83	95.50	86.66	91.11	65.27	74.16	86.66	61.48
	S4	96.66	98.88	97.77	95.41	93.88	93.88	70.83	84.44	92.22	89.62
CMHK		78.88	81.66	86.57	80.97	74.44	62.03	45.64	59.44	79.25	31.60
	P6	65.83	63.05	80.83	65.83	60.55	36.38	21.38	38.88	63.88	36.29
	S2	77.22	86.11	86.11	80.41	80.00	66.38	53.33	71.66	83.33	22.22
	S4	93.61	95.83	92.77	96.66	82.77	83.33	62.22	67.77	90.55	36.29
CMG		73.51	81.66	78.61	53.75	56.29	58.24	46.48	66.20	68.51	44.56
	P6	51.66	61.11	59.16	3.33	5.00	30.00	5.83	30.00	47.22	20.37
	S2	78.33	88.33	82.77	69.58	78.05	65.27	60.27	74.44	80.00	21.11
	S4	90.55	95.55	93.88	88.33	85.83	79.44	73.33	94.16	78.33	92.22

TABLE (10b): Mean Raw Scores of Q-Types in the Oral Production and the Dialogue Completion Tasks

(I) ORAL PRODUCTION

	WHO T=24	WHAT T=24	WHERE T=24	WHEN T=16	WHY T=24	HOW T=24	WHICH T=24	WHOSE T=24	YN T=12	EYN T=18
EMHK	19.00	20.68	22.22	14.02	19.40	15.75	11.26	8.66	9.73	10.53
P6	15.26	18.06	20.93	11.93	22.26	13.46	5.40	4.66	8.33	5.33
S2	19.46	21.40	23.13	14.80	22.80	18.20	11.60	9.40	10.46	11.46
S3	22.26	22.26	22.60	15.33	13.53	15.66	16.80	11.86	10.40	14.60
CMHK	16.26	17.97	19.26	11.80	17.13	10.42	6.06	6.17	7.40	5.44
P6	13.33	14.80	17.20	9.66	13.53	4.30	1.33	2.33	6.13	6.33
S2	16.20	19.13	18.53	11.60	18.40	10.86	6.33	8.13	8.13	4.53
S4	19.26	20.00	22.06	14.13	19.46	16.06	10.53	8.06	7.93	5.26
CMG	14.51	17.64	18.53	7.91	12.06	6.66	4.91	9.20	7.22	7.48
P6	9.46	14.80	14.53	0.66	1.13	0.00	0.40	2.86	5.00	3.80
S2	14.46	18.26	18.80	10.66	15.80	7.00	4.60	8.86	7.80	6.33
S4	19.60	19.86	22.26	13.00	19.20	13.00	9.73	15.86	8.86	12.33

(II) DIALOGUE COMPLETION

	WHO T=24	WHAT T=24	WHERE T=24	WHEN T=16	WHY T=24	HOW T=24	WHICH T=24	WHOSE T=24	YN T=12	EYN T=18
EMHK	19.35	22.68	22.31	14.51	20.15	20.17	13.77	17.00	10.15	10.77
P6	14.53	20.93	20.46	12.66	17.13	16.13	8.66	12.93	9.00	5.13
S2	20.33	23.40	23.00	15.60	20.80	21.86	15.66	17.80	10.40	11.06
S4	23.20	23.73	23.46	15.26	22.53	22.53	17.00	20.26	11.06	16.13
CMHK	18.93	19.60	20.77	12.95	17.86	14.88	10.95	14.26	9.51	5.68
P6	15.80	15.13	19.40	10.53	14.53	8.73	5.13	9.33	7.66	6.53
S2	18.53	20.66	20.66	12.86	19.20	15.93	12.80	17.20	10.00	4.00
S4	22.46	23.00	22.26	15.46	19.86	20.00	14.93	16.26	10.86	6.53
CMG	17.64	19.60	18.86	8.60	13.51	13.97	11.15	15.88	8.22	8.02
P6	12.40	14.66	14.20	.53	1.20	7.20	1.40	7.20	5.66	3.66
S2	18.80	21.20	19.86	11.13	18.73	15.66	14.46	17.86	9.60	3.80
S4	21.73	22.93	22.53	14.13	20.60	19.06	17.60	22.60	9.40	16.60

Table 11(a). ANOVA: The Performance on Q-types Between the Three Levels of EMHK Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	186.2	82.75	19.75	50.15	50.15	86.48	488.6	200.8	22.06	318.1
WITHIN GROUP	13.89	7.20	3.48	6.44	3.30	21.55	17.75	34.58	3.58	17.7
F. RATIO	*13.40	*11.35	*5.67	*7.78	*15.12	*4.01	*27.50	*5.80	*6.15	*17.9

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	292.4	35.08	39.08	38.68	114.0	185.7	300.6	208.9	16.68	454.7
WITHIN GROUP	16.60	3.65	5.89	3.13	11.13	21.93	24.00	19.70	2.96	24.72
F. RATIO	*17.6	*9.6	*6.52	*12.33	*10.33	*8.46	*12.29	*10.59	*5.62	*18.30

P<0.05 DF BETWEEN =2 DF WITHIN = 42 F.CRIT. =3.22

Table 11(b). ANOVA: The Performance on Q-types Between The Three Levels of CMHK Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	132.1	116.4	94.86	75.26	150.1	518.5	318.2	166.3	18.20	15.35
WITHIN GROUP	19.30	11.86	11.97	5.20	15.54	29.23	30.20	27.00	3.48	9.39
F. RATIO	*6.84	*9.81	*7.9	*14.4	*9.65	*17.7	*10.53	*6.15	*5.22	*1.63

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	168.5	244.9	30.95	91.35	126.7	488.3	398.4	277.1	41.08	32.08
WITHIN GROUP	13.23	15.97	9.28	5.74	15.52	38.61	30.50	39.34	3.64	13.70
F. RATIO	*12.72	*15.32	*3.33	*15.9	*8.16	*12.64	*13.06	*7.04	*11.27	2.34

P> 0.05 DF BETWEEN =2 DF WITHIN = 42 F. CRIT. = 3.22

Table (11c). ANOVA: The Performance on Q-types Between the Three Levels of CMG Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	385.1	100.6	225.1	622.7	1390	635.0	327.8	635.0	59.82	288.1
WITHIN GROUP	28.45	11.12	6.73	12.86	23.26	31.23	19.57	21.36	5.28	8.31
F. RATIO	*13.53	*9.04	*33.39	*48.40	*59.74	*21.00	*16.7	*29.7	*11.31	*34.66

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	341.7	285.1	271.7	765.8	1718	560.2	1107	933.4	73.62	827.8
WITHIN GROUP	13.49	8.77	7.85	8.45	16.83	35.11	34.26	26.89	5.58	4.98
F. RATIO	*25.31	*32.47	*34.58	*90.55	*102.1	*15.90	*32.32	*34.69	*13.18	*166.1

P<0.05 DF BETWEEN =2 DF WITHIN = 42 F.CRIT.=3.22

Appendix 7c

Table (12a). Scheffé Tests: the Performance on Q-types Between the Three Levels of EMHK Subjects

(I) ORAL PRODUCTION

COMPARISONS:	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
P6 Vs S2	*3.08	*3.39	*3.23	*3.12	*4.82	*2.83	*4.02	2.20	*3.08	*3.86
P6 Vs S4	*5.14	*4.60	2.45	*3.70	*5.12	1.34	*7.40	*3.30	*2.98	*5.90
S2 Vs S4	2.05	1.21	0.78	0.57	0.30	1.49	*3.37	1.11	0.09	2.04

(II) DIALOGUE COMPLETION

COMPARISONS:	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
P6 Vs S2	*3.89	*3.58	*2.83	*3.92	*3.03	*3.36	*3.87	*3.00	2.23	*3.27
P6 Vs S4	*5.84	*4.05	*3.35	*4.54	*4.45	*3.74	*4.61	*4.48	*3.29	*6.06
S2 Vs S4	1.94	0.47	0.52	0.61	1.42	0.37	0.72	1.48	1.06	*2.79

P<0.05 DF BETWEEN =2 DF WITHIN =42 T'CRIT=2.53

Table (12b). Scheffé Tests: the Performance on Q-types Between the Three Levels of CMHK Subjects

(I) ORAL PRODUCTION

COMPARISONS:	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
P6 Vs S2	1.80	*3.41	1.05	2.32	*3.40	*3.30	*2.51	*3.04	*2.93	1.79
P6 Vs S4	*3.67	*4.13	*3.83	*5.37	*4.09	*5.94	*4.48	*3.01	*2.64	1.13
S2 Vs S4	1.87	0.71	*2.79	*3.04	0.69	*2.63	1.99	0.02	0.29	0.66

(II) DIALOGUE COMPLETION

COMPARISONS:	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
P6 Vs S2	2.05	*3.78	1.13	*2.66	*3.26	*3.17	*3.80	*3.02	*3.35	1.87
P6 Vs S4	*5.01	*5.39	*2.57	*5.63	*3.68	*4.98	*4.85	*3.43	*4.59	0
S2 Vs S4	*2.95	1.60	1.43	*2.97	0.41	1.80	1.05	0.41	1.24	1.87

P<0.05 DF BETWEEN = 2 DF WITHIN = 42 T' CRIT.= 2.53

Table (12c). Scheffé Tests: the Performance on Q-types Between the Three Levels of CMG Subjects

(I) ORAL PRODUCTION

COMPARISONS:	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
P6 Vs S2	*2.56	*2.79	*4.50	*7.17	*8.33	*3.48	*2.60	*3.55	*3.33	2.40
P6 Vs S4	*5.20	*4.15	*8.16	*9.41	*10.26	*6.47	*5.75	*7.70	*4.60	*8.17
S2 Vs S4	*2.63	1.36	*3.65	2.24	1.93	*2.98	*3.15	*4.14	1.27	*5.70

(II) DIALOGUE COMPLETION

COMPARISONS:	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
P6 Vs S2	*4.78	*6.04	*5.47	*9.98	*11.60	*3.86	*6.11	*5.60	*4.56	0.16
P6 Vs S4	*6.95	*7.62	*8.14	*12.78	*12.95	*5.48	*7.57	*8.13	*4.33	*15.33
S2 Vs S4	2.16	1.52	*2.66	*2.79	1.26	1.62	1.46	*2.50	0.23	*15.17

P<0.05 DF BETWEEN =2 DF WITHIN = 42 T' CRIT=2.53

Appendix 7d

Table (13a). ANOVA: The Performance Between Different Q-types by the EMHK Subjects

ORAL PRODUCTION: Tests involving 'Qs in OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	112380.30	396	283.79		
Qs in OP	155506.41	9	17278.49	60.89	.000

DIALOGUE COMPLETION: Tests involving 'Qs in DC' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	112007.16	396	282.85		
Qs in DC	69634.47	9	7737.16	27.35	.000

Table (13b). ANOVA: The Performance Between Different Q-types by the CMHK Subjects

ORAL PRODUCTION: Tests involving 'Qs in OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	121515.44	396	306.86		
Qs in OP	195630.54	9	21736.73	70.84	.000

DIALOGUE COMPLETION: Tests involving 'Qs in DC' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	121671.27	396	307.25		
Qs in DC	131393.40	9	14599.27	47.52	.000

Table (13c). ANOVA: The Performance Between Different Q-types by the CMG Subjects

ORAL PRODUCTION: Tests involving 'Qs in OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	135135.68	396	341.25		
Qs in OP	138625.60	9	15402.84	45.14	.000

DIALOGUE COMPLETION: Tests involving 'Qs in DC' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	149024.08	396	376.32		
Qs in DC	67896.20	9	7544.02	20.05	.000

Appendix 7e

Table (14a). Scheffé Tests: the EMHK Subjects' Performance Between Different Q-types

(I) ORAL PRODUCTION

	WHOSE	WHICH	EYN	HOW	WHO	YN	WHAT	WHEN	WHY	WHERE
CELL MEANS	36.01	46.94	58.51	65.64	79.16	81.11	86.20	87.63	89.53	92.59
CELL TOTALS	1620.45	2112.30	2632.95	2953.80	3562.20	3649.95	3879.00	3943.35	4028.85	4166.55

WHOSE	1620.45	0	491.85	1012.50*	1333.35*	1941.75*	2029.50*	2258.55*	2322.90*	2408.40*	2546.10*
WHICH	2112.30		0	520.65	841.50*	1449.90*	1537.65*	1766.70*	1831.05*	1916.55*	2054.25*
EYN	2632.95			0	320.85	929.25*	1017.00*	1246.05*	1310.40*	1395.90*	1533.60*
HOW	2953.80				0	608.40	696.15	925.20*	989.55*	1075.05*	1212.75*
WHO	3562.20					0	87.75	316.80	381.15	466.65	604.35
YN	3649.95						0	229.05	293.40	378.90	516.60
WHAT	3879.00							0	64.35	149.85	287.55
WHEN	3943.35								0	85.50	223.20
WHY	4028.85									0	137.70
WHERE	4166.55										0

df = 396 N = 45 MSE = 283.79 k-1 = 10 F crit = 2.05 p = 0.05
F s = 20.50 t'crit = 723.60 *p = 0.05

(II) DIALOGUE COMPLETION

	WHICH	EYN	WHOSE	WHO	WHY	HOW	YN	WHEN	WHERE	WHAT
CELL MEANS	57.40	59.87	70.83	80.64	83.98	84.07	84.62	90.69	92.96	94.53
CELL TOTALS	2583.00	2694.15	3187.35	3628.80	3779.10	3783.15	3807.90	4081.05	4183.20	4253.85

WHICH	2583.00	0	111.15	604.35	1045.80*	1196.10*	1200.15*	1224.90*	1498.05*	1600.20*	1670.85*
EYN	2694.15		0	493.20	934.65*	1084.95*	1089.00*	1113.75*	1386.90*	1489.05*	1559.70*
WHOSE	3187.35			0	441.45	591.75	595.80	620.55	893.70*	995.85*	1066.50*
WHO	3628.80				0	150.30	154.35	179.10	452.25	554.40	625.05
WHY	3779.10					0	4.05	28.80	301.95	404.10	474.75
HOW	3783.15						0	24.75	297.90	400.05	470.70
YN	3807.90							0	273.15	375.30	445.95
WHEN	4081.05								0	102.15	172.80
WHERE	4183.20									0	70.65
WHAT	4253.85										0

df = 396 N = 45 MSE = 282.85 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 686.25 *p = 0.05

Table (14b). Scheffé Tests: the CMHK Subjects' Performance Between Different Q-types

(I) ORAL PRODUCTION

	WHICH	WHOSE	EYN	HOW	YN	WHO	WHY	WHEN	WHAT	WHERE
CELL MEANS	25.27	25.74	30.24	43.42	61.66	67.77	71.38	73.75	74.90	80.27
CELL TOTALS	1137.15	1158.30	1360.80	1953.90	2774.70	3049.65	3212.10	3318.75	3370.50	3612.15

WHICH	1137.15	0	21.15	223.65	816.75*	1637.55*	1912.50*	2074.95*	2181.60*	2233.35*	2475.00*
WHOSE	1158.30		0	202.50	795.60*	1616.40*	1891.35*	2053.80*	2160.45*	2212.20*	2453.85*
EYN	1360.80			0	593.10	1413.90*	1688.85*	1851.30*	1957.95*	2009.70*	2251.35*
HOW	1953.90				0	820.80*	1095.75*	1258.20*	1364.85*	1416.60*	1658.25*
YN	2774.70					0	274.95	437.40	544.05	595.80	837.45*
WHO	3049.65						0	162.45	269.10	320.85	562.50
WHY	3212.10							0	106.65	158.40	400.05
WHEN	3318.75								0	51.75	293.40
WHAT	3370.50									0	241.65
WHERE	3612.15										0

df = 396 N = 45 MSE = 306.86 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 714.79 *p = 0.05

(II) DIALOGUE COMPLETION

	EYN	WHICH	WHOSE	HOW	WHY	WHO	YN	WHEN	WHAT	WHERE
CELL MEANS	31.60	45.64	59.44	62.03	74.44	78.88	79.25	80.97	81.80	86.57
CELL TOTALS	1422.00	2053.80	2674.80	2791.35	3349.80	3549.60	3566.25	3643.65	3684.60	3895.65

EYN	1422.00	0	631.80	1252.80*	1369.35*	1927.80*	2127.60*	2144.25*	2221.65*	2262.60*	2473.65*
WHICH	2053.80		0	621.00	737.55*	1296.00*	1495.80*	1512.45*	1589.85*	1630.80*	1841.85*
WHOSE	2674.80			0	116.55	675.00	874.80*	891.45*	968.85*	1009.80*	1220.85*
HOW	2791.35				0	558.45	758.25*	774.90*	852.30*	893.25*	1104.30*
WHY	3349.80					0	199.80	216.45	293.85	334.80	545.85
WHO	3549.60						0	16.65	94.05	135.00	346.05
YN	3566.25							0	77.40	118.35	329.40
WHEN	3643.65								0	40.95	252.00
WHAT	3684.60									0	211.05
WHERE	3895.65										0

df = 396 N = 45 MSE = 307.25 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 715.24 *p = 0.05

Table (14c). Scheffé Tests: the CMG Subjects' Performance Between Different Q-types

(I) ORAL PRODUCTION

	WHICH	HOW	WHOSE	EYN	WHEN	WHY	YN	WHO	WHAT	WHERE
CELL MEANS	20.46	27.77	38.33	41.60	49.44	50.27	60.18	60.46	73.51	77.22
CELL TOTALS	920.70	1249.65	1724.85	1872.00	2224.80	2262.15	2708.10	2720.70	3307.95	3474.90

WHICH	920.70	0	328.95	804.15*	951.30*	1304.10*	1341.45*	1787.40*	1800.00*	2387.25*	2554.20*
HOW	1249.65		0	475.20	622.35	975.15*	1012.50*	1458.45*	1471.05*	2058.30*	2225.25*
WHOSE	1724.85			0	147.15	499.95	537.30	903.25*	995.85*	1583.10*	1750.05*
EYN	1872.00				0	352.80	390.15	836.10*	848.70*	1435.95*	1602.90*
WHEN	2224.80					0	37.35	483.30	495.90	1083.15*	1250.10*
WHY	2262.15						0	445.95	458.55	1045.80*	1212.75*
YN	2708.10							0	12.60	599.85	766.80*
WHO	2720.70								.0	587.25	754.20*
WHAT	3307.95									0	166.95
WHERE	3474.90										0

df = 396 N = 45 MSE = 341.25 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 753.78 *p = 0.05

(II) DIALOGUE COMPLETION

	EYN	WHICH	WHEN	WHY	HOW	WHOSE	YN	WHO	WHERE	WHAT
CELL MEANS	44.56	46.48	53.75	56.29	58.24	66.20	68.51	73.51	78.61	81.88
CELL TOTALS	2005.20	2091.60	2418.75	2533.05	2620.80	2979.00	3082.95	3307.95	3537.45	3684.60

EYN	2005.20	0	86.40	413.55	527.85	615.60	973.80*	1077.75*	1302.75*	1532.25*	1679.40*
WHICH	2091.60		0	327.15	441.45	529.20	887.40*	991.35*	1216.35*	1445.85*	1593.00*
WHEN	2418.75			0	114.30	202.05	560.25	664.20	889.20*	1118.70*	1265.85*
WHY	2533.05				0	87.75	445.95	549.90	774.90	1004.40*	1151.55*
HOW	2620.80					0	358.20	462.15	687.15	916.65*	1063.80*
WHOSE	2979.00						0	103.95	328.95	558.45	705.60
YN	3082.95							0	225.00	454.50	601.65
WHO	3307.95								0	229.50	376.65
WHERE	3537.45									0	147.15
WHAT	3684.60										0

df = 396 N = 45 MSE = 376.32 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 791.56 *p = 0.05

Appendix 8a

Table (15a). The Mean Percentage Scores of Inversion in Different Q-types in Each of the Elicitation Tasks

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK	72.96	73.70	87.40	77.77	78.14	62.59	42.59	28.88	81.85	52.22
P6	53.33	57.77	77.77	55.00	62.22	53.33	17.77	6.66	71.11	23.33
S2	75.55	76.66	93.33	88.33	84.44	73.33	43.33	34.44	86.66	54.44
S4	90.00	86.66	91.11	90.00	87.77	61.11	66.66	45.55	87.77	78.88
CMHK	51.48	56.29	61.85	48.88	44.44	38.14	19.25	15.92	60.74	23.70
P6	30.00	36.66	44.44	23.33	21.11	11.11	1.11	0.00	47.77	42.22
S2	51.11	61.11	56.66	46.66	52.22	40.00	23.33	24.44	67.77	11.11
S4	73.33	71.11	84.44	76.66	60.00	63.33	33.33	23.33	66.66	17.77
CMG	41.85	54.44	59.25	39.44	37.40	24.81	15.92	28.88	60.37	39.62
P6	17.77	33.33	32.22	1.66	2.22	0.00	0.00	3.33	40.00	16.66
S2	42.22	58.88	61.11	45.00	47.77	25.55	12.22	23.33	66.66	34.44
S4	65.55	71.11	84.44	71.66	62.22	48.88	35.55	60.00	74.44	67.77

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK	77.03	90.74	88.88	86.66	74.44	82.22	56.66	64.07	85.18	55.55
P6	51.11	78.88	75.55	68.33	56.66	63.33	31.11	43.33	75.55	23.33
S2	83.33	95.55	93.33	98.33	78.88	90.00	66.66	67.77	87.77	55.55
S4	96.66	97.77	97.77	93.33	87.77	93.33	72.22	81.11	92.22	87.77
CMHK	65.55	69.25	74.44	65.55	52.96	54.81	39.62	45.18	77.77	26.66
P6	44.44	42.22	62.22	36.66	28.88	27.77	12.22	17.77	58.88	47.77
S2	62.22	73.33	73.33	63.33	57.77	56.66	46.66	57.77	83.33	11.11
S4	90.00	92.22	87.77	96.66	72.22	80.00	60.00	60.00	91.11	21.11
CMG	62.96	70.74	67.40	45.55	45.55	53.33	43.33	55.18	68.88	33.33
P6	32.22	34.44	34.44	0.00	2.22	22.22	3.33	12.22	46.66	10.00
S2	70.00	84.44	76.66	53.33	60.00	61.11	54.44	64.44	80.00	1.11
S4	86.66	93.33	91.11	83.33	74.44	76.66	72.22	88.88	80.00	88.88

(III) GRAMMATICALITY JUDMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK	49.07	42.22	52.03	52.77	38.88	55.00	45.00	46.48	41.85	39.44
P6	43.33	37.77	53.33	40.00	27.22	52.22	40.00	47.77	26.11	33.05
S2	48.33	37.22	48.88	57.77	43.33	56.66	47.77	40.00	48.33	41.66
S4	55.55	51.66	53.88	60.55	46.11	56.11	47.22	51.66	51.11	43.61
CMHK	42.22	37.22	49.44	44.62	27.40	49.44	36.85	39.62	56.48	31.11
P6	39.44	34.44	46.66	38.88	16.11	38.33	31.11	36.11	32.77	26.38
S2	40.55	37.77	50.55	43.33	28.33	52.22	36.66	39.44	67.22	28.05
S4	46.66	39.44	51.11	51.66	37.77	57.77	42.77	43.33	69.44	38.88
CMG	48.33	48.14	50.37	46.85	34.25	53.14	38.88	40.00	62.59	43.24
P6	43.33	46.11	48.33	45.00	36.11	51.66	40.55	40.00	61.66	43.33
S2	50.55	43.33	47.77	41.11	28.33	50.00	29.44	35.00	61.11	30.00
S4	51.11	55.00	55.00	54.44	38.33	57.77	46.66	45.00	65.00	56.38

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK	45.18	54.65	51.85	49.38	47.16	52.59	41.72	41.97	62.22	28.14
P6	22.96	37.03	28.88	26.66	22.96	34.81	14.81	26.66	54.07	1.11
S2	51.85	61.48	62.96	59.25	54.81	61.48	51.85	43.70	65.18	31.85
S4	60.74	65.18	63.70	62.22	36.70	61.48	58.51	55.55	67.40	51.48
CMHK	44.19	53.58	51.85	44.19	40.24	51.60	43.70	38.51	70.12	16.29
P6	22.22	25.92	31.85	17.03	17.03	33.33	17.03	17.77	48.14	5.92
S2	41.48	57.03	51.11	47.40	38.51	49.62	37.03	38.51	74.81	8.88
S4	68.88	77.77	72.59	68.14	65.18	71.85	77.03	59.25	87.40	34.07
CMG	50.61	54.81	55.06	50.61	40.49	58.76	44.93	50.37	75.06	25.55
P6	35.55	28.14	34.18	17.77	18.51	32.59	10.37	17.03	53.33	8.88
S2	48.88	57.77	54.81	59.25	39.25	62.96	49.62	57.77	79.25	3.07
S4	67.40	78.51	75.55	74.81	63.70	80.74	74.81	76.29	92.59	64.07

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
EMHK	67.40	81.48	77.40	72.96	70.37	78.51	62.59	61.85	86.29	42.22
P6	34.44	55.55	43.33	40.00	34.44	52.22	22.22	40.00	75.55	1.66
S2	77.77	92.22	93.33	87.77	82.22	92.22	77.77	64.44	90.00	47.77
S4	90.00	96.66	95.55	91.11	94.44	91.11	87.77	81.11	93.33	77.22
CMHK	61.11	73.70	71.11	60.37	53.33	71.48	58.51	51.85	83.70	24.44
P6	33.33	38.88	46.66	25.55	25.55	50.00	25.55	26.66	58.88	8.88
S2	61.11	83.33	74.44	68.88	53.33	73.33	54.44	55.55	94.44	13.33
S4	88.88	98.88	92.22	86.66	81.11	91.11	95.55	73.33	97.77	51.11
CMG	67.77	73.33	71.85	65.92	52.96	75.92	54.81	61.48	85.92	34.62
P6	53.33	42.22	52.22	26.66	27.77	48.88	15.55	24.44	72.22	13.33
S2	66.66	80.00	71.11	78.88	51.11	81.11	60.00	70.00	87.77	5.55
S4	83.33	97.77	92.22	92.22	80.00	97.77	88.88	90.00	97.77	85.00

Table (15b). The Mean Raw Scores of Inversion in Different Q-types in Each of the Elicitation Tasks

(I) ORAL PRODUCTION

	WHO T=6	WHAT T=6	WHERE T=6	WHEN T=4	WHY T=6	HOW T=6	WHICH T=6	WHOSE T=6	YN T=6	EYN T=6
EMHK	4.37	4.42	5.24	3.11	4.68	3.75	2.55	1.73	4.91	3.13
P6	3.20	3.46	4.66	2.20	3.73	3.20	1.06	.40	4.26	1.40
S2	4.53	4.60	5.60	3.53	5.06	4.40	2.60	2.06	5.20	3.26
S4	5.40	5.20	5.46	3.60	5.26	3.66	4.00	2.73	5.26	4.73
CMHK	3.08	3.37	3.71	1.95	2.66	2.28	1.15	.95	3.64	1.42
P6	1.80	2.20	2.66	.93	1.26	.66	.06	.00	2.86	2.53
S2	3.06	3.66	3.40	1.86	3.13	2.40	1.40	1.46	4.06	.66
S4	4.40	4.26	5.06	3.06	3.60	3.80	2.00	1.40	4.00	1.06
CMG	2.51	3.26	3.55	1.57	2.24	1.48	.95	1.73	3.62	2.37
P6	1.06	2.00	1.93	.06	.13	.00	.00	.20	2.40	1.00
S2	2.53	3.53	3.66	1.80	2.86	1.53	.73	1.40	4.00	2.06
S4	3.93	4.26	5.06	2.86	3.73	2.93	2.13	3.60	4.46	4.06

(II) DIALOGUE COMPLETION

	WHO T=6	WHAT T=6	WHERE T=6	WHEN T=4	WHY T=6	HOW T=6	WHICH T=6	WHOSE T=6	YN T=6	EYN T=6
EMHK	4.62	5.44	5.33	3.46	4.46	4.93	3.40	3.84	5.11	3.33
P6	3.06	4.73	4.53	2.73	3.40	3.80	1.86	2.60	4.53	1.40
S2	5.00	5.73	5.60	3.93	4.73	5.40	4.00	4.06	5.26	3.33
S4	5.80	5.86	5.86	3.73	5.26	5.60	4.33	4.86	5.53	5.26
CMHK	3.93	4.15	4.46	2.62	3.17	3.28	2.37	2.71	4.66	1.60
P6	2.66	2.53	3.73	1.46	1.73	1.66	.73	1.06	3.53	2.86
S2	3.73	4.40	4.40	2.53	3.46	3.40	2.80	3.46	5.00	.66
S4	5.40	5.53	5.26	3.86	4.33	4.80	3.60	3.60	5.46	1.26
CMG	3.77	4.24	4.04	1.82	2.73	3.20	2.60	3.31	4.13	2.00
P6	1.93	2.06	2.06	.00	.13	1.33	.20	.73	2.80	.60
S2	4.20	5.06	4.60	2.13	3.60	3.66	3.26	3.86	4.80	.06
S4	5.20	5.60	5.46	3.33	4.46	4.46	4.33	5.33	4.80	5.33

(III) GRAMMATICALITY JUDGMENT

	WHO T=12	WHAT T=12	WHERE T=12	WHEN T=12	WHY T=12	HOW T=12	WHICH T=12	WHOSE T=12	YN T=12	EYN T=12
EMHK	5.88	5.06	6.24	6.33	4.66	6.60	5.40	5.57	5.02	4.73
P6	5.20	4.53	6.40	4.80	3.26	6.26	4.80	5.73	3.13	3.96
S2	5.80	4.46	5.86	6.93	5.20	6.80	5.73	4.80	5.80	5.00
S4	6.66	6.20	6.46	7.26	5.53	6.73	5.66	6.20	6.13	5.23
CMHK	5.06	4.46	5.93	5.35	3.28	5.93	4.42	4.75	6.77	3.78
P6	4.73	4.13	5.60	4.66	1.93	4.60	3.73	4.33	3.93	3.16
S2	4.86	4.53	6.06	5.20	3.40	6.26	4.40	4.73	8.06	3.38
S4	5.60	4.73	6.13	6.20	4.53	6.93	5.13	5.20	8.33	4.66
CMG	5.80	5.77	6.04	5.62	4.11	6.37	4.66	4.80	7.51	5.18
P6	5.20	5.53	5.80	5.40	4.33	6.20	4.86	4.80	7.40	5.20
S2	6.06	5.20	5.73	4.93	3.40	6.00	3.53	4.20	7.33	3.60
S4	6.13	6.60	6.60	6.53	4.46	6.93	5.60	5.40	7.80	6.77

(IV) CORRECTION (EXPLAINING)

	WHO T=9	WHAT T=9	WHERE T=9	WHEN T=9	WHY T=9	HOW T=9	WHICH T=9	WHOSE T=9	YN T=9	EYN T=9
EMHK	4.06	4.91	4.66	4.44	4.24	4.73	3.75	3.77	5.60	2.53
P6	2.06	3.33	2.60	2.40	2.06	3.13	1.33	2.40	4.86	0.10
S2	4.66	5.53	5.66	5.33	4.93	5.53	4.66	3.93	5.86	2.86
S4	5.46	5.86	5.73	5.60	5.73	5.53	5.26	5.00	6.06	4.63
CMHK	3.97	4.82	4.66	3.97	3.62	4.64	3.93	3.46	6.31	1.46
P6	2.00	2.33	2.86	1.53	1.53	3.00	1.53	1.60	4.33	0.53
S2	3.73	5.13	4.60	4.26	3.46	4.46	3.33	3.46	6.73	0.80
S4	6.20	7.00	6.53	6.13	5.86	6.46	6.93	5.33	7.86	3.06
CMG	4.55	4.93	4.95	4.55	3.64	5.28	4.04	4.53	6.75	2.30
P6	3.20	2.53	3.13	1.60	1.66	2.93	.93	1.53	4.80	2.40
S2	4.40	5.20	4.93	5.33	3.53	5.66	4.46	5.20	7.13	3.56
S4	6.06	7.06	6.80	6.73	5.73	7.26	6.73	6.86	8.33	4.16

(V) CORRECTION (CORRECTING ERRORS)

	WHO T=6	WHAT T=6	WHERE T=6	WHEN T=6	WHY T=6	HOW T=6	WHICH T=6	WHOSE T=6	YN T=6	EYN T=6
EMHK	4.04	4.88	4.64	4.37	4.22	4.71	3.75	3.71	5.17	2.58
P6	2.06	3.33	2.60	2.40	2.06	3.13	1.33	2.40	4.53	0.10
S2	4.66	5.53	5.60	5.26	4.93	5.53	4.66	3.86	5.40	2.86
S4	5.40	5.80	5.73	5.46	5.66	5.46	5.26	4.86	5.60	4.63
CMHK	3.66	4.42	4.26	3.62	3.20	4.28	3.51	3.11	5.02	1.46
P6	2.00	2.33	2.80	1.53	1.53	3.00	1.53	1.60	3.53	0.53
S2	3.66	5.00	4.46	4.13	3.20	4.40	3.26	3.33	5.66	0.80
S4	5.33	5.93	5.53	5.20	4.86	5.46	5.73	4.40	5.86	3.06
CMG	4.06	4.40	4.31	3.95	3.17	4.55	3.28	3.68	5.15	2.02
P6	3.20	2.53	3.13	1.60	1.66	2.93	0.93	1.46	4.33	0.80
S2	4.00	4.80	4.26	4.73	3.06	4.86	3.60	4.20	5.26	0.33
S4	5.00	5.86	5.53	5.53	4.80	5.86	5.33	5.40	5.86	5.20

Appendix 8b

Table (16a). ANOVA: Performance on Inversion in Different Q-types by the Three Levels of EMHK Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHERE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	18.42	11.62	3.82	9.35	10.42	5.48	32.28	21.66	4.68	41.86
WITHIN GROUP	1.13	1.29	0.77	0.75	1.44	1.74	1.39	2.41	1.00	3.32
F. RATIO	*16.20	*9.08	*4.91	*12.38	*7.19	*3.21	*23.16	*8.96	*4.65	*12.60

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	29.62	5.75	7.46	6.20	13.86	14.6	26.86	19.82	4.02	56.06
WITHIN GROUP	1.03	0.46	0.64	0.54	1.98	1.41	1.54	2.05	0.77	4.66
F. RATIO	*28.71	*12.33	*11.58	*11.42	*6.97	*10.28	*17.34	*9.65	*5.21	*12.02

(III) GRAMMATICALITY JUDGMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	8.15	14.46	1.62	26.86	22.46	1.26	4.06	7.62	40.55	27.26
WITHIN GROUP	5.24	7.90	6.78	5.72	6.56	6.86	6.87	6.04	8.66	24.15
F. RATIO	1.55	1.83	0.23	*4.69	*3.40	0.18	0.59	1.26	*4.68	1.12

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	47.40	28.42	48.06	47.28	55.75	28.80	67.35	25.62	6.20	313.26
WITHIN GROUP	2.14	1.54	1.13	2.15	1.87	1.21	2.27	3.48	2.34	11.00
F. RATIO	*22.12	*18.42	*42.17	*21.93	*29.71	*23.62	*29.59	*7.34	2.64	*28.46

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	46.02	27.48	47.08	44.15	54.28	28.02	67.35	23.08	4.82	313.2
WITHIN GROUP	2.09	1.60	1.09	2.10	1.83	1.17	2.27	3.26	1.73	11.00
F. RATIO	*21.99	*17.17	*42.86	*21.01	*29.53	*23.92	*29.59	*7.07	2.77	*28.46

P<0.05 DF BETWEEN =2 DF WITHIN = 42 F.crit.=3.22

Table (16b). ANOVA: Performance on Inversion in Different Q-types Between the Three Levels of CMHK Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	25.35	16.95	22.68	17.15	22.86	36.95	14.68	10.28	6.82	14.4
WITHIN GROUP	1.26	1.49	2.66	0.85	1.95	1.79	1.53	1.65	1.15	1.85
F. RATIO	*20.11	*11.36	*8.51	*20.23	*11.67	*20.60	*9.55	*6.23	*5.88	*7.80

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	28.46	34.42	8.86	21.68	26.28	36.95	32.82	30.48	15.20	19.40
WITHIN GROUP	1.71	2.31	1.93	1.17	2.47	2.40	2.49	2.95	1.03	3.26
F. RATIO	*16.63	*14.89	*4.57	*18.51	*10.61	*15.02	*13.13	*10.30	*14.75	*5.36

(III) GRAMMATICALITY JUDGMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
BETWEEN GROUP	3.26	1.40	1.26	9.08	25.40	21.66	7.35	2.82	91.28	39.8
WITHIN GROUP	5.57	6.20	4.91	5.81	8.86	4.08	7.81	7.15	12.93	14.51
F. RATIO	0.58	0.22	0.25	1.56	*6.59	*5.32	0.94	0.39	*7.05	2.74

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	66.82	82.75	50.46	80.28	70.68	45.42	113.4	52.26	48.82	116.26
WITHIN GROUP	2.50	1.88	2.12	3.05	3.12	1.74	3.14	2.68	4.42	10.29
F. RATIO	*26.64	*43.95	*23.79	*26.26	*22.62	*25.96	*36.08	*19.48	*11.02	*11.29

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	41.66	52.35	28.46	53.35	41.66	22.95	66.82	29.95	25.08	116.26
WITHIN GROUP	1.77	1.33	1.23	2.13	2.42	1.26	2.32	1.96	2.06	10.29
F. RATIO	*23.43	*39.08	*23.05	*24.93	*17.17	*18.07	*28.75	*15.24	*12.13	*11.29

P<0.05 DF BETWEEN = 2 DF WITHIN = 42 F.crit=3.22

Table (16c). ANOVA: Performance on Inversion in Different Q-types by the Three Levels of CMG Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	30.82	20.06	36.95	29.95	52.95	32.28	17.60	44.60	17.60	36.35
WITHIN GROUP	1.89	1.34	1.40	1.26	1.77	1.73	1.06	1.75	1.55	2.09
F. RATIO	*16.26	*14.87	*26.21	*23.70	*29.89	*18.66	*16.57	*25.45	*11.32	*17.37

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	42.00	54.42	46.80	42.75	78.86	42.46	69.06	82.80	20.00	126.06
WITHIN GROUP	1.27	0.89	0.72	0.78	2.88	1.95	2.63	2.00	1.40	1.37
F. RATIO	*32.84	*61.00	*64.97	*54.30	*27.36	*21.68	*26.21	*41.41	*14.18	*91.5

(III) GRAMMATICALITY JUDGMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	4.06	8.02	3.48	10.15	5.92	3.62	16.40	5.40	0.95	150.22
WITHIN GROUP	6.02	5.23	6.59	5.38	5.01	5.14	6.31	5.34	8.60	17.32
F. RATIO	0.67	1.53	0.52	1.88	1.18	0.70	2.60	1.01	0.11	*8.68

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	31.08	77.86	50.42	105.6	62.15	72.02	128.2	111.7	48.42	544.1
WITHIN GROUP	2.97	1.73	2.93	2.90	4.95	1.60	3.94	3.47	2.79	3.63
F. RATIO	*10.45	*44.75	*17.20	*36.40	*12.55	*45.01	*32.50	*32.15	*17.31	*149.67

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
MEAN SQUARE:										
BETWEEN GROUP	12.20	43.46	21.62	64.82	36.95	33.35	73.68	60.95	8.95	414.3
WITHIN GROUP	1.67	1.04	1.58	2.29	3.53	0.92	2.90	1.89	1.33	2.31
F. RATIO	*7.27	*41.61	*13.67	*28.28	*10.44	*36.48	*25.39	*32.10	*6.71	*178.76

P<0.05 DF BETWEEN = 2 DF WITHIN =42 F.crit=3.22

Appendix 8c

Table (17a). Scheffé Tests: Performance on Inversion in Different Q-types Between The Three Levels of EMHK Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs S2	*3.42	*2.75	*2.89	*4.19	*3.03	*2.59	*3.55	*2.93	*2.54	*2.80
P6 Vs S4	*5.66	*4.21	2.48	*4.41	*3.49	0.96	*6.80	*4.11	*2.73	*5.00
S2 Vs S4	2.24	1.45	0.41	0.21	0.45	1.52	*3.24	1.17	0.18	2.20

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs S2	*5.23	*4.00	*3.64	*4.46	*2.58	*3.67	*4.69	*2.78	2.28	2.44
P6 Vs S4	*7.38	*4.54	*4.54	*3.71	*3.62	*4.13	*5.42	*4.32	*3.10	*4.90
S2 Vs S4	2.15	0.53	0.90	0.74	1.03	0.45	0.73	1.52	0.82	2.45

(III) GRAMMATICALITY JUDGMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN.
COMPARISONS:										
P6 Vs S2	0.72	0.06	0.56	2.44	2.06	0.49	0.97	1.04	2.48	1.15
P6 Vs S4	1.75	1.69	0.63	*2.82	2.42	0.56	0.91	0.52	*2.79	1.41
S2 Vs S4	1.04	1.62	0.07	0.38	0.36	0.07	0.07	1.56	0.31	0.26

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs S2	*4.86	*4.85	*7.87	*5.47	*5.73	*5.95	*6.05	2.25	1.79	*4.57
P6 Vs S4	*6.36	*5.59	*8.04	*5.97	*7.33	*5.95	*7.14	*3.81	2.15	*7.48
S2 Vs S4	1.50	0.74	1.71	0.50	1.60	0	1.09	1.56	0.36	*2.92

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs S2	*4.92	*4.75	*7.84	*5.42	*5.79	*5.90	*6.05	2.22	1.80	*4.04
P6 Vs S4	*6.31	*5.33	*8.19	*5.79	*7.27	*6.07	*7.14	*3.73	2.22	*6.99
S2 Vs S4	1.39	0.57	0.35	0.38	1.48	1.69	1.09	1.52	0.42	*2.95

P<0.05 DF BETWEEN =2 DF WITHIN = 42 T'CRIT=2.53

Table (17b). Scheffé Tests: Performance on Inversion in Different Q-types Between The Three Levels of CMHK Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 vs S2	*3.07	*3.28	1.23	*2.77	*3.65	*3.54	*2.94	*2.98	*2.88	*3.74
P6 Vs S4	*6.34	*4.63	*4.02	*6.34	*4.56	*6.40	*4.27	*3.12	*3.05	*2.94
S2 Vs S4	*3.26	1.34	*2.78	*3.57	0.91	*2.86	1.32	1.42	0.16	0.80

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 vs S2	2.23	*3.36	1.31	*2.69	*3.01	*3.02	*3.58	*3.82	*3.95	*3.16
P6 Vs S4	*5.72	*5.40	*3.01	*6.07	*4.52	*5.47	*4.96	*4.03	*5.20	2.30
S2 Vs S4	*3.49	2.04	1.70	*3.37	1.50	2.44	1.38	2.12	1.25	0.86

(III) GRAMMATICALITY JUDGMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 vs S2	0.15	0.44	0.58	0.61	2.04	2.26	0.65	0.41	*3.15	0.28
P6 Vs S4	1.01	0.66	0.66	1.74	*3.62	*3.16	1.37	0.92	*3.35	2.16
S2 Vs S4	0.85	0.22	0.08	1.74	1.58	0.90	0.72	0.52	2.03	1.87

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 vs S2	*3.00	*5.59	*3.26	*4.28	*3.00	*3.04	*2.78	*3.12	*3.12	0.65
P6 Vs S4	*7.26	*9.31	*6.90	*7.20	*6.71	*7.18	*8.34	*6.24	*4.59	*4.35
S2 Vs S4	*4.27	*3.73	*3.64	*2.92	*3.73	*4.14	*5.56	*3.12	1.47	*3.70

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 vs S2	*3.42	*6.31	*4.11	*4.87	*2.93	*3.40	*3.11	*3.39	*4.06	0.65
P6 Vs S4	*6.85	*8.52	*6.74	*6.86	*5.86	*5.99	*7.54	*5.47	*4.45	*4.35
S2 Vs S4	*3.42	2.21	*2.63	2.00	*2.93	*2.59	*4.43	2.08	0.38	*3.70

P<0.05 DF BETWEEN =2 DF WITHIN = 42 T'CRIT=2.53

Table (17c). Scheffé Tests: Performance on Inversion in Different Q-types Between The Three Levels of CMG Subjects

(I) ORAL PRODUCTION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs s2	*2.91	*3.62	*3.99	*4.22	*5.62	*3.19	1.94	2.48	*3.51	2.01
P6 Vs S4	*5.70	*5.36	*7.22	*6.82	*7.41	*6.10	*5.66	*7.03	*4.53	*5.80
S2 Vs S4	*2.78	1.73	*3.23	*2.59	1.78	*2.91	*3.71	*4.55	1.02	*3.78

(II) DIALOGUE COMPLETION

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs s2	*5.46	*8.69	*8.17	*6.58	*5.59	*4.56	*5.17	*6.06	*4.61	1.24
P6 Vs S4	*7.87	*10.24	*10.96	*10.28	*6.98	*6.39	*6.97	*8.91	*4.61	*11.04
S2 Vs S4	2.41	1.54	*2.79	*3.70	1.39	1.82	1.79	*2.54	0	*12.28

(III) GRAMMATICALITY JUDGMENT

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs s2	0.97	0.40	0.07	0.55	1.14	0.24	1.45	0.71	0.06	2.10
P6 Vs S4	1.04	1.68	0.92	1.89	1.47	0.88	0.80	0.71	0.39	2.06
S2 Vs S4	0.07	1.28	0.85	1.33	0.33	1.12	2.25	1.42	0.45	*4.17

(IV) CORRECTION (EXPLAINING)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs s2	1.91	*5.54	*2.88	*6.00	2.29	*5.92	*4.87	*5.39	*3.82	1.17
P6 Vs S4	*4.55	*9.41	*5.87	*8.25	*5.00	*9.38	*8.00	*7.84	*5.79	*7.36
S2 Vs S4	*2.65	*3.89	*2.99	2.25	*2.71	*3.46	*3.13	2.45	1.97	*8.52

(V) CORRECTION (CORRECTING ERRORS)

	WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	YN	EYN
COMPARISONS:										
P6 Vs s2	1.69	*6.07	*2.53	*5.67	2.04	*5.54	*4.29	*5.43	2.21	1.35
P6 Vs S4	*3.80	*8.93	*5.23	*7.11	*4.56	*8.40	*7.07	*7.82	*3.64	*7.16
S2 Vs S4	2.12	*2.86	*2.76	1.45	*2.57	*2.86	*2.79	2.39	1.42	*8.51

P<0.05 DF BETWEEN =2 DF WITHIN = 42 T'CRIT=2.53

Appendix 8d

Table (18a). ANOVA: Performance on Inversion Between Q-types by the EMHK Subjects

ORAL PRODUCTION: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	164639.81	396	415.76		
INV in Qs	145346.30	9	16149.59	38.84	.000

DIALOGUE COMPLETION: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	166577.78	396	420.65		
INV in Qs	70088.89	9	7787.65	18.51	.000

GRAMMATICALITY JUDGMENT: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	87933.41	396	222.05		
INV in Qs	13424.23	9	1491.58	6.72	.000

CORRECTION (EXPLAINING): Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	77441.43	396	195.56		
INV in Qs	34151.17	9	3794.57	19.40	.000

CORRECTION (CORRECTING ERRORS): Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	165422.22	396	417.73		
INV in Qs	64494.44	9	7166.05	17.15	.000

Table (18b). ANOVA: Performance on Inversion Between Q-types by the CMHK Subjects

ORAL PRODUCTION: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	182594.75	396	461.10		
INV in Qs	118780.25	9	13197.81	28.62	.000

DIALOGUE COMPLETION: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	215955.86	396	545.34		
INV in Qs	108669.14	9	12074.35	22.14	.000

GRAMMATICALITY JUDGMENT: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	131631.40	396	332.40		
INV in Qs	31990.12	9	3554.46	10.69	.000

CORRECTION (EXPLAINING): Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	94496.57	396	238.63		
INV in Qs	75824.42	9	8424.94	35.31	.000

CORRECTION (CORRECTING) ERRORS: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	164408.02	396	415.17		
INV in Qs	106841.98	9	11871.33	28.59	.000

Table (18c). ANOVA: Performance on Inversion Between Q-types by the CMG Subjects

ORAL PRODUCTION: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	148533.33	396	375.08		
INV in Qs	87223.61	9	9691.51	25.84	.000

DIALOGUE COMPLETION: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	179740.74	396	453.89		
INV in Qs	64953.70	9	7217.08	15.90	.000

GRAMMATICALITY JUDGMENT: Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	116947.76	396	295.32		
INV in Qs	26321.33	9	2924.59	9.90	.000

CORRECTION (EXPLAINING): Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	101547.05	396	256.43		
INV in Qs	65888.13	9	7320.90	28.55	.000

CORRECTION (CORRECTING ERRORS): Tests involving 'INV in Qs' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	161226.23	396	407.14		
INV in Qs	83822.38	9	9313.60	22.88	.000

Appendix 8e

Table (19a). Scheffé Tests: the EMIK Subjects' Performance on Inversion Between Q-types

(I) ORAL PRODUCTION

	WHOSE	WHICH	EYN	HOW	WHO	WHAT	WHEN	WHY	YN	WHERE
CELL MEANS	28.88	42.59	52.22	62.59	72.96	73.70	77.77	78.14	81.85	87.40
CELL TOTALS	1299.60	1916.55	2349.90	2816.55	3283.20	3316.50	3499.65	3516.30	3683.25	3933.00

WHOSE	1299.60	0	616.95	1050.30*	1516.95*	1983.60*	2016.90*	2200.05*	2216.70*	2383.65*	2633.40*
WHICH	1916.55		0	433.35	900.00*	1366.65*	1399.95*	1583.10*	1599.75*	1766.70*	2016.45*
EYN	2349.90			0	466.65	933.30*	966.60*	1149.75*	1166.40*	1333.35*	1583.10*
HOW	2816.55				0	466.65	499.95	683.10	699.75	866.70*	1116.45*
WHO	3283.20					0	33.30	216.45	233.10	400.05	649.80
WHAT	3316.50						0	183.15	199.80	366.75	616.50
WHEN	3499.65							0	16.65	183.60	433.35
WHY	3516.30								0	166.95	416.70
YN	3683.25									0	249.75
WHERE	3933.00										0

df = 396 N = 45 MSE = 415.76 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 832.01 'p = 0.05

(II) DIALOGUE COMPLETION

	EYN	WHICH	WHOSE	WHY	WHO	HOW	YN	WHEN	WHERE	WHAT
CELL MEANS	55.55	56.66	64.07	74.44	77.03	82.22	85.18	86.66	88.88	90.74
CELL TOTALS	2499.75	2549.70	2883.15	3349.80	3466.35	3699.90	3833.10	3899.70	3999.60	4083.30

EYN	2499.75	0	49.95	383.40	850.05*	966.60*	1200.15*	1333.35*	1399.95*	1499.85*	1583.55*
WHICH	2549.70		0	333.45	800.10	916.65*	1150.20*	1283.40*	1350.00*	1449.90*	1533.60*
WHOSE	2883.15			0	466.65	583.20	816.75	949.95*	1016.55*	1116.45*	1200.15*
WHY	3349.80				0	116.55	350.10	483.30	549.90	649.80	733.50
WHO	3466.35					0	233.55	366.75	433.35	533.25	616.95
HOW	3699.90						0	133.20	199.80	299.70	383.40
YN	3833.10							0	66.60	166.50	250.20
WHEN	3899.70								0	99.90	183.60
WHERE	3999.60									0	83.70
WHAT	4083.30										0

df = 396 N = 45 MSE = 420.65 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 836.89 'p = 0.05

(III) GRAMMATICALITY JUDGMENT

	WHY	EYN	YN	WHAT	WHICH	WHOSE	WHO	WHERE	WHEN	HOW
CELL MEANS	38.88	39.44	41.85	42.22	45.00	46.48	49.07	52.03	52.77	55.00
CELL TOTALS	1749.60	1774.80	1883.25	1899.90	2025.00	2091.60	2208.15	2341.35	2374.65	2799.90

WHY	1749.60	0	25.20	133.65	150.30	275.40	342.00	458.55	591.75	625.05*	725.40*
EYN	1774.80		0	108.45	125.10	250.20	316.80	433.35	566.55	599.85	700.20*
YN	1883.25			0	16.65	141.75	208.35	324.90	458.10	491.40	591.75
WHAT	1899.90				0	125.10	191.70	308.25	441.45	474.75	575.10
WHICH	2025.00					0	66.60	183.15	316.35	349.65	450.00
WHOSE	2091.60						0	116.55	249.75	283.05	383.40
WHO	2208.15							0	133.20	166.50	266.85
WHERE	2341.35								0	33.30	133.65
WHEN	2374.65									0	100.35
HOW	2475.00										0

df = 396 N = 45 MSE = 222.05 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 608.04 'p = 0.05

(IV) CORRECTION (EXPLAINING)

	EYN	WHICH	WHOSE	WHO	WHY	WHEN	WHERE	HOW	WHAT	YN
CELL MEANS	28.14	41.72	41.97	45.18	47.16	49.38	51.85	52.59	54.65	62.22
CELL TOTALS	1266.30	1877.40	1888.65	2033.10	2122.20	2222.10	2333.25	2366.55	2459.25	2799.90

EYN	1266.30	0	611.10*	622.35*	766.80*	855.90*	955.80*	1066.95*	1100.25*	1192.95*	1533.60*
WHICH	1877.40		0	11.25	155.70	244.80	344.70	455.85	489.15	581.85*	922.50*
WHOSE	1888.65			0	144.45	233.55	333.45	444.60	477.90	570.60	911.25*
WHO	2033.10				0	89.10	189.00	300.15	333.45	426.15	766.80*
WHY	2122.20					0	99.90	211.05	244.35	337.05	677.70*
WHEN	2222.10						0	111.15	144.45	237.15	577.80*
WHERE	2333.25							0	33.30	126.00	466.65
HOW	2366.55								0	92.70	433.35
WHAT	2459.25								0	340.65	
YN	2799.90									0	

df = 396 N = 45 MSE = 195.56 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 570.62 *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

	EYN	WHOSE	WHICH	WHO	WHY	WHEN	WHERE	HOW	WHAT	YN
CELL MEANS	42.22	61.85	62.59	67.40	70.37	72.96	77.40	78.51	81.48	85.29
CELL TOTALS	1899.90	2783.25	2816.55	3033.00	3166.65	3283.20	3483.00	3532.95	3666.60	3838.05

EYN	1899.90	0	883.35*	916.65*	1133.10*	1266.75*	1383.30*	1583.10*	1633.05*	1766.70*	1938.15*
WHOSE	2783.25		0	33.30	249.75	383.40	499.95	699.75	749.70	883.35*	1054.80*
WHICH	2816.55			0	216.45	350.10	466.65	666.45	716.40	850.05*	1021.50*
WHO	3033.00				0	133.65	250.20	450.00	499.95	633.60	805.05
WHY	3166.65					0	116.55	316.35	366.30	499.95	671.40
WHEN	3283.20						0	199.80	249.75	383.40	554.85
WHERE	3483.00							0	49.95	183.60	355.05
HOW	3532.95								0	133.65	305.10
WHAT	3666.60									0	171.45
YN	3838.05										0

df = 396 N = 45 MSE = 417.73 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 833.98 *p = 0.05

Table (19b). Scheffé Tests: the CMHK Subjects' Performance on Inversion Between Q-types

(I) ORAL PRODUCTION

	WHICH	HOW	WHOSE	WHY	WHEN	EYN	WHO	WHAT	WHERE	YN
CELL MEANS	15.92	24.81	28.88	37.40	39.44	39.62	41.85	54.44	59.25	60.37
CELL TOTALS	716.40	1116.45	1299.60	1683.00	1774.80	1782.90	1883.25	2449.80	2666.25	2716.65

WHICH	716.40	0	400.05	583.20	966.60*	1058.40*	1066.50*	1166.85*	1733.40*	1949.85*	2000.25*
HOW	1116.45		0	183.15	566.55	658.35	666.45	766.80	1333.35*	1549.80*	1600.20*
WHOSE	1299.60			0	383.40	475.20	483.30	583.65	1150.20*	1366.65*	1417.05*
WHY	1683.00			0	91.80	99.90	200.25	766.80	983.25*	1033.65*	
WHEN	1774.80				0	8.10	108.45	675.00	891.45*	941.85*	
EYN	1782.90					0	100.35	666.90	883.35*	933.75*	
WHO	1883.25						0	566.55	783.00	833.40*	
WHAT	2449.80							0	216.45	266.85	
WHERE	2666.25								0	50.40	
YN	2716.65									0	

df = 396 N = 45 MSE = 375.08 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 790.26 *p = 0.05

(II) DIALOGUE COMPLETION

	EYN	WHICH	WHOSE	WHY	HOW	WHO	WHEN	WHAT	WHERE	YN
CELL MEANS	26.66	39.92	45.18	52.96	54.81	65.55	65.55	69.25	74.44	77.77
CELL TOTALS	1199.70	1796.40	2033.10	2383.20	2466.45	2949.75	2949.75	3116.25	3349.80	3499.65

EYN	1199.70	0	596.70	833.40	1183.50*	1266.75*	1750.05*	1750.05*	1916.55*	2150.10*	2299.95*
WHICH	1796.40		0	236.70	586.80	670.05	1153.35*	1153.35*	1319.85*	1553.40*	1703.25*
WHOSE	2033.10			0	350.10	433.35	916.65	916.65	1083.15*	1316.70*	1466.55*
WHY	2383.20				0	83.25	566.55	566.55	733.05	966.60*	1116.45*
HOW	2466.45					0	483.30	483.30	649.80	883.35	1033.20*
WHO	2949.75						0		166.50	400.05	549.90
WHEN	2949.75							0	166.50	400.05	549.90
WHAT	3116.25								0	233.55	383.40
WHERE	3349.80								0	149.85	
YN	3499.65									0	

df = 396 N = 45 MSE = 545.34 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 952.89 *p = 0.05

(III) GRAMMATICALITY JUDGMENT

	WHY	EYN	WHICH	WHAT	WHOSE	WHO	WHEN	WHERE	HOW	YN
CELL MEANS	27.40	31.11	36.85	37.22	39.62	42.22	44.62	49.44	49.44	56.48
CELL TOTALS	1233.00	1399.95	1658.25	1674.90	1782.90	1899.90	2007.90	2224.80	2224.80	2541.60

WHY	1233.00	0	166.95	425.25	441.90	549.90	666.90	774.90*	991.80*	991.80*	1308.60*
EYN	1399.95		0	258.30	274.95	382.95	499.95	607.95	824.85*	824.85*	1141.65*
WHICH	1658.25			0	16.65	124.65	241.65	349.65	566.55	566.55	883.35*
WHAT	1674.90				0	108.00	225.00	333.00	549.90	549.90	866.70*
WHOSE	1782.90					0	117.00	225.00	441.90	441.90	758.70*
WHO	1899.90						0	108.00	324.90	324.90	641.70
WHEN	2007.90							0	216.90	216.90	533.70
WHERE	2224.80								0		316.80
HOW	2224.80									0	316.80
YN	2541.60										0

df = 396 N = 45 MSE = 332.40 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 743.94 *p = 0.05

(IV) CORRECTION (EXPLAINING)

	EYN	WHOSE	WHY	WHICH	WHO	WHEN	HOW	WHERE	WHAT	YN
CELL MEANS	16.29	38.51	40.24	43.70	44.19	44.19	51.60	51.85	53.58	70.12
CELL TOTALS	733.05	1732.95	1810.80	1966.50	1988.55	1988.55	2322.00	2333.25	2411.10	3155.40

EYN	733.05	0	999.90*	1077.75*	1233.45*	1255.50*	1255.50*	1588.95*	1600.20*	1678.05*	2422.35*
WHOSE	1732.95		0	77.85	233.55	255.60	255.60	589.05	600.30	678.15*	1422.45*
WHY	1810.80			0	155.70	177.75	177.75	511.20	522.45	600.30	1344.60*
WHICH	1966.50				0	22.05	22.05	355.50	366.75	444.60	1188.90*
WHO	1988.55			0		0	333.45	344.70	422.55	1166.85*	
WHEN	1988.55				0		333.45	344.70	422.55	1166.85*	
HOW	2322.00						0	11.25	89.10	833.40*	
WHERE	2333.25							0	77.85	822.15*	
WHAT	2411.10								0	744.30*	
YN	3155.40									0	

df = 396 N = 45 MSE = 238.63 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 630.33 *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

	EYN	WHOSE	WHY	WHICH	WHEN	WHO	WHERE	HOW	WHAT	YN
CELL MEANS	24.44	51.85	53.33	58.51	60.37	61.11	71.11	71.48	73.70	83.70
CELL TOTALS	1099.80	2333.25	2399.85	2632.95	2716.65	2749.95	3199.95	3216.60	3316.50	3766.50

EYN	1099.80	0	1233.45*	1300.05*	1533.15*	1616.85*	1650.15*	2100.15*	2116.80*	2216.70*	2666.70*
WHOSE	2333.25		0	66.60	299.70	383.40	416.70	866.70*	883.35*	983.25*	1433.25*
WHY	2399.85			0	233.10	316.80	350.10	800.10	816.75	916.65*	1366.65*
WHICH	2632.95				0	83.70	117.00	567.00	583.65	683.55	1133.55*
WHEN	2716.65					0	33.30	483.30	499.95	599.85	1049.85*
WHO	2749.95						0	450.00	466.65	566.55	1016.55*
WHERE	3199.95							0	16.65	116.55	566.55
HOW	3216.60								0	99.90	549.90
WHAT	3316.50								0	450.00	
YN	3766.50									0	

df = 396 N = 45 MSE = 415.17 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 831.42 *p = 0.05

Table (19c). Scheffé Tests: the CMG Subjects' Performance on Inversion Between Q-types

(I) ORAL PRODUCTION

	WHICH	HOW	WHOSE	WHY	WHEN	EYN	WHO	WHAT	WHERE	YN
CELL MEANS	15.92	24.81	28.88	37.40	39.44	39.62	41.85	54.44	59.25	60.37
CELL TOTALS	716.40	1116.45	1299.60	1683.00	1774.80	1782.90	1883.25	2449.80	2666.25	2716.65

WHICH	716.40	0	400.05	583.20	966.60*	1058.40*	1066.50*	1166.85*	1733.40*	1949.85*	2000.25*
HOW	1116.45		0	183.15	566.55	658.35	666.45	766.80	1333.35*	1549.80*	1600.20*
WHOSE	1299.60			0	383.40	475.20	483.30	583.65	1150.20*	1366.65*	1417.05*
WHY	1683.00				0	91.80	99.90	200.25	766.80	983.25*	1033.65*
WHEN	1774.80					0	8.10	108.45	675.00	891.45*	941.85*
EYN	1782.90						0	100.35	666.90	883.35*	933.75*
WHO	1883.25							0	566.55	783.00	833.40*
WHAT	2449.80							0	216.45	266.85	
WHERE	2666.25								0	50.40	
YN	2716.65									0	

df = 396 N = 45 MSE = 375.08 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 790.26 *p = 0.05

(II) DIALOGUE COMPLETION

	EYN	WHICH	WHEN	WHY	HOW	WHOSE	WHO	WHERE	YN	WHAT
CELL MEANS	33.33	43.33	45.55	45.55	53.33	55.18	62.96	67.40	68.88	70.74
CELL TOTALS	1499.85	1949.85	2049.75	2049.75	2399.85	2483.10	2833.20	3033.00	3099.60	3183.30

EYN	1499.85	0	450.00	549.90	549.90	900.00*	983.25*	1333.35*	1533.15*	1599.75*	1683.45*
WHICH	1949.85		0	99.90	99.90	450.00	533.25	883.35*	1083.15*	1149.75*	1233.45*
WHEN	2049.75			0		350.10	433.35	783.45	983.25*	1049.85*	1133.55*
WHY	2049.75				0	350.10	433.35	783.45	983.25*	1049.85*	1133.55*
HOW	2399.85					0	83.25	433.35	633.15	699.75	783.45
WHOSE	2483.10						0	350.10	549.90	616.50	700.20
WHO	2833.20							0	199.80	266.40	350.10
WHERE	3033.00								0	66.60	150.30
YN	3099.60									0	83.70
WHAT	3183.30										0

df = 396 N = 45 MSE = 453.89 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 869.33 *p = 0.05

(III) GRAMMATICALITY JUDGMENT

	WHY	WHICH	WHOSE	EYN	WHEN	WHAT	WHO	WHERE	HOW	YN
CELL MEANS	34.25	38.88	40.00	43.24	46.85	48.14	48.33	50.37	53.14	62.95
CELL TOTALS	1541.25	1749.60	1800.00	1945.80	2108.25	2166.30	2174.85	2266.65	2391.30	2832.75

WHY	1541.25	0	208.35	258.75	404.55	567.00	625.05	633.60	725.40*	850.05*	1291.50*
WHICH	1749.60		0	50.40	196.20	358.65	416.70	425.25	517.05	641.70	1083.15*
WHOSE	1800.00			0	145.80	308.25	366.30	374.85	466.65	591.30	1032.75*
EYN	1945.80				0	162.45	220.50	229.05	320.85	445.50	886.95*
WHEN	2108.25					0	58.05	66.60	158.40	283.05	724.50*
WHAT	2166.30						0	8.55	100.35	225.00	666.45
WHO	2174.85							0	91.80	216.45	657.90
WHERE	2266.65								0	124.65	566.10
HOW	2391.30								0	441.45	
YN	2832.75									0	

df = 396 N = 45 MSE = 295.32 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 701.22 *p = 0.05

(IV) CORRECTION (EXPLAINING)

	EYN	WHY	WHICH	WHOSE	WHO	WHEN	WHAT	WHERE	HOW	YN
CELL MEANS	25.55	40.49	44.93	50.37	50.61	50.61	54.81	55.06	58.76	75.06
CELL TOTALS	1149.75	1822.05	2021.85	2266.65	2277.45	2277.45	2466.45	2477.70	2644.20	3377.70

EYN	1149.75	0	672.30*	872.10*	1116.90*	1127.70*	1127.70*	1316.70*	1327.95*	1494.45*	2227.95*
WHY	1822.05		0	199.80	444.60	455.40	455.40	644.40	655.65*	822.15*	1555.65*
WHICH	2021.85			0	244.80	255.60	255.60	444.60	455.85	622.35	1355.85*
WHOSE	2266.65				0	10.80	10.80	199.80	211.05	377.55	1111.05*
WHO	2277.45					0		189.00	200.25	366.75	1100.25*
WHEN	2277.45						0	189.00	200.25	366.75	1100.25*
WHAT	2466.45							0	11.25	177.75	911.25*
WHERE	2477.70								0	166.50	900.00*
HOW	2644.20									0	733.50*
YN	3377.70										0

df = 396 N = 45 MSE = 256.43 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 653.42 *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

	EYN	WHY	WHICH	WHOSE	WHEN	WHO	WHERE	WHAT	HOW	YN
CELL MEANS	34.62	52.96	54.81	61.48	65.92	67.77	71.85	73.33	75.92	85.92
CELL TOTALS	1557.90	2383.20	2466.45	2766.60	2966.40	3049.65	3233.25	3299.85	3416.40	3866.40

EYN	1557.90	0	825.30*	908.55*	1208.70*	1408.50*	1491.75*	1675.35*	1741.95*	1858.50*	2308.50*
WHY	2383.20		0	83.25	383.40	583.20	666.45	850.05*	916.65*	1033.20*	1483.20*
WHICH	2466.45			0	300.15	499.95	583.20	766.80	833.40*	949.95*	1399.95*
WHOSE	2766.60				0	199.80	283.05	466.65	533.25	649.80	1099.80*
WHEN	2966.40					0	83.25	266.85	333.45	450.00	900.00*
WHO	3049.65						0	183.60	250.20	366.75	816.75
WHERE	3233.25							0	66.60	183.15	633.15
WHAT	3299.85								0	116.55	566.55
HOW	3416.40									0	450.00
YN	3866.40										0

df = 396 N = 45 MSE = 407.14 k-1 = 10 F crit = 1.85 p = 0.05
F s = 18.50 t'crit = 823.34 *p = 0.05

Appendix 9a

Table (20a). Mean Percentage Scores of Inversion of the Three Q-operators

	OP			DC			GJ			CR(E)			CR(C)		
	BE	MOD	DO	BE	MOD	DO	BE	MOD	DO	BE	MOD	DO	BE	MOD	DO
EMHK	63.58	72.77	59.30	78.57	76.94	76.25	53.05	46.18	43.81	51.85	53.70	38.60	77.36	80.00	57.36
P6	52.30	55.41	37.50	67.14	63.33	45.00	50.00	42.29	35.83	36.94	33.61	10.00	55.41	50.41	15.00
S2	68.72	77.91	65.83	80.47	80.00	90.00	51.87	47.08	43.54	57.77	60.83	49.16	86.66	91.25	72.50
S4	69.74	85.00	74.58	88.09	87.50	93.75	57.29	49.16	52.08	60.83	66.66	56.66	90.00	98.33	84.58
CMHK	49.40	50.69	27.63	65.07	62.36	47.77	48.47	38.95	35.13	55.27	48.61	34.07	76.25	67.22	44.58
P6	32.82	25.83	7.50	47.14	38.75	17.50	45.20	29.79	30.41	35.55	26.94	5.83	52.91	40.41	8.75
S2	56.92	54.58	24.58	70.47	65.41	49.16	49.79	42.29	31.25	58.05	42.77	34.44	83.33	63.33	50.00
S4	58.46	71.66	50.83	77.61	82.91	76.66	50.41	44.79	43.75	72.22	76.11	61.94	92.50	97.91	75.00
CMG	47.86	34.86	33.05	70.47	52.91	46.25	53.08	39.86	41.25	58.98	46.66	46.48	80.69	62.22	53.61
P6	39.48	0.41	1.25	54.76	2.91	2.08	53.33	38.75	39.58	46.66	16.66	9.73	69.58	25.00	14.58
S2	47.69	38.75	33.75	76.66	70.41	52.50	51.25	37.91	32.91	61.94	54.16	45.27	83.33	70.00	56.25
S4	56.41	65.41	64.16	80.00	85.41	84.16	57.08	42.91	51.25	68.33	69.16	84.44	89.16	91.66	90.00

Table (20b). Mean Raw Scores of Inversion of Q-operators

	OP			DC			GT			CR(E)			CR(C)		
	T=13	T=16	T=16	T=14	T=16	T=16	T=32			T=24			T=16		
	BE	MOD	DO	BE	MOD	DO	BE	MOD	DO	BE	MOD	DO	BE	MOD	DO
EMHK	8.26	11.64	9.48	11.00	12.31	12.20	16.97	14.77	14.02	12.44	12.88	9.26	12.37	12.80	9.17
P6	6.80	8.86	6.00	9.40	10.13	7.20	16.00	13.53	11.46	8.86	8.06	2.40	8.86	8.06	2.40
S2	8.93	12.46	10.53	11.26	12.80	14.40	16.60	15.06	13.93	13.86	14.60	11.80	13.86	14.60	11.60
S4	9.06	13.60	11.93	12.33	14.00	15.00	18.33	15.73	16.66	14.60	16.00	13.60	14.40	15.73	13.53
CMHK	6.42	8.11	4.42	9.11	9.97	7.64	15.51	12.46	11.24	13.26	11.66	8.17	12.20	10.75	7.13
P6	4.26	4.13	1.20	6.60	6.20	2.80	14.46	9.53	9.73	8.53	6.46	1.40	8.46	6.46	1.40
S2	7.40	8.73	3.93	9.86	10.46	7.86	15.93	13.53	10.00	13.93	10.26	8.26	13.33	10.13	8.00
S4	7.60	11.46	8.13	10.86	13.26	12.26	16.13	14.33	14.00	17.33	18.26	14.86	14.80	15.66	12.00
CMG	6.22	5.57	5.28	9.86	8.46	7.40	17.24	12.75	13.20	14.15	11.20	11.15	12.91	9.95	8.57
P6	5.13	0.06	0.20	7.66	0.46	0.33	17.06	12.40	12.66	11.20	4.00	2.33	11.13	4.00	2.33
S2	6.20	6.20	5.40	10.73	11.26	8.40	16.40	12.13	10.53	14.86	13.00	10.86	13.33	11.20	9.00
S4	7.33	10.46	10.26	11.20	13.66	13.46	18.26	13.73	16.40	16.40	16.60	20.26	14.26	14.66	14.40

Appendix 9b

Table (21). ANOVA: The Subjects' Performance on Inversion Between the Three Q-operators

	OP BE	OP MOD	OP DO	DC BE	DC MOD	DC DO	GJ BE	GJ MOD	GJ DO	CR(E) BE	CR(E) MOD	CR(E) DO	CR(C) BE	CR(C) MOD	CR(C) DO
(I) EMHK MEAN SQUARE:															
BETWEEN GP	24.26	92.62	144.3	33.06	58.75	282.62	22.02	19.08	101.5	146.0	269.0	542.6	139.8	256.9	530.8
WITHIN GP	1.86	5.16	7.25	2.66	3.86	6.19	29.54	32.84	42.47	8.59	8.82	15.99	8.35	8.55	15.02
F. RATIO	*13.02	*17.72	*19.89	*12.41	*15.22	*45.65	0.47	0.58	2.38	*16.98	*30.48	*33.93	*16.71	*30.01	*35.33
(II) CMHK MEAN SQUARE:															
BETWEEN GP	52.42	206.0	183.0	74.68	190.0	336.6	12.42	99.20	85.68	295.4	544.2	680.20	164.9	321.8	429.8
WITHIN GP	3.24	9.15	8.59	5.26	12.97	19.54	26.20	24.11	23.02	8.09	23.6	25.29	3.89	19.4	16.32
F.RATIO	*16.17	*22.51	*21.28	*14.19	*14.63	*17.21	0.47	*4.11	*3.72	*36.49	*23.05	*26.89	*42.35	*16.58	*30.00
(III) CMG MEAN SQUARE:															
BETWEEN GP	18.15	410.0	380.2	55.26	741.6	658.1	13.42	11.02	132.3	107.1	631.8	120.7	38.82	444.1	548.00
WITHIN GP	12.74	6.83	9.11	4.25	7.80	9.77	19.74	30.00	26.96	10.04	19.94	29.09	4.80	13.04	18.35
F.RATIO	*6.60	*59.97	*41.69	*12.99	*94.96	*67.30	0.67	0.36	*4.90	*10.66	*31.68	*41.48	*8.07	*34.05	*29.85

p < 0.05 DF BETWEEN=2 DF WITHIN=42 F.CRIT.=3.22

Appendix 9c

Table (22). Scheffé Tests: the Subjects' Performance on Inversion Between the Three Q-operators

	OP BE	OP MOD	OP DO	DC BE	DC MOD	DC DO	GJ BE	GJ MOD	GJ DO	CR(E) BE	CR(E) MOD	CR(E) DO	CR(C) BE	CR(C) MOD	CR(C) DO
(I) EMHK COMPARISONS:															
P6 Vs S2	*4.21	*4.58	*4.61	*3.12	*3.71	*7.92	0.30	0.73	1.04	*4.67	*6.02	*6.44	*4.73	*6.12	*8.61
P6 Vs S4	*4.55	*5.94	*6.00	*4.92	*5.39	*8.58	1.17	1.05	2.19	*5.36	*7.31	*7.67	*5.24	*7.18	*10.42
S2 Vs S4	0.33	1.36	1.39	1.80	1.67	0.66	0.87	0.32	1.15	0.68	1.29	1.23	0.51	1.06	1.81
(II) CMHK COMPARISONS:															
P6 Vs S2	*4.77	*4.16	*2.55	*3.90	*3.24	*3.14	0.78	0.23	0.15	*5.20	2.14	*3.74	*6.76	2.28	*4.78
P6 Vs S4	*5.07	*6.64	*6.48	*5.09	*5.37	*5.86	0.89	*2.68	*2.55	*8.47	*6.65	*7.33	*8.79	*5.72	*10.99
S2 Vs S4	0.30	2.47	*3.92	1.19	2.13	0.66	0.11	0.45	2.28	*3.27	*4.05	*3.59	2.04	*3.44	*2.89
(III) CMG COMPARISONS:															
P6 Vs S2	1.76	*5.80	*4.72	*4.07	*10.58	*7.06	0.41	0.31	1.13	*3.17	*5.52	*4.33	*2.75	*7.73	*4.26
P6 Vs S4	*3.63	*10.89	*9.13	*4.69	*12.94	*11.50	1.15	0.80	1.97	*4.49	*7.73	*9.11	*3.91	*8.09	*7.71
S2 Vs S4	*1.87	*4.27	*4.41	0.62	2.35	*4.44	0.73	0.67	*3.09	1.33	2.21	*4.37	1.17	*2.62	*3.45

P < 0.05 DF BETWEEN =2 DF WITHIN=42 T'CRIT.=2.53

Appendix 9d

Table (23a). ANOVA: Performance on Inversion Between the Q-operators by the EMHK Subjects

ORAL PRODUCTION: Tests involving 'INV OF Q-OP.' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	11352.40	88	129.00		
INV OF Q-OP	4264.13	2	2132.06	16.53	.000

DIALOGUE COMPLETION: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	15524.33	88	176.41		
INV OF Q-OP	127.78	2	63.89	.36	.697

GRAMMATICALITY JUDGMENT :Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	6912.18	88	78.55		
INV OF Q-OP	2072.19	2	1036.10	13.19	.000

CORRECTION (EXPLAINING):Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	12501.54	88	142.06		
INV OF Q-OP	6097.99	2	3049.00	21.46	.000

CORRECTION (CORRECTING ERRORS): Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	26546.30	88	301.66		
INV OF Q-OP	13792.25	2	6896.12	22.86	.000

Table (23b). ANOVA: Performance on Inversion Between the Q-operators by the CMHK Subjects

ORAL PRODUCTION: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	17294.62	88	196.53		
INV OF Q-OP	15102.75	2	7551.38	38.42	.000

DIALOGUE COMPLETION: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	22999.70	88	261.36		
INV OF Q-OP	7791.11	2	3895.56	14.90	.000

GRAMMATICALITY JUDGMENT: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	10112.27	88	114.91		
INV OF Q-OP	4243.20	2	2121.60	18.46	.000

CORRECTION (EXPLAINING): Tests involving 'INV OF Q-OP' Within-Subject Effect

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	23505.14	88	267.10		
INV OF Q-OP	10580.50	2	5290.25	19.81	.000

CORRECTION (CORRECTING): Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	38209.49	88	434.20		
INV OF Q-OP	23951.97	2	11975.98	27.58	.000

Table (23c). ANOVA: Performance on Inversion of Q-operators by the CMG Subjects

ORAL PRODUCTION: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	22007.32	88	250.08		
INV OF Q-OP	5873.75	2	2936.88	11.74	.000

DIALOGUE COMPLETION: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	29104.59	88	330.73		
INV OF Q-OP	14095.34	2	7047.67	21.31	.000

GRAMMATICALITY JUDGMENT: Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	10606.34	88	120.53		
INV OF Q-OP	5376.74	2	2688.37	22.31	.000

CORRECTION (EXPLAINING): Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	28251.29	88	321.04		
INV OF Q-OP	4619.08	2	2309.54	7.19	.001

CORRECTION (CORRECTING): Tests involving 'INV OF Q-OP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	36074.07	88	409.93		
INV OF Q-OP	17233.22	2	8616.61	21.02	.000

Appendix 9e

Table (24a). Scheffé Tests: Performance on Inversion Between Q-operators by the EMHK Subjects

(I) ORAL PRODUCTION

	DO	COP	MOD
CELL MEANS	59.30	63.58	72.77
CELL TOTALS	2668.50	2861.10	3274.65

DO	2668.50	0	192.60	606.15*
COP	2861.10		0	413.55*
MOD	3274.65			0

df =88,N =45,MSE =129.00,k-1 =3,F crit =2.70
F s = 8.10, t'crit = 306.66, *p = 0.05

(II) DIALOGUE COMPLETION

	DO	MOD	COP
CELL MEANS	76.25	76.94	78.57
CELL TOTALS	3431.25	3462.30	3535.65

DO	3431.25	0	31.05	104.40
MOD	3462.30		0	73.35
COP	3535.65			0

df =88,N =45,MSE =176.41,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 358.61, *p = 0.05

(III) GRAMMATICALITY JUDGMENT

	DO	MOD	COP
CELL MEANS	43.81	46.18	53.05
CELL TOTALS	1971.45	2078.10	2387.25

DO	1971.45	0	106.65	415.80*
MOD	2078.10		0	309.15*
COP	2387.25			0

df =88,N =45,MSE =78.55,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 239.30, *p = 0.05

(IV) CORRECTION (EXPLAINING)

	DO	COP	MOD
CELL MEANS	38.61	51.85	53.70
CELL TOTALS	1737.45	2333.25	2416.50

DO	1737.45	0	595.80*	679.05*
COP	2333.25		0	83.25
MOD	2416.50			0

df =88,N =45,MSE =142.06,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 321.81, *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

	DO	COP	MOD
CELL MEANS	57.36	77.36	80.00
CELL TOTALS	2581.20	3481.20	3600.00

DO	2581.20	0	900.00*	1018.80*
COP	3481.20		0	118.80
MOD	3600.00			0

df =88,N =45,MSE =301.66,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 468.95, *p = 0.05

Table (24b). Scheffé Tests: Performance on Inversion Between Q-operators by the CMHK Subjects

(I) ORAL PRODUCTION

		DO	COP	MOD
CELL MEANS		27.63	49.04	50.69
CELL TOTALS		1243.35	2206.80	2281.05
DO	1243.35	0	963.45*	1037.70*
COP	2206.80		0	74.25
MOD	2281.05			0

df =88,N =45,MSE =196.53,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 378.51, *p = 0.05

(II) DIALOGUE COMPLETION

		DO	MOD	COP
CELL MEANS		47.77	62.36	65.07
CELL TOTALS		2149.65	2806.20	2928.15
DO	2149.65	0	656.55*	778.50*
MOD	2806.20		0	121.95
COP	2928.15			0

df =88,N =45,MSE =261.36,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 436.50, *p = 0.05

(III) GRAMMATICALITY JUDGMENT

		DO	MOD	COP
CELL MEANS		35.13	38.95	48.47
CELL TOTALS		1580.85	1752.75	2181.15
DO	1580.85	0	171.90	600.30*
MOD	1752.75		0	428.40*
COP	2181.15			0

df =88,N =45,MSE =114.91,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 289.43, *p = 0.05

(IV) CORRECTION (EXPLAINING)

		DO	MOD	COP
CELL MEANS		34.07	48.61	55.27
CELL TOTALS		1533.15	2187.45	2487.15
DO	1533.15	0	654.30*	954.00*
MOD	2187.45		0	299.70
COP	2487.15			0

df =88,N =45,MSE =267.10,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 441.27, *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

		DO	MOD	COP
CELL MEANS		44.58	67.22	76.25
CELL TOTALS		2006.10	3024.90	3431.25
DO	2006.10	0	1018.80*	1425.15*
MOD	3024.90		0	406.35
COP	3431.25			0

df =88,N =45,MSE =434.20,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 562.61, *p = 0.05

Table (24c). Scheffé Tests: Performance on Inversion Between Q-operators by the CMG Subjects

(I) ORAL PRODUCTION

		DO	MOD	COP
CELL MEANS		33.05	34.86	47.86
CELL TOTALS		1487.25	1568.70	2153.70
DO	1487.25	0	81.45	666.45*
MOD	1568.70		0	585.00*
COP	2153.70			0

df =88,N =45,MSE =250.08,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 426.98,*p = 0.05

(II) DIALOGUE COMPLETION

		DO	MOD	COP
CELL MEANS		46.25	52.91	70.47
CELL TOTALS		2081.25	2380.95	3171.15
DO	2081.25	0	299.70	1089.90*
MOD	2380.95		0	790.20*
COP	3171.15			0

df =88,N =45,MSE =330.73,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 491.02, *p = 0.05

(III) GRAMMATICALITY JUDGMENT

		MOD	DO	COP
CELL MEANS		39.86	41.25	53.88
CELL TOTALS		1793.70	1856.25	2424.60
MOD	1793.70	0	62.55	630.90*
DO	1856.25		0	568.35*
COP	2424.60			0

df =88,N =45,MSE =120.53,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 296.42, *p = 0.05

(IV) CORRECTION (EXPLAINING)

		DO	MOD	COP
CELL MEANS		46.48	46.66	58.98
CELL TOTALS		2091.60	2099.70	2654.10
DO	2091.60	0	8.10	562.50*
MOD	2099.70		0	554.40*
COP	2654.10			0

df =88,N =45,MSE =321.04,k-1 =3,F crit =2.70,
Fs =8.10, t'crit = 483.77, *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

		DO	MOD	COP
CELL MEANS		53.61	62.22	80.69
CELL TOTALS		2412.45	2799.90	3631.05
DO	2412.45	0	387.45	1218.60*
MOD	2799.90		0	831.15*
COP	3631.05			0

df =88,N =45,MSE =409.93,k-1 =3,F crit =2.70,
F s = 8.10, t'crit = 546.66, *p = 0.05

Appendix 9f

Table (25a). ANOVA: Performance on Inversion of Q-operators between Tasks By the EMHK Subjects

Tests involving 'INV of BE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	27974.05	176	158.94		
INV of BE	29450.16	4	7362.54	46.32	.000

Tests involving 'INV of MOD' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	37440.66	176	212.73		
INV of MOD	40756.39	4	10189.10	47.90	.000

Tests involving 'INV of DO' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	54898.44	176	311.92		
INV of DO	39116.32	4	9779.08	31.35	.000

Table (25b). ANOVA: Performance on Inversion of Q-operators between Tasks By the CMHK Subjects

Tests involving 'INV of BE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	30878.97	176	175.45		
INV of BE	24807.76	4	6201.94	35.35	.000

Tests involving 'INV of MOD' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	49327.43	176	280.27		
INV of MOD	22951.22	4	5737.80	20.47	.000

Tests involving 'INV of DO' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	53122.38	176	301.83		
INV of DO	12139.78	4	3034.94	10.06	.000

Table (25c). ANOVA: Performance on Inversion of Q-operators between Tasks By the CMG Subjects

Tests involving 'INV of BE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	27559.47	176	156.59		
INV of BE	31290.85	4	7822.71	49.96	.000

Tests involving 'INV of MOD' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	70906.94	176	402.88		
INV of MOD	20910.76	4	5227.69	12.98	.000

Tests involving 'INVDO' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	67621.16	176	384.21		
INV of DO	10388.39	4	2597.10	6.76	.000

Appendix 9g

Table (26a). Scheffé Tests: Performance on Inversion of Q-operators Between Tasks by the EMHK Subjects

(I) INVERSION OF 'BE' BETWEEN TASKS

		CR(E)BE	GJBE	OPBE	CR(C)BE	DCBE
CELL MEANS		51.85	53.05	63.58	77.36	78.57
CELL TOTALS		2333.25	2387.25	2861.10	3481.20	3535.65
CR(E)BE	2333.25	0	54.00	527.85*	1147.95*	1202.40*
GJBE	2387.25		0	473.85*	1093.95*	1148.40*
OPBE	2861.10			0	620.10*	674.55*
CR(C)BE	3481.20				0	54.45
DCBE	3535.65					0

df = 176 N = 45 MSE = 158.94 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 402.05 *p = 0.05

(II) INVERSION OF 'MOD' BETWEEN TASKS

		GJMOD	CR(E)MOD	OPMOD	DCMOD	CR(C)MOD
CELL MEANS		46.18	53.70	72.77	76.94	80.00
CELL TOTALS		2078.10	2416.50	3274.65	3462.30	3600.00
GJMOD	2078.10	0	338.40	1196.55*	1384.20*	1521.90*
CR(E)MOD	2416.50		0	858.15*	1045.80*	1183.50*
OPMOD	3274.65			0	187.65	325.35
DCMOD	3462.30				0	137.70
CR(C)MOD	3600.00					0

df = 176 N = 45 MSE = 212.73 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 465.13 *p = 0.05

(III) INVERSION OF 'DO' BETWEEN TASKS

		CR(E)DO	GJDO	CR(C)DO	OPDO	DCDO
CELL MEANS		38.60	43.81	57.36	59.30	76.25
CELL TOTALS		1737.00	1971.45	2581.20	2668.50	3431.25
CR(E)DO	1737.00	0	234.45	844.20*	931.50*	1694.25*
GJDO	1971.45		0	609.75*	697.05*	1459.80*
CR(C)DO	2581.20			0	87.30	850.05*
OPDO	2668.50				0	762.75*
DCDO	3431.25					0

df = 176 N = 45 MSE = 311.92 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 563.23 *p = 0.05

Table (26b). Scheffé Tests: Performance on Inversion of Q-operators Between Tasks by the CMHK Subjects

(I) INVERSION OF 'BE' BETWEEN TASKS

		GJBE	OPBE	CR(E)BE	DCBE	CR(C)BE
CELL MEANS		48.47	49.40	55.27	65.07	76.25
CELL TOTALS		2181.15	2223.00	2487.15	2928.15	3431.25
GJBE	2181.15	0	41.85	306.00	747.00*	1250.10*
OPBE	2223.00		0	264.15	705.15*	1208.25*
CR(E)BE	2487.15			0	441.00*	944.10*
DCBE	2928.15				0	503.10*
CR(C)BE	3431.25					0

df = 176 N = 45 MSE = 175.45 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 422.41 *p = 0.05

(II) INVERSION OF 'MOD' BETWEEN TASKS

		GJMOD	CR(E)MOD	OPMOD	DCMOD	CR(C)MOD
CELL MEANS		38.95	48.61	50.69	62.36	67.22
CELL TOTALS		1752.75	2187.45	2281.05	2806.20	3024.90
GJMOD	1752.75	0	434.70	528.30	1053.45*	1272.15*
CR(E)MOD	2187.45		0	93.60	618.75*	837.45*
OPMOD	2281.05			0	525.15	743.85*
DCMOD	2806.20				0	218.70
CR(C)MOD	3024.90					0

df = 176 N = 45 MSE = 280.27 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 533.89 *p = 0.05

(III) INVERSION OF 'DO' BETWEEN TASKS

		OPDO	CR(E)DO	GJDO	CR(C)DO	DCDO
CELL MEANS		27.63	34.07	35.13	44.58	47.77
CELL TOTALS		1243.35	1533.15	1580.85	2006.10	2149.65
OPDO	1243.35	0	289.80	337.50	762.75*	906.30*
CR(E)DO	1533.15		0	47.70	472.95	616.50*
GJDO	1580.85			0	425.25	568.80*
CR(C)DO	2006.10				0	143.55
DCDO	2149.65					0

df = 176 N = 45 MSE = 301.83 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 554.04 *p = 0.05

Table (26c). Scheffé Tests: Performance on Inversion of Q-operators Between Tasks by the CMG Subjects

(I) INVERSION OF 'BE' BETWEEN TASKS

		OPBE	GJBE	CR(E)BE	DCBE	CR(C)BE
CELL MEANS		47.86	53.88	58.98	70.47	80.69
CELL TOTALS		2153.70	2424.60	2654.10	3171.15	3631.05
OPBE	2153.70	0	270.90	500.40*	1017.45*	1477.35*
GJBE	2424.60		0	229.50	746.55*	1206.45*
CR(E)BE	2654.10			0	517.05*	976.95*
DCBE	3171.15				0	459.90*
CR(C)BE	3631.05					0

df = 176 N = 45 MSE = 156.59 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 399.06 *p = 0.05

(II) INVERSION OF 'MOD' BETWEEN TASKS

		OPMOD	GJMOD	CR(E)MOD	DCMOD	CR(C)MOD
CELL MEANS		34.86	39.86	46.66	52.91	62.22
CELL TOTALS		1568.70	1793.70	2099.70	2380.95	2799.90
OPMOD	1568.70	0	225.00	531.00	812.25*	1231.20*
GJMOD	1793.70		0	306.00	587.25	1006.20*
CR(E)MOD	2099.70			0	281.25	700.20*
DCMOD	2380.95				0	418.95
CR(C)MOD	2799.90					0

df = 176 N = 45 MSE = 402.88 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 640.10 *p = 0.05

(III) INVERSION OF 'DO' BETWEEN TASKS

		OPDO	GJDO	DCDO	CR(E)DO	CR(C)DO
CELL MEANS		33.05	41.25	46.25	46.48	53.61
CELL TOTALS		1487.25	1856.25	2081.25	2091.60	2412.45
OPDO	1487.25	0	369.00	594.00	604.35	925.20*
GJDO	1856.25		0	225.00	235.35	556.20
DCDO	2081.25			0	10.35	331.20
CR(E)DO	2091.60				0	320.85
CR(C)DO	2412.45					0

df = 176 N = 45 MSE = 384.21 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 625.09 *p = 0.05

Appendix 9h

Table (27). Performance on Inversion of Q-operators Between the Three Groups of Subjects

(I) INVERSION OF 'BE'

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	12511.373	4	3127.843	38.418	.000
GROUP	814.424	2	407.212	5.002	.008
LEVEL	11696.949	2	5848.474	71.834	.000
2-Way Interactions	509.953	4	127.488	1.566	.187
GROUP LEVEL	509.953	4	127.488	1.566	.187
Explained	13021.326	8	1627.666	19.992	.000
Residual	10258.479	126	81.417		
Total	23279.805	134	173.730		

(II) INVERSION OF MODAL

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	48206.433	4	12051.608	70.488	.000
GROUP	8075.255	2	4037.628	23.615	.000
LEVEL	40131.177	2	20065.589	117.360	.000
2-Way Interactions	3094.623	4	773.656	4.525	.002
GROUP LEVEL	3094.623	4	773.656	4.525	.002
Explained	51301.056	8	6412.632	37.506	.000
Residual	21542.818	126	170.975		
Total	72843.874	134	543.611		

(III) INVERSION OF 'DO'

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig of F
Main Effects	65741.373	4	16435.343	70.238	.000
GROUP	6839.562	2	3419.781	14.615	.000
LEVEL	58901.811	2	29450.906	125.861	.000
2-Way Interactions	2538.129	4	634.532	2.712	.033
GROUP LEVEL	2538.129	4	634.532	2.712	.033
Explained	68279.502	8	8534.938	36.475	.000
Residual	29483.362	126	233.995		
Total	97762.865	134	729.574		

Appendix 10a

Table 29(a). Mean Percentage Scores of WH-Rules

	OP WHP	INV	Q-OP.	DC WHP	INV	Q-OP.	GJ WHP	INV	Q-OP.	CR(E) WHP	INV	Q-OP.	CR(C) WHP	INV	Q-OP.
EWHK	79.39	64.97	65.55	86.78	77.19	75.26	76.04	47.68	48.33	73.05	48.05	39.81	95.87	71.57	59.44
P6	71.36	47.68	46.81	77.31	58.11	55.65	68.33	42.70	36.04	74.72	26.85	11.20	92.50	40.27	16.38
S2	81.81	70.43	70.86	89.27	83.62	82.31	76.94	47.50	52.84	76.94	55.92	53.51	97.08	83.47	80.27
S4	85.07	76.81	78.98	93.76	89.82	87.82	82.84	52.84	56.11	67.50	61.38	54.72	98.05	90.97	81.66
CWHK	71.20	41.73	44.34	82.97	58.11	59.08	76.48	40.85	32.77	81.08	45.98	28.14	90.27	62.68	40.41
P6	59.78	20.86	25.94	71.66	33.91	37.10	65.34	35.13	26.18	71.66	22.77	11.20	80.83	34.02	16.11
S2	73.40	44.34	46.23	87.68	61.30	63.04	78.05	41.11	30.90	75.64	45.09	29.44	91.38	65.55	43.33
S4	80.43	60.00	60.86	89.56	79.13	77.10	86.04	46.31	41.25	95.92	70.09	43.79	98.61	88.47	61.80
CWG	61.52	37.68	38.06	74.71	55.94	53.86	70.64	45.00	39.02	78.45	50.70	38.91	83.98	65.50	52.59
P6	35.65	11.73	12.31	45.14	18.40	19.13	61.45	43.88	35.55	50.18	24.35	9.35	62.91	36.38	14.02
S2	66.88	39.27	39.71	85.79	66.08	61.73	70.48	40.69	32.98	89.91	53.79	45.27	92.77	69.86	60.00
S4	82.02	62.02	62.17	93.18	83.33	80.72	80.00	50.41	48.54	95.37	73.98	62.12	96.25	90.27	83.75

Table (29b). Mean Raw Scores of WH-Rules

	OP T=92 WHP	T=46 INV	T=46 Q-OP	DC T=92 WHP	T=46 INV	T=46 Q-OP	GT T=96 WHP	INV	Q-OP	CR(E) T=72 WHP	INV	Q-OP	CR(C) T=48 WHP	INV	Q-OP
EWHK	73.04	29.88	30.15	79.84	35.51	34.62	73.00	45.77	46.40	52.60	34.60	28.66	46.02	34.35	28.53
P6	65.60	21.93	21.53	71.13	26.73	25.60	65.60	41.00	34.60	53.80	19.33	8.06	44.40	19.33	7.86
S2	75.26	32.40	32.60	82.13	38.46	37.86	73.86	45.60	50.73	55.40	40.26	38.53	46.60	40.06	38.53
S4	78.26	35.33	36.33	86.26	41.33	40.40	79.53	50.73	53.86	48.60	44.20	39.40	47.06	43.66	39.20
CWHK	65.51	19.20	20.40	76.33	26.73	27.17	73.42	39.22	31.46	58.37	33.11	20.26	43.33	30.08	19.40
P6	55.00	9.60	11.93	65.93	15.60	17.06	62.73	33.73	25.13	51.60	16.40	8.06	38.80	16.33	7.73
S2	67.53	20.40	21.26	80.66	28.20	29.00	74.93	39.46	29.66	54.46	32.46	21.20	43.86	31.46	20.80
S4	74.00	27.60	28.00	82.40	36.40	35.46	82.60	44.46	39.60	69.06	50.46	31.53	47.33	42.46	29.66
CWG	56.60	17.33	17.51	68.73	25.73	24.77	67.82	43.20	37.46	56.48	36.51	28.02	40.31	31.44	25.24
P6	32.80	5.40	5.66	41.53	8.46	8.80	59.00	42.13	34.13	36.13	17.53	6.73	30.20	17.46	6.73
S2	61.53	18.06	18.26	78.93	30.40	28.40	67.66	39.06	31.66	64.66	38.73	32.60	44.53	33.53	28.80
S4	75.46	28.53	28.60	85.73	38.33	37.13	76.80	48.40	46.60	68.66	53.26	44.73	46.20	43.33	40.20

Appendix 10b

Table (30). ANOVA: Subjects' Performance on the WH-Rules

	OP WHP	OP INV	OP Q-OP.	DC WHP	DC INV	DC Q-OP.	GJ WHP	GJ INV	GJ Q-OP.	CR(E) WHP	CR(E) INV	CR(E) Q-OP.	CR(C) WHP	CR(C) INV	CR(C) Q-OP.
(I) EMHK MEAN SQUARE:															
BETWEEN GP.	657.2	744.3	888.6	917.8	897.6	939.8	736.5	355.6	1603.0	189.6	2680.2	4776.9	30.42	2587.8	4807.3
WITHIN GP.	37.46	27.04	18.01	52.24	20.38	19.11	173.1	267.5	216.3	67.84	57.96	71.62	4.66	56.51	70.71
F. RATIO	*17.54	*17.54	*27.52	*17.56	*44.04	*49.16	*4.25	1.32	*7.41	2.79	*46.23	*66.69	*6.51	*45.74	*67.97
(II) CMHK MEAN SQUARE:															
BETWEEN GP.	1400.3	1231.1	976.5	1228.6	1647.2	1307.8	1506.1	432.7	821.7	1316.6	4357.3	2075.2	276.3	2582.1	1826.5
WITHIN GP.	74.61	41.09	32.47	83.75	77.84	59.77	187.5	153.6	159.3	124.6	83.93	120.5	27.51	50.92	110.3
F. RATIO	*18.76	*30.01	*30.07	*14.66	*21.15	*21.86	*8.03	2.81	*5.1	*10.56	*51.90	*17.31	*10.04	*50.71	*16.54
(III) CMG MEAN SQUARE:															
BETWEEN GP.	7100.5	2013.2	1979.2	8497.4	3590.1	3158.8	1188.5	339.5	961.3	4721.2	4844.6	5651.3	1161.2	2558.4	4342.1
WITHIN GP.	109.9	39.29	33.23	119.3	46.20	39.56	179.2	158.8	201.2	108.4	108.3	115.1	42.96	68.11	79.85
F.RATIO	*64.63	*51.22	*59.53	*71.69	*77.69	*79.81	*6.63	2.13	*4.77	*43.55	*44.71	*49.10	*27.01	*37.55	*54.38

P < 0.05 DF BETWEEN=2 DF WITHIN=42 F.CRIT=3.22

Appendix 10c

Table (31). Scheffé Tests: Subjects' Performance on the Wh-Rules

	OP WHP	OP INV	OP Q-OP.	DC WHP	DC INV	DC Q-OP.	GJ WHP	GJ INV	GJ Q-OP.	CR(E) WHP	CR(E) INV	CR(E) Q-OP.	CR(C) WHP	CR(C) INV	CR(C) Q-OP.
(I) EMHK COMPARISONS:															
P6 Vs S2	*4.36	*5.52	*7.14	*4.13	*7.11	*7.68	1.72	0.77	*3.00	0.53	*7.53	*9.86	*2.79	*7.55	*9.99
P6 Vs S4	*5.70	*7.05	*9.55	*5.69	*8.85	*9.27	*2.90	1.63	*3.59	1.72	*8.94	*10.14	*3.38	*8.86	*10.20
S2 Vs S4	1.34	1.52	2.40	1.56	1.74	1.58	1.18	0.85	0.58	2.26	1.41	0.28	0.59	0.85	0.21
(II) CMHK COMPARISONS:															
P6 Vs S2	*3.97	*4.61	*4.45	*4.41	*3.91	*4.32	2.43	1.27	0.98	0.70	*4.80	*3.28	*2.65	*5.81	*3.41
P6 Vs S4	*6.02	*7.69	*7.21	*4.93	*6.46	*6.52	*3.97	2.37	*3.13	*4.28	*10.18	*5.85	*4.46	*10.03	*5.72
S2 Vs S4	2.04	*3.07	*3.26	0.52	*2.55	2.29	1.53	1.10	2.15	*3.58	*5.38	*2.58	1.81	*4.22	2.31
(III) CMG COMPARISONS:															
P6 Vs S2	*7.50	*5.33	*8.31	*9.37	*8.84	*8.53	0.56	0.67	0.48	*7.51	*5.58	*6.60	*5.99	*5.33	*6.76
P6 Vs S4	*11.14	*10.11	*10.89	*11.08	*12.03	*12.34	*3.64	2.02	*2.88	*8.56	*9.40	*9.70	*6.68	*8.58	*10.26
S2 Vs S4	*3.63	*4.57	*4.91	1.70	*3.20	*3.80	1.87	1.36	2.41	1.05	*3.82	*3.10	0.70	*3.25	*3.49

P < 0.05 DF BETWEEN = 2 DF WITHIN = 42 T'CRIT=2.53

Appendix 11a

Table (32a). Mean Percentage Scores of YN-Rules and EYN-Rules

	OP YN-Q INV	Q-OP.	EYN-Q -INV	CON	DC YN-Q INV	Q-OP.	EYN-Q -INV	CON	GJ YN-Q INV	Q-OP.	EYN-Q -INV	CON
EMHK	81.85	80.37	52.22	42.22	85.18	84.07	55.55	48.88	41.85	37.96	39.44	43.14
P6	71.11	67.77	23.33	4.44	75.55	74.44	23.33	3.33	26.11	23.33	33.06	37.22
S2	86.66	87.77	54.44	50.00	87.77	85.55	55.55	55.55	48.33	42.77	41.66	47.22
S4	87.77	85.55	78.88	72.22	92.22	92.22	87.88	87.77	51.11	47.77	43.61	45.00
CMHK	60.74	62.59	23.07	4.44	77.78	80.74	26.66	6.66	56.48	23.88	31.11	34.62
P6	47.77	54.54	42.22	0.00	58.88	68.88	47.11	0.00	32.77	17.22	26.39	28.88
S2	67.77	67.77	11.11	1.11	83.33	83.33	11.11	0.00	67.22	22.77	28.06	37.22
S4	66.66	65.55	17.77	12.22	91.11	90.00	21.22	20.00	69.44	31.66	38.89	37.77
CMG	60.37	60.00	39.62	18.51	68.88	68.14	33.33	30.74	62.59	38.33	43.24	50.18
P6	40.00	43.33	16.66	0.00	46.66	47.77	10.00	0.00	61.66	38.11	43.33	50.55
S2	66.66	63.33	34.44	0.00	80.00	80.00	1.11	0.00	61.11	41.11	30.00	48.33
S4	74.44	73.33	67.77	55.56	80.00	76.66	88.88	92.22	65.00	35.55	56.38	51.66

	CR(E) YN-Q INV	Q-OP.	EYN-Q -INV	CON	CR(C) YN-Q INV	Q-OP.	EYN-Q -INV	CON
EMHK	62.22	40.24	28.14	40.49	86.29	60.00	42.22	60.37
P6	54.07	10.37	1.11	5.93	75.55	15.55	1.67	8.89
S2	65.18	54.07	31.85	51.11	90.00	80.00	47.78	76.67
S4	67.40	56.29	51.48	64.44	93.33	84.44	77.22	95.56
CMHK	70.12	26.91	16.29	23.70	83.70	38.14	24.44	34.07
P6	48.14	14.81	5.92	2.22	58.88	21.11	8.89	3.33
S2	74.81	28.14	8.88	19.26	94.44	40.00	13.33	28.88
S4	87.40	37.77	34.07	49.63	97.77	53.33	51.11	70.00
CMG	75.06	44.69	25.55	32.35	85.92	58.14	34.63	38.88
P6	53.33	19.25	8.88	5.93	72.22	27.77	13.33	8.88
S2	49.25	57.03	3.70	8.14	87.77	71.11	5.55	12.22
S4	92.59	57.77	64.07	82.96	97.77	75.55	85.00	95.55

Table (32b). Mean Raw Scores of YN-Rules and EYN-Rules

	OP YN-Q INV T=6	Q-OP	EYN-Q -INV T=6	CON	DC YN-Q INV T=6	Q-OP	EYN-Q -INV T=6	CON	GT YN-Q INV T=12	Q-OP	EYN-Q -INV T=24	CON T=12	CR(E) YN-Q INV T=9	Q-OP	EYN-Q -INV T=18	CON T=9	CR(C) YN-Q INV T=6	Q-OP	EYN-Q -INV T=12	CON T=6
EMHK	4.91	4.82	3.13	2.53	5.11	5.04	3.33	2.93	5.02	4.55	9.46	5.17	5.60	3.62	5.06	3.64	5.17	3.60	5.06	3.62
P6	4.26	4.06	1.40	0.26	4.53	4.46	1.40	0.20	3.13	2.80	7.93	4.46	4.86	0.93	0.20	0.53	4.53	0.93	0.20	0.53
S2	5.20	5.26	3.26	3.00	5.26	5.13	3.33	3.33	5.80	5.13	10.00	5.66	5.86	4.86	5.73	4.60	5.40	4.80	5.73	4.60
S4	5.26	5.13	4.73	4.33	5.53	5.53	5.26	5.27	6.13	5.73	10.46	5.40	6.06	5.06	9.26	5.80	5.60	5.06	9.26	5.73
CMHK	3.64	3.75	1.42	0.26	4.66	4.84	1.60	0.40	6.77	2.86	7.46	4.15	6.31	2.42	2.93	2.13	5.02	2.28	2.93	2.04
P6	2.86	3.26	2.53	0.00	3.53	4.13	2.83	0.00	3.93	2.06	6.33	3.46	4.33	1.33	1.06	0.20	3.53	1.26	1.06	0.20
S2	4.06	4.06	0.66	0.06	5.00	5.00	0.66	0.00	8.06	2.73	6.73	4.46	6.73	2.53	1.60	1.73	5.66	2.40	1.60	1.73
S4	4.00	3.93	1.06	0.73	5.46	5.40	1.26	1.20	8.33	3.80	9.33	4.53	7.86	3.40	6.13	4.46	5.86	3.20	6.13	4.20
CMG	3.62	3.60	2.37	1.11	4.13	4.08	2.00	1.84	7.51	4.60	10.37	6.02	6.75	4.02	4.60	2.91	5.15	3.48	4.15	2.33
P6	2.40	2.60	1.00	0.00	2.80	2.86	0.60	0.00	7.40	4.60	10.40	6.06	4.80	1.73	1.60	0.53	4.33	1.66	1.60	0.53
S2	4.00	3.80	2.06	0.00	4.80	4.80	0.06	0.00	7.33	4.93	7.20	5.80	7.13	5.13	0.66	0.73	5.26	4.26	0.66	0.73
S4	4.46	4.40	4.06	3.33	4.80	4.60	5.33	5.53	7.80	4.26	13.53	6.20	8.33	5.20	11.53	7.46	5.86	4.53	10.20	5.73

Appendix 11b

Table (33). ANOVA: Subjects' Performance on YN-Rules and EYN-Rules

	OP				DC				GJ			
	YN-Q	EYN-Q			YN-Q	EYN-Q			YN-Q	EYN-Q		
	INV	Q-OP.	-INV	CON	INV	Q-OP.	-INV	CON	INV	Q-OP.	-INV	CON
(I) EMHK MEAN SQUARE:												
BETWEEN GP.	4.69	6.48	41.86	64.47	4.02	4.36	56.06	98.07	40.56	36.02	29.23	5.95
WITHIN GP.	1.01	0.89	3.32	3.34	0.77	0.74	4.66	3.68	8.66	4.74	24.15	6.73
F.RATIO	*4.66	*7.25	*12.60	*19.30	*5.22	*5.86	*12.02	*26.63	*4.69	*7.60	1.13	0.88
(II) CMHK MEAN SQUARE:												
BETWEEN GP.	6.82	2.76	14.49	2.46	15.27	6.29	19.40	7.20	91.29	11.46	39.80	5.36
WITHIN GP.	1.15	0.78	1.86	1.09	1.05	0.89	3.62	1.58	12.93	3.43	14.51	7.46
F.RATIO	*5.89	*3.53	*7.80	2.26	*14.75	*7.08	*5.36	*4.55	*7.06	*3.34	2.74	0.72
(III) CMG MEAN SQUARE:												
BETWEEN GP.	17.62	12.60	36.36	55.55	20.00	16.96	126.07	153.08	0.95	1.67	150.42	0.62
WITHIN GP.	1.55	1.28	2.09	1.65	1.41	1.42	1.38	0.62	8.60	6.66	17.32	8.61
F.RATIO	*11.32	*9.87	*17.38	*33.66	*14.19	*11.92	*91.50	*249.86	0.11	0.25	*8.68	0.07

	CR(E)				CR(C)			
	YN-Q	EYN-Q			YN-Q	EYN-Q		
	INV	Q-OP.	-INV	CON	INV	Q-OP.	-INV	CON
(I) EMHK MEAN SQUARE:								
BETWEEN GP.	6.20	81.49	313.26	114.28	4.82	80.27	313.26	112.15
WITHIN GP.	2.34	1.89	11.00	1.85	1.73	1.81	11.00	1.82
F RATIO	2.64	*42.99	*28.46	*61.75	2.77	*44.21	*28.46	*61.76
(II) CMHK MEAN SQUARE:								
BETWEEN GP.	48.82	16.16	116.26	70.07	25.09	14.15	116.26	61.09
WITHIN GP.	4.43	3.58	10.29	3.69	2.07	3.31	10.29	3.14
F.RATIO	*11.03	*4.51	*11.29	*18.98	*12.14	*4.28	*11.29	*19.48
(III) CMG MEAN SQUARE:								
BETWEEN GP.	48.42	58.96	544.06	233.62	8.96	37.62	414.28	130.20
WITHIN GP.	2.79	3.98	3.63	1.53	1.33	2.57	2.31	0.89
F RATIO	*17.31	*14.82	*149.67	*152.36	*6.72	*14.63	*178.76	*145.55

P < 0.05 DF BETWEEN=2 DF WITHIN=42 F.CRIT=3.22

Appendix 11c

Table (34). Scheffé Tests: Subjects' Performance on the YN-Rules and EYN-Rules

	OP YN-Q INV	Q-OP.	EYN-Q -INV	CON	DC YN-Q INV	Q-OP.	EYN-Q -INV	CON	GJ YN-Q INV	Q-OP.	EYN-Q -INV	CON
(I) EMHK COMPARISONS:												
P6 Vs S2	*2.55	*3.47	*2.80	*4.09	2.29	2.12	2.45	*4.47	2.48	*2.94	1.15	1.27
P6 Vs S4	*2.73	*3.09	*5.01	*6.09	*3.12	*3.39	*4.90	*7.23	*2.79	*3.69	1.41	0.99
S2 Vs S4	0.18	0.38	2.20	1.99	0.83	1.27	2.45	*2.76	0.31	0.75	0.26	0.28
(II) CMHK COMPARISONS:												
P6 Vs S2	*3.05	2.48	*3.75	1.75	*3.95	2.52	*3.17	0.00	*3.15	0.99	*2.42	1.00
P6 Vs S4	*2.88	2.07	*2.94	1.92	*5.20	*3.68	2.30	*2.61	*3.35	*2.56	2.16	1.07
S2 Vs S4	1.70	0.41	0.80	1.75	1.26	1.16	0.86	*2.61	2.03	1.58	1.87	0.07
(III) CMG COMPARISONS:												
P6 Vs S2.	*3.51	*2.91	2.02	0.00	*4.61	*3.98	1.24	0.00	0.06	0.35	2.10	0.25
P6 Vs S4	*4.54	*4.36	*5.81	*7.10	*4.61	*4.43	*11.04	*19.36	0.39	0.35	2.06	0.12
S2 Vs S4	1.02	1.45	*3.77	*7.10	0.00	0.46	*12.29	*19.36	0.45	0.71	*4.17	0.37

	CR(E) YN-Q INV	Q-OP.	EYN-Q -INV	CON	CR(C) YN-Q INV	Q-OP.	EYN-Q -INV	CON
(I) EMHK COMPARISONS:								
P6 Vs S2.	1.79	*7.82	*4.57	*8.19	1.80	*7.85	*4.04	*4.45
P6 Vs S4	2.15	*8.22	*7.48	*10.60	2.22	*8.40	*6.99	*6.97
S2 Vs S4	0.36	0.39	*2.92	2.41	0.42	0.54	*2.95	2.51
(II) CMHK COMPARISONS:								
P6 Vs S2	*3.12	1.74	0.65	2.19	*4.06	1.71	0.65	0.21
P6 Vs S4	*4.59	*2.99	*4.35	*6.08	*4.45	*2.91	*4.35	*3.73
S2 Vs S4	1.47	1.25	*3.70	*3.90	0.38	1.20	*3.70	*3.52
(III) CMG COMPARISONS:								
P6 Vs S2	*3.82	*4.67	1.17	0.44	2.21	*4.44	1.35	1.89
P6 Vs S4	*5.79	*4.76	*7.35	*15.33	*3.64	*4.89	*7.16	*22.57
S2 Vs S4	1.97	0.09	*8.52	*14.89	1.42	0.45	*8.51	*23.76

P < 0.05 DF BETWEEN=2 DF WITHIN=42 T.CRIT=2.53

Table (35a). ANOVA: The EMHK Subjects' Performance Between the Different Rules in Each of the Tasks

ORAL PRODUCTION: Tests involving 'OP:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	94425.34	264	357.67		
OP:RULE	62580.88	6	10430.15	29.16	.000

DIALOGUE COMPLETION: Tests involving 'DC:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	113907.63	264	431.47		
DC:RULE	61608.28	6	10268.05	23.80	.000

GRAMMATICALITY JUDGMENT: Tests involving 'GJ:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	50691.57	264	192.01		
GJ:RULE	45967.03	6	7661.17	39.90	.000

CORRECTION (EXPLAINING): Tests involving 'CR(E):RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	70021.12	264	265.23		
CR(E):RULE	63241.12	6	10540.19	39.74	.000

CORRECTION (CORRECTING ERRORS): Tests involving 'CR(C):RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	123916.50	264	469.38		
CR(C):RULE	89311.43	6	14885.24	31.71	.000

Table (35b). ANOVA: The CMHK Subjects' Performance Between the Different Rules in Each of the Tasks

ORAL PRODUCTION: Tests involving 'OP:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	74386.26	264	281.77		
OP:RULE	150656.65	6	25109.44	89.11	.000

DIALOGUE COMPLETION: Tests involving 'DC:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	108945.01	264	412.67		
DC:RULE	230490.47	6	38415.08	93.09	.000

GRAMMATICALITY JUDGMENT: Tests involving 'GJ:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	75912.97	264	287.55		
GJ:RULE	89335.67	6	14889.28	51.78	.000

CORRECTION (EXPLAINING): Tests involving 'CR(E):RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	79196.91	264	299.99		
CR(E):RULE	168685.59	6	28114.26	93.72	.000

CORRECTION (CORRECTING ERRORS): Tests involving 'CR(C):RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	124216.05	264	470.52		
CR(C):RULE	178992.04	6	29832.01	63.40	.000

Table (35c). ANOVA: The CMG Subjects' Performance Between the Different Rules in Each of the Tasks

ORAL PRODUCTION: Tests involving 'OP:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	71794.19	264	271.95		
OP:RULE	70463.70	6	11743.95	43.18	.000

DIALOGUE COMPLETION: Tests involving 'DC:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	128287.11	264	485.94		
DC:RULE	81645.34	6	13607.56	28.00	.000

GRAMMATICALITY JUDGMENT: Tests involving 'GJ:RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	77391.91	264	293.15		
GJ:RULE	41040.32	6	6840.05	23.33	.000

CORRECTION (EXPLAINING): Tests involving 'CR(E):RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	88700.18	264	335.99		
C(R)E: RULE	112317.79	6	18719.63	55.72	.000

CORRECTION (CORRECTING ERRORS): Tests involving 'CR(C):RULE' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	127257.00	264	482.03		
CR(C): RULE	109135.61	6	18189.27	37.73	.000

Table (36a). Scheffé Tests: The EMHK Subjects' Performance on the Different Rules In Each of the Tasks

(I) ORAL PRODUCTION

		EYN:CON.	EYN:-INV	WH:INV	WH:Q-OP.	WHP	YN:Q-OP.	YN:INV
CELL MEANS		42.22	52.22	64.97	65.55	79.39	80.37	81.85
CELL TOTALS		1899.90	2349.90	2923.65	2949.75	3572.55	3616.65	3683.25
EYN:CON.	1899.90	0	450.00	1023.75*	1049.85*	1672.65*	1716.75*	1783.35*
EYN:-INV	2349.90		0	573.75	599.85	1222.65*	1266.75*	1333.35*
WH:INV	2923.65			0	26.10	648.90	693.00*	759.60*
WH:Q-OP.	2949.75				0	622.80	666.90	733.50*
WHP	3572.55					0	44.10	110.70
YN:Q-OP.	3616.65						0	66.60
YN:INV	3683.25							0

df = 264 N = 45 MSE = 357.67 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 679.65 *p = 0.05

(II) DIALOGUE COMPLETION

		EYN:CON.	EYN:-INV	WH:Q-OP.	WH:INV	YN:Q-OP.	YN:INV	WHP
CELL MEANS		48.88	55.55	75.26	77.19	84.07	85.18	86.78
CELL TOTALS		2199.60	2499.75	3386.70	3473.55	3783.15	3833.10	3905.10
EYN:CON.	2199.60	0	300.15	1187.10*	1273.95*	1583.55*	1633.50*	1705.50*
EYN:-INV	2499.75		0	886.95*	973.80*	1283.40*	1333.35*	1405.35*
WH:Q-OP.	3386.70			0	86.85	396.45	446.40	518.40
WH:INV	3473.55				0	309.60	359.55	431.55
YN:Q-OP.	3783.15					0	49.95	121.95
YN:INV.	3833.10						0	72.00
WHP	3905.10							0

df = 264 N = 45 MSE = 431.47 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 746.49 *p = 0.05

(III) GRAMMATICALITY JUDGMENT

		YN:Q-OP.	EYN:-INV	YN:INV	EYN:CON.	WH:INV	WH:Q-OP.	WHP
CELL MEANS		37.96	39.44	41.85	43.14	47.68	48.33	76.04
CELL TOTALS		1708.20	1774.80	1883.25	1941.30	2145.60	2174.85	3421.80
YN:Q-OP.	1708.20	0	66.60	175.05	233.10	437.40	466.65	1713.60*
EYN:-INV	1774.80		0	108.45	166.50	370.80	400.05	1647.00*
YN:INV	1883.25			0	58.05	262.35	291.60	1538.55*
EYN:CON.	1941.30				0	204.30	233.55	1480.50*
WH:INV	2145.60					0	29.25	1276.20*
WH:Q-OP.	2174.85						0	1246.95*
WHP	3421.80							0

df = 264 N = 45 MSE = 192.01 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 497.98 *p = 0.05

(IV) CORRECTION (EXPLAINING)

		EYN:-INV	WH:Q-OP.	YN:Q-OP.	EYN:CON.	WH:INV	YN:INV	WHP
CELL MEANS		28.14	39.81	40.24	40.49	48.05	62.22	73.05
CELL TOTALS		1266.30	1791.45	1810.80	1822.05	2162.25	2799.90	3287.25
EYN:-INV	1266.30	0	525.15	544.50	555.75	895.95*	1533.60*	2020.95*
WH:Q-OP.	1791.45		0	19.35	30.60	370.80	1008.45*	1495.80*
YN:Q-OP.	1810.80			0	11.25	351.45	989.10*	1476.45*
EYN:CON.	1822.05				0	340.20	977.85*	1465.20*
WH:INV	2162.25					0	637.65*	1125.00*
YN:INV	2799.90						0	487.35
WHP	3287.25							0

df = 264 N = 45 MSE = 265.23 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 585.27 *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

		EYN:-INV	WH:Q-OP.	YN:Q-OP.	EYN:CON.	WH:INV	YN:INV	WHP
CELL MEANS		42.22	59.44	60.00	60.37	71.57	86.29	95.87
CELL TOTALS		1899.90	2674.80	2700.00	2716.65	3220.65	3883.05	4314.15
EYN:-INV	1899.90	0	774.90	800.10*	816.75*	1320.75*	1983.15*	2414.25*
WH:Q-OP.	2674.80		0	25.20	41.85	545.85	1208.25*	1639.35*
YN:Q-OP.	2700.00			0	16.65	520.65	1183.05*	1614.15*
EYN:CON.	2716.65				0	504.00	1166.40*	1597.50*
WH:INV	3220.65					0	662.40	1093.50*
YN:INV	3883.05						0	431.10
WHP	4314.15							0

df = 264 N = 45 MSE = 469.38 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 778.59 *p = 0.05

Table (36b). Scheffé Tests: The CMHK Subjects' Performance on the Different Rules In Each of the Tasks

(I) ORAL PRODUCTION

		EYN:CON.	EYN:-INV	WH:INV	WH:Q-OP.	YN:INV	YN:Q-OP.	WHP
CELL MEANS		4.44	23.07	41.73	44.34	60.74	62.59	71.20
CELL TOTALS		199.80	1038.15	1877.85	1995.30	2733.30	2816.55	3204.00
EYN:CON.	199.80	0	838.35*	1678.05*	1795.50*	2533.50*	2616.75*	3004.20*
EYN:-INV	1038.15		0	839.70*	957.15*	1695.15*	1778.40*	2165.85*
WH:INV	1877.85			0	117.45	855.45*	938.70*	1326.15*
WH:Q-OP.	1995.30				0	738.00*	821.25*	1208.70*
YN:INV	2733.30					0	83.25	470.70
YN:Q-OP.	2816.55						0	387.45
WHP	3204.00							0

df = 264 N = 45 MSE = 281.77 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 603.25 *p = 0.05

(II) DIALOGUE COMPLETION

		EYN:CON.	EYN:-INV	WH:INV	WH:Q-OP.	YN:INV	YN:Q-OP.	WHP
CELL MEANS		6.66	26.66	58.11	59.08	77.78	80.74	82.97
CELL TOTALS		299.70	1199.70	2614.95	2658.60	3500.10	3633.30	3733.65
EYN:CON.	299.70	0	900.00*	2315.25*	2358.90*	3200.40*	3333.60*	3433.95*
EYN:-INV	1199.70		0	1415.25*	1458.90*	2300.40*	2433.60*	2533.95*
WH:INV	2614.95			0	43.65	885.15*	1018.35*	1118.70*
WH:Q-OP.	2658.60				0	841.50*	974.70*	1075.05*
YN:INV	3500.10					0	133.20	233.55
YN:Q-OP.	3633.30						0	100.35
WHP	3733.65							0

df = 264 N = 45 MSE = 412.67 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 730.04 *p = 0.05

(III) GRAMMATICALITY JUDGMENT

		YN:Q-OP.	EYN:-INV	WH:Q-OP.	EYN:CON.	WH:INV	YN:INV	WHP
CELL MEANS		23.88	31.11	32.77	34.62	40.85	56.48	76.48
CELL TOTALS		1074.60	1399.95	1474.65	1557.90	1838.25	2541.60	3441.60
YN:Q-OP.	1074.60	0	325.35	400.05	483.30	763.65*	1467.00*	2367.00*
EYN:-INV	1399.95		0	74.70	157.95	438.30	1141.65*	2041.65*
WH:Q-OP.	1474.65			0	83.25	363.60	1066.95*	1966.95*
EYN:CON.	1557.90				0	280.35	983.70*	1883.70*
WH:INV	1838.25					0	703.35*	1603.35*
YN:INV	2541.60						0	900.00*
WHP	3441.60							0

df = 264 N = 45 MSE = 287.55 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 609.40 *p = 0.05

(IV) CORRECTION (EXPLAINING)

		EYN:-INV	EYN:CON.	YN:Q-OP.	WH:Q-OP.	WH:INV	YN:INV	WHP
CELL MEANS		16.29	23.70	26.91	28.14	45.98	70.12	81.08
CELL TOTALS		733.05	1066.50	1210.95	1266.30	2069.10	3155.40	3648.60
EYN:-INV	733.05	0	333.45	477.90	533.25	1336.05*	2422.35*	2915.55*
EYN:CON.	1066.50		0	144.45	199.80	1002.60*	2088.90*	2582.10*
YN:Q-OP.	1210.95			0	55.35	858.15*	1944.45*	2437.65*
WH:Q-OP.	1266.30				0	802.80*	1889.10*	2382.30*
WH:INV	2069.10					0	1086.30*	1579.50*
YN:INV	3155.40						0	493.20
WHP	3648.60							0

df = 264 N = 45 MSE = 299.99 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 622.44 *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

		EYN:-INV	EYN:CON.	YN:Q-OP.	WH:Q-OP.	WH:INV	YN:INV	WHP
CELL MEANS		24.44	34.07	38.14	40.41	62.68	83.70	90.27
CELL TOTALS		1099.80	1533.15	1716.30	1818.45	2820.60	3766.50	4062.15
EYN:-INV	1099.80	0	433.35	616.50	718.65	1720.80*	2666.70*	2962.35*
EYN:CON.	1533.15		0	183.15	285.30	1287.45*	2233.35*	2529.00*
YN:Q-OP.	1716.30			0	102.15	1104.30*	2050.20*	2345.85*
WH:Q-OP.	1818.45				0	1002.15*	1948.05*	2243.70*
WH:INV	2820.60					0	945.90*	1241.55*
YN:INV	3766.50						0	295.65
WHP	4062.15							0

df = 264 N = 45 MSE = 470.52 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 779.54 *p = 0.05

Table (36c). Scheffé Tests: The CMG Subjects' Performance on the Different Rules In Each of the Tasks

(I) ORAL PRODUCTION

		EYN:CON.	WH:INV	WH:Q-OP.	EYN:-INV	YN:Q-OP.	YN:INV	WHP
CELL MEANS		18.51	37.68	38.06	39.62	60.00	60.37	61.52
CELL TOTALS		832.95	1695.60	1712.70	1782.90	2700.00	2716.65	2768.40
EYN:CON.	832.95	0	862.65*	879.75*	949.95*	1867.05*	1883.70*	1935.45*
WH:INV	1695.60		0	17.10	87.30	1004.40*	1021.05*	1072.80*
WH:Q-OP.	1712.70			0	70.20	987.30*	1003.95*	1055.70*
EYN:-INV	1782.90				0	917.10*	933.75*	985.50*
YN:Q-OP.	2700.00					0	16.65	68.40
YN:INV	2716.65						0	51.75
WHP	2768.40							0

df = 264 N = 45 MSE = 271.95 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 592.64 *p = 0.05

(II) DIALOGUE COMPLETION

		EYN:CON.	EYN:-INV	WH:Q-OP.	WH:INV	YN:Q-OP.	YN:INV	WHP
CELL MEANS		30.74	33.33	53.86	55.94	68.14	68.88	74.71
CELL TOTALS		1383.30	1499.85	2423.70	2517.30	3066.30	3099.60	3361.95
EYN:CON.	1383.30	0	116.55	1040.40*	1134.00*	1683.00*	1716.30*	1978.65*
EYN:-INV	1499.85		0	923.85*	1017.45*	1566.45*	1599.75*	1862.10*
WH:Q-OP.	2423.70			0	93.60	642.60	675.90	938.25*
WH:INV	2517.30				0	549.00	582.30	844.65*
YN:Q-OP.	3066.30					0	33.30	295.65
YN:INV	3099.60						0	262.35
WHP	3361.95							0

df = 264 N = 45 MSE = 485.94 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 792.21 *p = 0.05

(III) GRAMMATICALITY JUDGMENT

		YN:Q-OP.	WH:Q-OP.	EYN:-INV	WH:INV	EYN:CON.	YN:INV	WHP
CELL MEANS		38.33	39.02	43.24	45.00	50.18	62.59	70.64
CELL TOTALS		1724.85	1755.90	1945.80	2025.00	2258.10	2816.55	3178.80
YN:Q-OP.	1724.85	0	31.05	220.95	300.15	533.25	1091.70*	1453.95*
WH:Q-OP.	1755.90		0	189.90	269.10	502.20	1060.65*	1422.90*
EYN:-INV	1945.80			0	79.20	312.30	870.75*	1233.00*
WH:INV	2025.00				0	233.10	791.55*	1153.80*
EYN:CON.	2258.10					0	558.45	920.70*
YN:INV	2816.55						0	362.25
WHP	3178.80							0

df = 264 N = 45 MSE = 293.15 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 615.31 *p = 0.05

(IV) CORRECTION (EXPLAINING)

		EYN:-INV	EYN:CON.	WH:Q-OP.	YN:Q-OP.	WH:INV	YN:INV	WHP
CELL MEANS		25.55	32.35	38.91	44.69	50.70	75.06	78.45
CELL TOTALS		1149.75	1455.75	1750.95	2011.05	2281.50	3377.70	3530.25
EYN:-INV	1149.75	0	306.00	601.20	861.30*	1131.75*	2227.95*	2380.50*
EYN:CON.	1455.75		0	295.20	555.30	825.75*	1921.95*	2074.50*
WH:Q-OP.	1750.95			0	260.10	530.55	1626.75*	1779.30*
YN:Q-OP.	2011.05				0	270.45	1366.65*	1519.20*
WH:INV	2281.50					0	1096.20*	1248.75*
YN:INV	3377.70						0	152.55
WHP	3530.25							0

df = 264 N = 45 MSE = 335.99 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 658.73 *p = 0.05

(V) CORRECTION (CORRECTING ERRORS)

		EYN:-INV	EYN:CON.	WH:Q-OP.	YN:Q-OP.	WH:INV	WHP	YN:INV
CELL MEANS		34.63	38.88	52.59	58.14	65.50	83.98	85.92
CELL TOTALS		1558.35	1749.60	2366.55	2616.30	2947.50	3779.10	3866.40
EYN:-INV	1558.35	0	191.25	808.20*	1057.95*	1389.15*	2220.75*	2308.05*
EYN:CON.	1749.60		0	616.95	866.70*	1197.90*	2029.50*	2116.80*
WH:Q-OP.	2366.55			0	249.75	580.95	1412.55*	1499.85*
YN:Q-OP.	2616.30				0	331.20	1162.80*	1250.10*
WH:INV	2947.50					0	831.60*	918.90*
WHP	3779.10						0	87.30
YN:INV	3866.40							0

df = 264 N = 45 MSE = 482.03 k-1 = 7 F crit = 2.05 p = 0.05
F s = 14.35 t'crit = 789.01 *p = 0.05

Table (37a). ANOVA: The EMHK Subjects' Performance on the Rules Between Tasks

Tests involving 'WHP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	17540.88	176	99.66		
WHP	15191.07	4	3797.77	38.11	.000

Tests involving 'WH:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	26148.06	176	148.57		
WH:INV	32886.40	4	8221.60	55.34	.000

Tests involving 'WH:QOP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	29043.61	176	165.02		
WH:QOP	35141.38	4	8785.34	53.24	.000

Tests involving 'YN:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	44141.98	176	250.81		
YN:INV	66530.86	4	16632.72	66.32	.000

Tests involving 'YN:QOP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	56096.16	176	318.73		
YN:QOP	84101.37	4	21025.34	65.97	.000

Tests involving 'EYN:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	100251.54	176	569.61		
EYN:INV	21382.72	4	5345.68	9.38	.000

Tests involving 'EYN:CON' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	115905.21	176	658.55		
EYN:CON	11804.66	4	2951.17	4.48	.002

Table (37b). ANOVA: The CMHK Subjects' Performance on the Rules Between Tasks

Tests involving 'WHP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	18455.56	176	104.86		
WHP	9202.32	4	2300.58	21.94	.000

Tests involving 'WH:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	25799.84	176	146.59		
WH:INV	17759.32	4	4439.83	30.29	.000

Tests involving 'WH:QOP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	28469.86	176	161.76		
WH:QOP	25707.43	4	6426.86	39.73	.000

Tests involving 'YN:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	71886.69	176	408.45		
YN:INV	23242.94	4	5810.73	14.23	.000

Tests involving 'YN:QOP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	51511.80	176	292.68		
YN:QOP	107821.54	4	26955.38	92.10	.000

Tests involving 'EYN:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	93763.89	176	532.75		
EYN:INV	5234.57	4	1308.64	2.46	.047

Tests involving 'EYN:CON' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	77739.51	176	441.70		
EYN:CON	37939.51	4	9484.88	21.47	.000

Table (37c). ANOVA: The CMG Subjects' Performance on the Rules Between Tasks

Tests involving 'WHP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	23997.97	176	136.35		
WHP	12908.08	4	3227.02	23.67	.000

Tests involving 'WH:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	38573.93	176	219.17		
WH:INV	20178.58	4	5044.65	23.02	.000

Tests involving 'WH:QOP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	35614.67	176	202.36		
WH:QOP	11504.15	4	2876.04	14.21	.000

Tests involving 'YN:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	77104.80	176	438.10		
YN:INV	19191.50	4	4797.87	10.95	.000

Tests involving 'YN:QOP' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	71614.68	176	406.90		
YN:QOP	26342.11	4	6585.53	16.18	.000

Tests involving 'EYN:INV' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	76800.93	176	436.37		
EYN:INV	8148.15	4	2037.04	4.67	.001

Tests involving 'EYN:CON' Within-Subject Effect.

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN CELLS	100371.06	176	570.29		
EYN:CON	24246.23	4	6061.56	10.63	.000

Appendix 11g

Table (38a). Scheffé Tests: The EMHK Subjects' Performance on the Rules Between Tasks

(I) WH-PREPOSING BETWEEN TASKS

		CR(E)WHP	GJWHP	OPWHP	DCWHP	CR(C)WHP
CELL MEANS		73.05	76.04	79.39	86.78	95.87
CELL TOTALS		3287.25	3421.80	3572.55	3905.10	4314.15
CR(E)WHP	3287.25	0	134.55	285.30	617.85*	1026.90*
GJWHP	3421.80		0	150.75	483.30*	892.35*
OPWHP	3572.55			0	332.55*	741.60*
DCWHP	3905.10				0	409.05*
CR(C)WHP	4314.15					0

df = 176 N = 45 MSE = 99.66 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 318.36 *p = 0.05

(II) INVERSION IN WH-QS BETWEEN TASKS

		GJWHI	CR(E)WHI	OPWHI	CR(C)WHI	DCWHI
CELL MEANS		47.68	48.05	64.97	71.57	77.19
CELL TOTALS		2145.60	2162.25	2923.65	3220.65	3473.55
GJWHI	2145.60	0	16.65	778.05*	1075.05*	1327.95*
CR(E)WHI	2162.25		0	761.40*	1058.40*	1311.30*
OPWHI	2923.65			0	297.00	549.90*
CR(C)WHI	3220.65				0	252.90
DCWHI	3473.55					0

df = 176 N = 45 MSE = 148.57 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 388.71 *p = 0.05

(III) SUPPLY OF Q-OPERATOR IN WH-QS BETWEEN TASKS

		CR(E)QOP	GJQOP	CR(C)QOP	OPQOP	DCQOP
CELL MEANS		39.81	48.33	59.44	65.55	75.26
CELL TOTALS		1791.45	2174.85	2674.80	2949.75	3386.70
CR(E)QOP	1791.45	0	383.40	883.35*	1158.30*	1595.25*
GJQOP	2174.85		0	499.95*	774.90*	1211.85*
CR(C)QOP	2674.80			0	274.95	711.90*
OPQOP	2949.75				0	436.95*
DCQOP	3386.70					0

df = 176 N = 45 MSE = 165.02 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 409.66 *p = 0.05

(IV) INVERSION IN IN YN-QS BETWEEN TASKS

		GJYNI	CR(E)YNI	OPYNI	DCYNI	CR(C)YNI
CELL MEANS		41.85	62.22	81.85	85.18	86.29
CELL TOTALS		1883.25	2799.90	3683.25	3833.10	3883.05
GJYNI	1883.25	0	916.65*	1800.00*	1949.85*	1999.80*
CR(E)YNI	2799.90		0	883.35*	1033.20*	1083.15*
OPYNI	3683.25			0	149.85	199.80
DCYNI	3833.10				0	49.95
CR(C)YNI	3883.05					0

df = 176 N = 45 MSE = 250.81 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 505.05 *p = 0.05

(V) SUPPLY OF Q-OPERATOR IN YN-QS BETWEEN TASKS

		GJQOP	CR(E)QOP	CR(C)QOP	OPQOP	DCQOP
CELL MEANS		37.96	40.24	60.00	80.73	84.07
CELL TOTALS		1708.20	1810.80	2700.00	3632.85	3783.15
GJQOP	1708.20	0	102.60	991.80*	1924.65*	2074.95*
CR(E)QOP	1810.80		0	889.20*	1822.05*	1972.35*
CR(C)QOP	2700.00			0	932.85*	1083.15*
OPQOP	3632.85				0	150.30
DCQOP	3783.15					0

df = 176 N = 45 MSE = 318.73 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 569.34 *p = 0.05

(VI) NON-INVERSION IN EYN-QS BETWEEN TASKS

	CR(E)-INV	GJ-INV	CR(C)-INV	OP-INV	DC-INV
CELL MEANS	28.14	39.44	42.22	52.22	55.55
CELL TOTALS	1266.30	1774.80	1899.90	2349.90	2499.75
CR(E)-INV 1266.30	0	508.50	633.60	1083.60*	1233.45*
GJ-INV 1774.80		0	125.10	575.10	724.95
CR(C)-INV 1899.90			0	450.00	599.85
OP-INV 2349.90				0	149.85
DC-INV 2499.75					0

df = 176 N = 45 MSE = 569.61 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 761.11 *p = 0.05

(VII) SUPPLY OF CONNECTIVE IN EYN-QS BETWEEN TASKS

	CR(E)CON	OPCON	GJCON	DCCON	CR(C)CON
CELL MEANS	40.49	42.22	43.14	48.88	60.37
CELL TOTALS	1822.05	1899.90	1941.30	2199.60	2716.65
CR(E)CON 1822.05	0	77.85	119.25	377.55	894.60*
OPCON 1899.90		0	41.40	299.70	816.75
GJCON 1941.30			0	258.30	775.35
DCCON 2199.60				0	517.05
CR(C)CON 2716.65					0

df = 176 N = 45 MSE = 658.55 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 818.38 *p = 0.05

Table (38b). Scheffé Tests: The CMHK Subjects' Performance on the Rules Between Tasks

(I) WH-PREPOSING BETWEEN TASKS

	OPWHP	GJWHP	CR(E)WHP	DCWHP	CR(C)WHP
CELL MEANS	71.20	76.48	81.08	82.97	90.27
CELL TOTALS	3204.00	3441.60	3648.60	3733.65	4062.15
OPWHP 3204.00	0	237.60	444.60*	529.65*	858.15*
GJWHP 3441.60		0	207.00	292.05	620.55*
CR(E)WHP 3648.60			0	85.05	413.55*
DCWHP 3733.65				0	328.50*
CR(C)WHP 4062.15					0

df = 176 N = 45 MSE = 104.86 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 326.56 *p = 0.05

(II) INVERSION IN WH-QS BETWEEN TASKS

	GJWHI	OPWHI	CR(E)WHI	DCWHI	CR(C)WHI
CELL MEANS	40.85	41.73	45.98	58.11	62.68
CELL TOTALS	1838.25	1877.85	2069.10	2614.95	2820.60
GJWHI 1838.25	0	39.60	230.85	776.70*	982.35*
OPWHI 1877.85		0	191.25	737.10*	942.75*
CR(E)WHI 2069.10			0	545.85*	751.50*
DCWHI 2614.95				0	205.65
CR(C)WHI 2820.60					0

df = 176 N = 45 MSE = 146.59 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 386.11 *p = 0.05

(III) SUPPLY OF Q-OPERATORS IN WH-QS BETWEEN TASKS

	CR(E)QOP	GJQOP	CR(C)QOP	OPQOP	DCQOP
CELL MEANS	28.14	32.77	40.41	44.34	59.08
CELL TOTALS	1266.30	1474.65	1818.45	1995.30	2658.60
CR(E)QOP 1266.30	0	208.35	552.15*	729.00*	1392.30*
GJQOP 1474.65		0	343.80	520.65*	1183.95*
CR(C)QOP 1818.45			0	176.85	840.15*
OPQOP 1995.30				0	663.30*
DCQOP 2658.60					0

df = 176 N = 45 MSE = 161.76 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 405.60 *p = 0.05

(IV) INVERION IN YN-QS BETWEEN TASKS

		GJYNI	OPYNI	CR(E)YNI	DCYNI	CR(C)YNI
CELL MEANS		56.48	60.74	70.12	77.78	83.70
CELL TOTALS		2541.60	2733.30	3155.40	3500.10	3766.50
GJYNI	2541.60	0	191.70	613.80	958.50*	1224.90*
OPYNI	2733.30		0	422.10	766.80*	1033.20*
CR(E)YNI	3155.40			0	344.70	611.10
DCYNI	3500.10				0	266.40
CR(C)YNI	3766.50					0

df = 176 N = 45 MSE = 408.45 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 644.51 *p = 0.05

(V) SUPPLY OF Q-OPERATOR IN YN-QS BETWEEN TASKS

		GJQOP	CR(E)QOP	CR(C)QOP	OPQOP	DCQOP
CELL MEANS		23.88	26.91	38.14	62.59	80.74
CELL TOTALS		1074.60	1210.95	1716.30	2816.55	3633.30
GJQOP	1074.60	0	136.35	641.70*	1741.95*	2558.70*
CR(E)QOP	1210.95		0	505.35	1605.60*	2422.35*
CR(C)QOP	1716.30			0	1100.25*	1917.00*
OPQOP	2816.55				0	816.75*
DCQOP	3633.30					0

df = 176 N = 45 MSE = 292.68 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 545.58 *p = 0.05

(VI) NON-INVERSION IN EYN-QS BETWEEN TASKS

		CR(E)-INV	OP-INV	CR(C)-INV	DC-INV	GJ-INV
CELL MEANS		16.29	23.07	24.44	26.66	31.11
CELL TOTALS		733.05	1038.15	1099.80	1199.70	1399.95
CR(E)-INV	733.05	0	305.10	366.75	466.65	666.90
OP-INV	1038.15		0	61.65	161.55	361.80
CR(C)-INV	1099.80			0	99.90	300.15
DC-INV	1199.70				0	200.25
GJ-INV	1399.95					0

df = 176 N = 45 MSE = 532.75 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 736.08 *p = 0.05

(VII) SUPPLY OF CONNECTIVE IN EYN-QS BETWEEN TASKS

		OPCON	DCCON	CR(E)CON	CR(C)CON	GJCON
CELL MEANS		4.44	6.66	23.07	34.07	34.62
CELL TOTALS		199.80	299.70	1038.15	1533.15	1557.90
OPCON	199.80	0	99.90	838.35*	1333.35*	1358.10*
DCCON	299.70		0	738.45*	1233.45*	1258.20*
CR(E)CON	1038.15			0	495.00	519.75
CR(C)CON	1533.15				0	24.75
GJCON	1557.90					0

df = 176 N = 45 MSE = 441.70 k-1 =5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 670.23 *p = 0.05

Table (38c). Scheffé Tests: The CMG Subjects' Performance on the Rules Between Tasks

(I) WH-PREPOSING BETWEEN TASKS

		OPWHP	GJWHP	DCWHP	CR(E)WHP	CR(C)WHP
CELL MEANS		61.52	70.64	74.71	78.45	83.98
CELL TOTALS		2768.40	3178.80	3361.95	3530.25	3779.10
OPWHP	2768.40	0	410.40*	593.55*	761.85*	1010.70*
GJWHP	3178.80		0	183.15	351.45	600.30*
DCWHP	3361.95			0	168.30	417.15*
CR(E)WHP	3530.25				0	248.85
CR(C)WHP	3779.10					0

df = 176 N = 45 MSE = 136.35 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 372.38 *p = 0.05

(II) INVERSION IN WH-QS BETWEEN TASKS

		OPWHI	GJWHI	CR(E)WHI	DCWHI	CR(C)WHI
CELL MEANS		37.68	45.00	50.70	55.94	65.50
CELL TOTALS		1695.60	2025.00	2281.50	2517.30	2947.50
OPWHI	1695.60	0	329.40	585.90*	821.70*	1251.90*
GJWHI	2025.00		0	256.50	492.30*	922.50*
CR(E)WHI	2281.50			0	235.80	666.00*
DCWHI	2517.30				0	430.20
CR(C)WHI	2947.50					0

df = 176 N = 45 MSE = 219.17 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 472.12 *p = 0.05

(III) SUPPLY OF Q-OPERATOR IN WH-QS BETWEEN TASKS

		OPQOP	CR(E)QOP	GJQOP	CR(C)QOP	DCQOP
CELL MEANS		38.06	38.91	39.02	52.59	53.86
CELL TOTALS		1712.70	1750.95	1755.90	2366.55	2423.70
OPQOP	1712.70	0	38.25	43.20	653.85*	711.00*
CR(E)QOP	1750.95		0	4.95	615.60*	672.75*
GJQOP	1755.90			0	610.65*	667.80*
CR(C)QOP	2366.55				0	57.15
DCQOP	2423.70					0

df = 176 N = 45 MSE = 202.36 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 453.65 *p = 0.05

(IV) INVERSION IN YN-QS BETWEEN TASKS

		OPYNI	GJYNI	DCYNI	CR(E)YNI	CR(C)YNI
CELL MEANS		60.37	62.59	68.88	75.06	85.92
CELL TOTALS		2716.65	2816.55	3099.60	3377.70	3866.40
OPYNI	2716.65	0	99.90	382.95	661.05	1149.75*
GJYNI	2816.55		0	283.05	561.15	1049.85*
DCYNI	3099.60			0	278.10	766.80*
CR(E)YNI	3377.70				0	488.70
CR(C)YNI	3866.40					0

df = 176 N = 45 MSE = 438.10 k-1 = 5 F crit = 2.26 p = 0.05
F s = 11.30 t'crit = 667.49 *p = 0.05

(V) SUPPLY OF Q-OPERATOR IN YN-QS BETWEEN TASKS

		GJQOP	CR(E)QOP	CR(C)QOP	OPQOP	DCQOP
CELL MEANS		38.33	44.69	58.14	60.00	68.14
CELL TOTALS		1724.85	2011.05	2616.30	2700.00	3066.30
GJQOP	1724.85	0	286.20	891.45*	975.15*	1341.45*
CR(E)QOP	2011.05		0	605.25	688.95*	1055.25*
CR(C)QOP	2616.30			0	83.70	450.00
OPQOP	2700.00				0	366.30
DCQOP	3066.30					0

df = 176 N = 45 MSE = 406.90 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 643.29 *p = 0.05

(VI) NON-INVERSION IN EYN-QS BETWEEN TASKS

	CR(E)-INV	DC-INV	CR(C)-INV	OP-INV	GJ-INV
CELL MEANS	25.55	33.33	34.63	39.62	43.24
CELL TOTALS	1149.75	1499.85	1558.35	1782.90	1945.80

CR(E)-INV 1149.75	0	350.10	408.60	633.15	796.05*
DC-INV 1499.85		0	58.50	283.05	445.95
CR(C)-INV 1558.35			0	224.55	387.45
OP-INV 1782.90				0	162.90
GJ-INV 1945.80					0

df = 176 N = 45 MSE = 436.37 k-1 = 5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 666.17 *p = 0.05

(VII) SUPPLY OF CONNECTIVE IN EYN-QS BETWEEN TASKS

	OPCON	DCCON	CR(E)CON	CR(C)CON	GJCON
CELL MEANS	18.51	30.74	32.35	38.88	50.18
CELL TOTALS	832.95	1383.30	1455.75	1749.60	2258.10

OPCON 832.95	0	550.35	622.80	916.65*	1425.15*
DCCON 1383.30		0	72.45	366.30	874.80*
CR(E)CON 1455.75			0	293.85	802.35*
CR(C)CON 1749.60				0	508.50
GJCON 2258.10					0

df = 176 N = 45 MSE = 570.29 k-1 =5 F crit =2.26 p = 0.05
F s = 11.30 t'crit = 761.57 *p = 0.05

Appendix 12a

TABLE (39a). RASCH PARTIAL CREDIT ANALYSIS OF OP TASK

GROUP 1. EMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	0.66	-1.86	-4.07	---	-4.07	1.56	0.58	1.47		---	1.34	CON
		-0.18	-3.05	-3.05	---	-4.07	1.13	2.26	1.45	-0.80	---	1.24	
	MOD	0.32	-2.31	-4.07	-3.05	-4.07	-0.65	2.53	3.84		---	1.78	
		-1.53	-0.03	-4.07	-3.05	-4.07	-2.31	0.22	2.59	-1.23	---	1.90	
	'DO'	1.66	-0.03	-2.31	-1.86	-4.07	-0.09	4.51	1.78		---	1.78	
		0.09	-3.05	-3.05	-3.05	-4.07	-0.18	1.44	2.35	-0.62	---	1.34	
	MEAN	0.17	-1.72	-3.44	-2.75	-4.07	-0.09	1.92	2.25	-0.89	---	1.56	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-1.86	-0.65	-2.31	---	-0.48	1.78	1.24	2.13		-3.05	1.13	INV
		-0.04	-3.05	-2.31	---	1.13	1.14	2.67	3.16	0.18	-1.53	1.02	
	MOD	0.58	0.58	-1.53	0.22	-1.26	-0.48	0.80	2.26		-1.86	1.56	
		-1.26	-0.48	-0.83	-1.26	-1.86	-2.31	0.46	2.26	-0.26	-3.05	1.45	
	'DO'	0.69	1.02	-0.04	-0.32	-0.04	0.69	4.19	1.90		1.24	0.80	
		0.69	0.34	-0.83	-0.18	-0.65	1.13	0.91	2.01	0.72	0.58	0.45	
	MEAN	-0.20	-0.37	-1.31	-0.39	-0.53	0.33	1.71	2.29	0.21	-1.28	1.07	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
O-OP	COP	-1.86	-0.83	-0.83	---	0.46	2.13	1.24	2.98		-0.83	-2.31	O-OP
		-0.04	-3.05	-1.86	---	0.34	1.34	2.82	3.16	0.43	-1.86	-1.03	
	MOD	0.46	0.34	-1.86	-0.04	-1.86	-0.48	0.46	2.01		-2.31	-1.26	
		-1.26	-1.86	-1.03	-1.53	-3.05	-2.31	0.22	2.01	-0.61	-3.05	-1.53	
	'DO'	0.69	0.91	-0.04	0.32	-0.18	0.69	4.19	1.90		1.24	0.58	
		0.69	0.34	-0.83	-0.18	-0.65	1.13	0.91	2.01	0.74	0.58	0.58	
	MEAN	-0.22	-0.69	-1.08	-0.36	-0.82	0.42	1.64	2.35	0.19	-1.04	-0.83	
OVERALL MEAN		-0.08	-0.93	-1.94	-1.17	-1.81	0.22	1.76	2.29	-0.16	-1.16	0.60	

Rasch Analysis on OP Task : EMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 1.17 Standard Deviation= 0.968
Average Estimated Error = 0.206
Reliability Index = 0.957
Separation Coefficient = 4.69
No. of Reliably Distinct Bands of Ability = 9.72

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.658
Average Estimated Error = 0.526
Reliability Index = 0.909
Separation Coefficient = 3.15
No. of Reliably Distinct Bands of Difficulty = 6.64

TABLE (39b). RASCH PARTIAL CREDIT ANALYSIS OF OP TASK

GROUP 2. CMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-0.20	-3.33	-5.08	---	-3.33	1.41	0.45	1.43		---	3.07	CON
		1.26	-5.08	-5.08	---	-3.33	0.45	1.41	0.03	-1.36	---	4.26	
	MOD	-0.13	-0.10	-1.56	-3.33	-3.33	-0.40	1.92	3.03		---	3.07	
		2.07	0.57	-0.20	2.89	-0.29	-0.86	2.50	1.69	0.28	---	3.52	
	'DO'	0.90	-3.33	-0.90	0.57	-3.33	0.13	2.61	0.85		---	3.52	
		-0.77	0.57	-0.90	-4.07	-3.33	3.01	1.02	0.85	-0.38	---	4.26	
	MEAN	0.52	-1.78	-2.29	-0.99	-2.82	0.62	1.65	1.31	-0.49	---	3.62	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-2.07	-1.24	-1.53	---	0.13	1.87	1.41	2.74		-1.24	2.47	INV
		-1.11	-2.89	-2.30	---	1.55	1.02	2.74	3.07	0.24	-0.19	2.25	
	MOD	0.90	-0.29	-0.51	0.13	-0.29	0.19	1.28	1.55		-2.30	2.74	
		-0.51	-0.86	-0.51	-0.98	-1.11	-0.51	1.55	1.41	0.09	-5.08	1.15	
	'DO'	1.28	2.05	0.56	0.79	1.41	0.90	2.05	1.87		1.87	0.13	
		1.28	1.28	0.67	0.56	0.56	1.15	1.87	2.05	1.27	1.28	1.02	
	MEAN	-0.04	-0.33	-0.60	0.13	0.38	0.77	1.82	2.12	0.53	-0.94	1.63	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
O-OP	COP	-2.30	-1.24	-1.38	---	0.24	2.47	1.28	5.27		-1.38	-1.53	O-OP
		-1.11	-2.89	-1.70	---	0.90	1.28	2.74	3.07	0.47	-0.51	-0.51	
	MOD	0.24	-0.74	-1.24	-1.11	-0.98	-0.19	1.15	1.41		-2.56	-0.51	
		-0.74	-1.11	-1.38	-1.70	-2.07	-0.62	1.41	1.15	-0.41	-5.08	-2.89	
	'DO'	1.28	2.05	0.67	0.79	1.41	0.90	2.05	1.87		1.87	0.24	
		1.28	1.28	0.67	0.56	0.45	1.15	1.87	2.05	1.27	1.28	1.02	
	MEAN	-0.23	-0.44	-0.73	-0.37	-0.01	0.83	1.75	2.47	0.45	-1.06	-0.70	
OVERALL MEAN		0.09	-0.85	-1.21	-0.41	-0.82	0.74	1.74	1.97	0.16	-1.00	1.52	

Rasch Analysis on OP Task : CMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.086 Standard Deviation= 0.910
Average Estimated Error = 0.189
Reliability Index = 0.959
Separation Coefficient = 4.82
No. of Reliably Distinct Bands of Ability = 9.97

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.864
Average Estimated Error = 0.481
Reliability Index = 0.938
Separation Coefficient = 3.87
No. of Reliably Distinct Bands of Difficulty = 8.08

TABLE (39c). RASCH PARTIAL CREDIT ANALYSIS OF OP TASK

GROUP 3 CMG

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-3.31	-3.66	-4.86	---	-0.92	0.89	1.18	2.99		---	1.81	CON
		-1.37	-3.31	-4.86	---	-0.92	1.18	1.18	-1.07	-1.20	---	2.18	
	MOD	-0.40	3.03	-0.98	-0.64	-0.92	4.44	2.93	2.93		---	2.64	
		-1.84	-3.31	-3.31	-0.64	1.60	0.47	1.33	1.09	0.36	---	2.18	
	'DO'	0.44	-3.66	-4.86	-0.64	-1.01	1.03	4.56	-0.13		---	1.81	
		0.77	-3.31	-4.86	-0.78	-1.07	0.89	0.61	0.14	-0.74	---	1.18	
	MEAN	-0.95	-2.37	-3.96	-0.68	-0.54	1.48	1.97	0.99	-0.53	---	1.97	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-2.37	-1.52	-2.78	---	0.06	1.99	1.48	1.18		-2.01	1.18	INV
		0.20	-2.78	-3.66	---	2.64	1.33	3.26	1.81	0.06	-2.01	0.61	
	MOD	0.89	0.20	0.33	0.61	0.75	1.81	2.92	2.64		-0.64	1.99	
		0.61	-0.36	-0.22	0.61	0.06	0.61	1.64	0.61	0.86	-3.03	0.61	
	'DO'	1.81	1.48	0.47	0.47	0.61	1.48	2.40	0.20		1.99	1.07	
		0.89	0.06	0.33	0.33	0.06	1.64	1.81	1.03	0.94	0.33	-0.22	
	MEAN	0.34	-0.49	-0.92	0.51	0.70	1.48	2.25	1.25	0.62	-0.90	0.87	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
O-OP	COP	-2.37	-1.52	-2.37	---	1.03	2.40	1.48	3.72		-1.37	-2.78	O-OP
		0.20	2.78	-3.03	---	2.40	1.81	3.26	1.33	0.79	-2.01	-1.31	
	MOD	0.20	-0.50	0.06	0.20	0.47	1.81	2.92	2.65		-0.64	-0.08	
		0.47	-0.50	-0.64	0.33	-0.36	0.61	1.33	0.33	0.59	-4.12	-2.37	
	'DO'	1.99	1.48	0.47	0.61	0.47	1.48	2.40	0.33		1.99	-1.07	
		0.89	0.06	0.20	0.33	0.06	1.64	1.64	1.03	0.94	0.33	-0.08	
	MEAN	0.23	0.30	-0.89	0.37	0.68	1.63	2.17	1.56	0.77	-0.97	-1.28	
OVERALL MEAN		-0.13	-0.85	-1.92	0.07	0.28	1.53	2.13	1.27	0.29	-0.93	0.52	

Rasch Analysis on OP Task : CMG

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= -0.175 Standard Deviation= 1.493
Average Estimated Error = 0.205
Reliability Index = 0.981
Separation Coefficient = 7.28
No. of Reliably Distinct Bands of Ability = 14.90

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.917
Average Estimated Error = 0.457
Reliability Index = 0.946
Separation Coefficient = 4.19
No. of Reliably Distinct Bands of Difficulty = 8.72

Appendix 12b

TABLE (40a). RASCH PARTIAL CREDIT ANALYSIS OF DC TASK

GROUP 1. EMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	0.33	-3.51	-1.74	---	-2.49	-0.42	2.39	-0.94		---	2.03	CON
		-0.94	-3.51	-2.49	---	-1.28	-0.42	-0.42	1.18	-1.02	---	1.91	
	MOD	1.70	-2.49	-1.74	-2.49	-0.42	-0.66	4.75	1.70		---	1.91	
		0.33	-2.49	-2.49	-1.74	-1.74	-2.49	1.91	4.97	-0.21	---	2.15	
	'DO'	-1.29	-2.49	-2.49	-2.49	-1.74	-0.01	2.66	1.75		---	2.15	
		3.01	-1.74	-2.49	-2.49	-2.49	0.16	2.25	1.37	-0.53	---	2.03	
	MEAN	0.52	-2.71	-2.24	-2.30	-1.69	-0.64	2.26	1.67	-0.59	---	2.03	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	0.33	-0.66	-0.94	---	-0.42	-0.21	-0.21	0.48		-2.49	1.79	INV
		-0.94	-2.49	-2.49	---	1.17	-0.42	3.31	2.15	-0.10	-1.74	1.55	
	MOD	0.16	-1.28	-0.66	-1.74	0.16	-0.66	3.16	2.51		-2.49	1.67	
		0.48	-1.28	-1.28	-0.66	1.18	-1.74	2.15	0.33	0.05	-1.74	1.30	
	'DO'	0.91	-0.01	0.16	-0.01	0.91	0.91	0.63	0.63		0.33	1.91	
		0.91	-0.66	-0.01	0.16	-0.01	0.91	0.16	0.78	0.40	2.15	1.79	
	MEAN	0.31	-1.06	-0.87	-0.56	0.50	-0.20	1.53	1.15	0.12	-1.00	1.67	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
Q-OP	COP	0.33	-0.66	-0.66	---	1.79	0.33	2.77	0.48		-1.74	-1.74	Q-OP
		-0.94	-2.49	-2.49	---	1.67	-0.01	4.67	1.79	0.47	-0.94	0.63	
	MOD	-0.01	-1.74	-1.74	-1.74	-0.42	-0.66	3.03	2.27		-2.49	-0.42	
		0.48	-1.28	-0.66	-0.42	-0.66	-1.74	2.15	-0.01	-0.20	-1.74	-2.49	
	'DO'	0.91	-0.01	-0.01	0.63	0.91	1.05	0.63	0.78		.0.33	2.03	
		0.91	-0.66	0.16	0.78	-0.01	0.91	0.16	0.78	0.50	2.15	2.03	
	MEAN	0.28	-1.14	-0.90	-0.19	0.55	-0.02	2.24	1.02	0.26	-0.74	0.01	
OVERALL MEAN		0.37	-1.64	-1.34	-1.02	-0.22	-0.29	2.01	1.28	-0.07	-0.58	1.24	

Rasch Analysis on DC Task : EMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 1.885 Standard Deviation= 1.15
Average Estimated Error = 0.243
Reliability Index = 0.957
Separation Coefficient = 4.74
No. of Reliably Distinct Bands of Ability =9.81

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.555
Average Estimated Error = 0.575
Reliability Index = 0.880
Separation Coefficient = 2.70
No. of Reliably Distinct Bandsof Difficulty = 5.74

TABLE (40b). RASCH PARTIAL CREDIT ANALYSIS OF DC TASK

GROUP 2. CMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-1.94	-0.61	-2.29	---	-2.76	0.87	4.38	-1.01		---	4.59	COP
		-4.54	-3.51	-3.51	---	-1.94	0.04	0.16	3.12	-0.97	---	4.12	
	MOD	-0.34	-1.01	-3.51	-3.51	-1.66	0.16	2.20	1.25		---	4.12	
		-0.04	-0.11	-4.54	-2.29	-2.76	-0.51	3.86	0.31	-0.78	---	4.12	
	'DO'	-2.76	-4.54	-3.51	-3.51	-3.51	-0.37	0.04	0.43		---	3.77	
		-0.71	-3.17	-4.54	0.52	-3.51	-0.83	2.53	-0.05	-1.72	---	4.12	
	MEAN	-1.72	-2.16	-3.65	-2.20	-2.69	-0.11	2.20	0.68	-1.16	---	4.14	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-1.41	-0.09	-1.41	---	-0.23	0.87	0.75	1.21		-1.41	2.67	INV
		-3.51	-0.67	-2.29	---	0.75	0.40	1.94	1.68	-0.14	-0.67	1.94	
	MOD	0.16	-0.67	-1.20	-0.23	1.56	0.04	1.56	0.64		-2.76	1.81	
		0.40	-0.67	-1.20	-0.83	-0.51	0.64	2.35	1.21	0.20	-1.66	2.21	
	'DO'	1.81	0.87	0.98	0.28	1.56	1.33	1.56	0.98		-0.51	2.21	
		0.87	0.28	0.98	0.98	1.33	0.75	0.75	1.33	1.04	1.33	2.50	
	MEAN	-0.28	-0.16	-0.69	0.05	0.74	0.67	1.49	1.18	0.37	-0.95	2.22	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
0-OP	COP	-3.51	-1.01	-2.29	---	1.33	0.40	4.12	1.56		-1.20	0.16	0-OP
		-1.41	-0.37	-1.41	---	0.52	0.87	1.94	1.21	0.14	-2.29	-1.01	
	MOD	0.16	-1.01	-1.94	-1.01	-0.51	0.52	2.35	0.16		-1.94	-2.76	
		-0.09	-0.83	-1.41	-0.83	-1.01	-0.37	1.33	0.87	-0.23	-3.51	-1.66	
	'DO'	0.87	0.28	0.98	0.98	1.33	1.33	0.75	1.33		1.33	3.49	
		1.81	0.87	0.98	0.40	1.68	0.75	1.56	0.98	1.06	-0.51	2.21	
	MEAN	-0.36	-0.35	-0.85	-0.12	0.56	0.58	2.01	1.02	0.32	-1.35	0.07	
OVERALL MEAN		-0.79	-0.89	-1.73	-0.75	-0.46	0.38	1.90	0.96	-0.16	-0.77	2.15	

Rasch Analysis on DC Task : CMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.918 Standard Deviation= 1.186
Average Estimated Error = 0.207
Reliability Index = 0.97
Separation Coefficient = 5.73
No. of Reliably Distinct Bands of Ability = 11.78

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.800
Average Estimated Error = 0.506
Reliability Index = 0.927
Separation Coefficient = 3.56
No. of Reliably Distinct Bands of Difficulty = 7.45

TABLE (40c) RASCH PARTIAL CREDIT ANALYSIS OF DC TASK

GROUP 3. CMG

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-3.06	-2.39	-3.54	---	-0.48	0.39	3.62	-2.12		---	2.26	CON
		-4.30	-4.30	-5.33	---	-0.30	-0.67	0.22	-1.66	-1.71	---	2.26	
	MOD	0.03	-1.88	-2.39	-0.13	-0.30	-0.48	3.04	0.60		---	2.41	
		-0.20	-0.62	-1.45	-0.30	-0.13	0.72	5.11	-0.19	0.09	---	2.41	
	'DO'	-0.74	-4.30	-3.54	0.05	-0.67	-0.13	0.88	-0.20		---	2.10	
		-0.98	-3.54	-2.69	0.39	-0.48	-0.48	0.22	-0.39	-1.04	---	2.26	
	MEAN	-1.54	-2.84	-3.16	0.00	-0.39	-0.11	2.18	-0.66	-0.99	---	2.28	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-2.69	-2.12	-3.54	---	0.72	0.72	1.65	-0.30		-1.66	2.41	INV
		-4.30	-4.30	-5.33	---	1.80	-0.30	0.39	1.50	-1.15	-3.06	2.10	
	MOD	1.04	0.22	0.05	0.05	0.72	1.50	1.95	0.39		-2.39	2.10	
		0.56	-0.30	0.39	1.04	1.80	0.05	1.65	0.56	0.73	0.39	2.41	
	'DO'	2.10	0.88	1.20	1.95	1.65	1.65	1.65	0.39		0.56	1.50	
		0.88	0.05	1.50	1.95	0.88	0.56	1.20	0.88	1.21	1.95	2.10	
	MEAN	-0.40	-0.93	-0.96	1.25	1.26	0.70	1.42	0.57	0.26	-0.70	2.10	

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
Q-OP	COP	-3.06	-2.12	-3.54	---	2.10	1.20	1.65	1.50		-1.45	-3.06	Q-OP
		-4.30	-4.30	-4.30	---	2.74	-0.30	3.94	-1.24	-0.72	-2.69	-2.39	
	MOD	1.20	0.22	0.88	0.05	0.39	1.65	1.65	0.39		-2.39	-0.67	
		0.72	-0.30	0.39	1.20	0.39	0.22	2.10	0.22	0.71	0.39	-2.39	
	'DO'	1.04	1.04	1.65	2.26	1.65	0.56	1.65	0.39		0.56	1.80	
		2.26	0.05	1.80	1.95	0.88	1.65	1.35	0.88	1.32	1.95	1.80	
	MEAN	-0.36	-0.90	-0.52	1.37	1.36	0.83	2.06	0.36	0.44	-0.61	-0.82	
OVERALL MEAN		-0.77	-1.56	-1.54	0.87	0.74	0.47	1.88	0.09	-0.06	-0.44	1.19	

Rasch Analysis on DC Task : CMG

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.850 Standard Deviation= 1.845
Average Estimated Error = 0.227
Reliability Index = 0.985
Separation Coefficient = 8.13
No. of Reliably Distinct Bands of Ability = 16.59

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.841
Average Estimated Error = 0.499
Reliability Index = 0.931
Separation Coefficient = 3.69
No. of Reliably Distinct Bands of Difficulty = 7.71

Appendix 12c

TABLE (41a). RASCH PARTIAL CREDIT ANALYSIS OF GJ TASK

GROUP 1. EMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-2.35	-0.95	-0.54	-0.65	-1.39	0.38	1.11	0.02	-0.55	-0.46	-1.07	G
WH-P	COP	-0.99	-0.48	0.82	-0.28	0.55	-1.15	0.49	0.31	-0.09	---	1.07	PIMC
	MOD	0.65	-0.16	-0.04	0.33	0.22	1.11	0.95	0.90	0.50	---	0.36	
	'DO'	0.81	0.91	-0.05	-0.23	0.16	0.23	0.70	0.51	0.38	---	1.70	
	MEAN	0.16	0.09	0.24	-0.06	0.31	0.06	0.71	0.57	0.26	---	1.04	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	1.17	-1.17	1.84	-1.16	-1.39	-0.74	-0.56	-0.46	-0.35	-1.03	-1.87	
INV	COP	2.17	1.11	1.63	0.16	1.92	0.49	1.20	1.26	1.24	0.72	1.65	PIC
	MOD	1.44	0.69	0.99	1.78	1.86	2.17	1.48	-1.07	1.17	1.25	0.41	
	'DO'	0.98	0.45	1.21	0.07	-0.77	0.61	1.99	1.64	0.77	1.27	-0.23	
	MEAN	1.53	0.75	1.28	0.67	1.00	1.09	1.56	0.61	1.06	1.08	0.61	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-0.16	0.05	-1.72	1.12	-2.00	-1.93	0.26	-0.46	-0.89	-2.32	-0.15	
Q-OP	COP	0.93	2.55	1.63	1.42	-0.43	1.04	1.55	1.11	1.23	0.45	1.33	MIMC
	MOD	0.45	1.58	1.44	1.34	1.13	0.91	1.67	0.53	1.13	1.65	2.40	
	'DO'	1.39	1.23	1.09	2.42	0.69	1.92	1.21	2.05	1.50	0.89	1.44	
	MEAN	0.92	1.79	1.39	1.73	0.46	1.29	1.48	1.23	1.29	1.00	1.72	
OVERALL MEAN		0.87	0.88	0.97	0.78	0.59	0.81	1.25	0.80	0.87	1.04	1.13	

Rasch Analysis on GJ Task : EMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.337 Standard Deviation= 0.454
Average Estimated Error = 0.096
Reliability Index = 0.957
Separation Coefficient = 4.72
No. of Reliably Distinct Bands of Ability = 9.87

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 0.887
Average Estimated Error = 0.523
Reliability Index = 0.742
Separation Coefficient = 1.70
No. of Reliably Distinct Bands of Difficulty = 3.73

TABLE (41b). RASCH PARTIAL CREDIT ANALYSIS OF GJ TASK

GROUP 2. CMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-2.55	-1.43	-0.84	-1.34	-0.91	-0.15	-0.55	-0.98	-1.09	-1.36	-0.65	G
WH-P	COP	-2.15	-0.56	-0.34	-0.88	-1.00	-0.84	0.02	0.15	-0.70	---	2.30	PIMC
	MOD	0.23	-0.40	-0.66	-0.24	-1.72	0.61	0.10	0.26	-0.23	---	3.54	
	'DO'	-0.21	-0.05	-0.33	-0.79	-0.40	0.15	0.15	0.56	-0.12	---	1.60	
	MEAN	-0.71	-0.34	-0.44	-0.64	-1.04	-0.03	0.09	0.32	-0.35	---	2.48	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-0.13	-1.22	-1.37	-1.47	-0.75	-0.59	-0.92	-0.65	-0.89	-1.65	-0.54	G
INV	COP	0.60	0.85	0.78	0.10	0.56	0.27	0.33	-0.74	0.34	-0.48	0.11	PIC
	MOD	1.70	1.28	0.85	2.52	1.05	1.98	2.23	3.54	1.89	-0.49	0.64	
	'DO'	0.33	1.41	0.95	0.63	3.54	0.99	1.83	1.43	1.39	-0.30	3.54	
	MEAN	0.88	1.18	0.86	1.08	1.72	1.08	1.46	1.41	1.21	-0.42	1.43	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-1.64	-0.11	-1.99	1.03	-1.99	-1.03	-0.05	-1.14	-0.87	-1.86	-0.35	G
O-OP	COP	1.95	0.66	0.69	1.97	2.10	-0.61	3.54	1.01	1.41	-1.10	-0.11	MIMC
	MOD	0.60	1.18	0.64	0.08	-0.04	0.39	0.63	1.95	0.68	1.59	1.74	
	'DO'	2.43	0.43	2.32	3.54	-0.78	1.47	1.24	0.40	1.38	3.54	0.63	
	MEAN	1.66	0.76	1.22	1.86	0.43	0.42	1.80	1.12	1.16	1.34	0.75	
OVERALL MEAN		0.61	0.53	0.54	0.77	0.37	0.49	1.12	0.95	0.67	0.46	1.55	

Rasch Analysis on GJ Task : CMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.094 Standard Deviation= 0.319
Average Estimated Error = 0.088
Reliability Index = 0.929
Separation Coefficient = 3.62
No. of Reliably Distinct Bands of Ability = 7.57

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 0.791
Average Estimated Error = 0.490
Reliability Index = 0.723
Separation Coefficient = 1.61
No. of Reliably Distinct Bands of Difficulty = 3.56

TABLE (41c). RASCH PARTIAL CREDIT ANALYSIS OF GJ TASK

GROUP 3. CMG

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-3.67	-0.08	-1.76	0.33	-0.80	-1.21	-0.28	0.69	-0.85	-0.19	-0.34	G
WH-P	COP	-1.14	-0.14	-1.03	-0.28	-0.40	-1.16	0.43	0.21	-0.44	---	1.82	PIMC
	MOD	-0.01	0.40	-0.21	0.04	-0.63	0.79	0.12	0.05	0.07	---	0.07	
	'DO'	-0.01	-0.41	-0.71	-0.37	-0.02	0.24	0.20	0.55	-0.07	---	1.19	
	MEAN	-0.39	-0.05	-0.65	-0.20	-0.35	-0.04	0.25	0.27	-0.15	---	1.03	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	0.28	-0.77	-1.04	-0.78	-0.45	-0.69	-1.09	-0.72	-0.66	-1.28	-0.20	G
INV	COP	0.92	1.50	1.11	0.12	1.16	0.91	0.70	2.02	1.06	-0.56	0.50	PIC
	MOD	2.28	1.68	1.14	1.39	1.43	1.88	1.67	3.71	1.90	-0.27	0.78	
	'DO'	0.75	1.48	1.66	1.39	0.99	1.03	1.15	1.92	1.30	-0.73	0.28	
	MEAN	1.32	1.55	1.30	0.97	1.19	1.27	1.17	2.55	1.42	-0.52	0.52	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-0.26	0.43	-1.39	-0.40	-0.85	-0.77	0.18	-1.28	-0.54	-2.80	-0.98	G
G-OP	COP	1.29	0.85	1.86	1.23	2.12	0.62	2.50	1.23	1.46	1.19	0.49	MIMC
	MOD	1.27	1.39	1.50	1.98	0.46	2.21	2.69	1.91	1.68	0.28	0.10	
	'DO'	3.71	0.87	1.15	0.63	1.57	1.41	1.41	1.26	1.50	0.32	0.08	
	MEAN	2.09	1.04	1.50	1.28	1.38	1.41	2.20	1.47	1.55	0.60	0.22	
OVERALL MEAN		1.01	0.85	0.72	0.68	0.74	0.88	1.21	1.43	0.94	0.04	0.59	

Rasch Analysis on GJ Task : CMG

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.143 Standard Deviation= 0.263
Average Estimated Error = 0.082
Reliability Index = 0.912
Separation Coefficient = 3.22
No. of Reliably Distinct Bands of Ability = 6.78

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 0.698
Average Estimated Error = 0.461
Reliability Index = 0.696
Separation Coefficient = 1.51
No. of Reliably Distinct Bands of Difficulty = 3.36

TABLE (41d). RASCH PARTIAL CRADIT ANALYSIS OF GRAMMATICALITY JUDGMENT

GROUP 4: NATIVE SPEAKERS OF ENGLISH

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-2.73	-2.73	-2.64	-3.76	-3.76	3.10	-1.19	-1.50	-1.90	-2.73	-1.04	G
WH-P	COP	-0.60	0.14	1.56	0.56	0.78	-1.11	2.53	1.11	0.62	——	1.13	PIMC
	MOD	1.70	0.98	0.49	1.31	-0.30	-0.22	2.43	4.14	1.32	——	4.14	
	'DO'	-0.31	-0.70	1.34	0.14	2.56	4.14	0.79	0.50	1.06	——	1.42	
	MEAN	0.26	0.14	1.13	0.67	1.01	0.94	1.92	1.92	1.00	——	2.23	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-1.41	-2.64	-2.72	-3.76	-0.22	-3.76	3.01	-1.04	-1.57	-1.41	-1.88	G
INV	COP	0.15	2.67	2.44	-0.14	1.80	1.42	0.94	0.19	1.18	4.14	0.73	PIC
	MOD	1.71	2.45	-0.08	4.14	2.66	2.80	2.44	4.14	2.53	4.14	0.33	
	'DO'	2.07	2.25	1.17	1.97	4.14	0.43	1.35	0.71	1.83	4.14	1.10	
	MEAN	1.31	2.46	1.36	1.99	2.87	1.55	1.58	1.68	1.85	4.14	0.72	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
	G	-2.73	-0.93	-2.73	1.10	-2.73	-2.73	0.01	-1.97	-1.59	-2.73	-2.73	G
AUX	COP	-0.36	0.45	-0.02	-0.05	-0.48	0.16	0.87	-0.52	0.00	-1.31	1.71	MIMC
	MOD	-0.62	0.00	0.00	0.63	0.75	-0.40	0.13	0.14	0.11	0.30	0.75	
	'DO'	0.97	0.99	1.09	0.98	0.97	1.54	1.29	0.81	1.08	1.14	0.09	
	MEAN	0.00	0.72	0.54	0.52	0.41	0.43	0.76	0.14	0.60	0.04	0.85	
O'ALL	MEAN	0.79	1.11	1.01	1.06	1.43	0.97	1.42	1.25	1.15	2.09	1.27	

Rasch Analysis on GJ Task : NATIVE SPEAKERS

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.326 Standard Deviation= 0.505
Average Estimated Error = 0.116
Reliability Index = 0.950
Separation Coefficient = 4.35
No. of Reliably Distinct Bands of Ability = 9.02

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.011
Average Estimated Error = 0.699
Reliability Index = 0.677
Separation Coefficient = 1.45
No. of Reliably Distinct Bands of Difficulty = 3.23

Appendix 12d

TABLE (42a). RASCH PARTIAL CREDIT ANALYSIS OF CR(E) TASK

GROUP 1. EMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	0.84	1.32	1.18	1.46	0.94	0.96	1.11	1.41	1.15	---	5.19	PIMC
	MOD	1.29	1.32	1.32	1.07	1.41	0.84	1.44	1.84	1.32	---	5.19	
	'DO'	2.18	1.06	1.07	0.93	0.84	1.57	1.42	1.84	1.36	---	5.19	
	MEAN	1.44	1.23	1.19	1.15	1.06	1.12	1.32	1.70	1.28	---	5.19	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	5.19	5.19	5.19	3.42	5.19	5.19	5.19	3.94	4.81	1.69	5.19	PIC
	MOD	4.02	4.17	5.19	5.19	4.16	5.19	5.19	4.01	4.64	1.87	5.19	
	'DO'	5.19	5.19	3.97	3.93	5.19	3.88	5.19	3.80	4.54	3.28	5.19	
	MEAN	4.80	4.85	4.78	4.18	4.85	4.75	5.19	3.92	4.67	2.28	5.19	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
Q-OP	COP	5.19	4.16	5.19	5.19	5.19	5.19	5.19	5.19	5.06	5.19	3.99	MIMC
	MOD	3.34	4.04	4.06	5.19	5.19	4.13	5.19	5.19	4.54	5.19	5.19	
	'DO'	5.19	5.19	5.19	5.19	5.19	5.19	5.19	5.19	5.19	3.75	5.19	
	MEAN	4.57	4.46	4.81	5.19	5.19	4.84	5.19	5.19	4.93	4.71	4.79	
OVERALL MEAN		3.60	3.52	3.60	3.51	3.70	3.57	3.90	3.60	3.62	3.50	5.06	

Rasch Analysis on CR(E) Task : EMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.099 Standard Deviation= 0.954
Average Estimated Error = 0.192
Reliability Index = 0.961
Separation Coefficient = 4.97
No. of Reliably Distinct Bands of Ability = 10.26

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 2.185
Average Estimated Error = 0.570
Reliability Index = 0.936
Separation Coefficient = 3.83
No. of Reliably Distinct Bands of Difficulty = 7.99

TABLE (42b). RASCH PARTIAL CREDIT ANALYSIS OF CR(E) TASK

GROUP 2 CMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-1.14	-1.33	-1.52	-1.27	-0.89	-1.27	-0.88	-0.95	-1.16	---	4.93	PIMC
	MOD	-0.96	-1.62	-1.07	-1.16	-1.76	-1.01	-1.22	-1.74	-1.32	---	4.93	
	'DO'	-1.05	-0.95	-1.35	-1.50	-1.49	-1.67	-1.26	-0.73	-1.25	---	4.93	
	MEAN	-1.05	-1.30	-1.31	-1.31	-1.38	-1.32	-1.12	-1.14	-1.24	---	4.93	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	1.70	2.16	1.77	2.02	1.03	1.96	1.72	1.52	1.74	-0.24	4.93	PIC
	MOD	2.23	1.74	1.81	1.71	2.34	2.38	1.90	1.43	1.94	-0.44	4.93	
	'DO'	1.64	1.41	1.50	1.70	0.40	1.30	0.83	1.54	1.29	0.34	4.93	
	MEAN	1.86	1.77	1.69	1.81	1.26	1.88	1.48	1.50	1.66	-0.11	4.93	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
Q-OP	COP	3.89	2.29	3.87	2.83	4.93	4.93	1.96	4.93	3.70	2.79	3.40	MIMC
	MOD	1.95	2.24	2.99	2.87	2.86	2.44	2.89	1.66	2.49	2.49	2.30	
	'DO'	3.39	3.11	4.93	3.25	2.74	4.93	3.49	4.93	3.85	3.44	3.36	
	MEAN	3.08	2.55	3.93	2.98	3.51	4.10	2.78	3.84	3.35	2.91	3.02	
OVERALL MEAN		1.29	1.01	1.44	1.16	1.13	1.55	1.05	1.40	1.25	1.40	4.29	

Rasch Analysis on CR(E) Task : CMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= -0.186 Standard Deviation= 0.932
Average Estimated Error = 0.154
Reliability Index = 0.974
Separation Coefficient = 6.06
No. of Reliably Distinct Bands of Ability = 12.46

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.871
Average Estimated Error = 0.533
Reliability Index = 0.925
Separation Coefficient = 3.51
No. of Reliably Distinct Bands of Difficulty = 7.36

TABLE (42c). RASCH PARTIAL CREDIT ANALYSIS OF CR(E) TASK

GROUP 3. CMG

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-1.55	-1.64	-1.68	-2.21	-1.18	-1.84	-3.44	-1.51	-1.88	---	2.35	PIMC
	MOD	-2.09	-1.25	-1.18	-1.98	-1.22	-2.70	-3.67	-2.06	-2.02	---	1.75	
	'DO'	-2.56	-2.02	-1.77	-1.82	-1.27	-2.01	-1.54	-2.25	-1.91	---	2.34	
	MEAN	-2.07	-1.64	-1.54	-2.00	-1.22	-2.18	-2.88	-1.94	-1.94	---	2.15	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	2.01	2.24	1.87	2.59	2.10	1.82	1.41	1.11	1.89	-0.34	1.60	PIC
	MOD	2.31	2.49	1.65	1.86	2.15	1.54	1.11	1.23	1.79	-1.08	2.18	
	'DO'	0.34	0.48	-0.10	0.07	0.41	-0.30	-0.34	-0.61	-0.01	-0.10	1.84	
	MEAN	1.55	1.74	1.14	1.51	1.55	1.02	0.73	0.58	1.23	-0.51	1.87	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
Q-DP	COP	1.85	1.78	1.89	1.74	1.62	2.77	1.06	0.83	1.69	1.37	0.82	MIMC
	MOD	2.37	1.85	2.78	2.08	1.72	2.75	1.88	1.85	2.16	1.44	0.01	
	'DO'	3.78	1.36	2.09	2.93	1.69	2.32	1.88	1.51	2.20	1.73	0.91	
	MEAN	2.67	1.66	2.25	2.25	1.68	2.61	1.61	1.40	2.02	1.51	0.58	
OVERALL MEAN		0.72	0.59	0.62	0.58	0.67	0.48	-0.18	0.01	0.44	0.50	1.53	

Rasch Analysis on CR(E) Task ; CMG

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.015 Standard Deviation= 1.047
Average Estimated Error = 0.147
Reliability Index = 0.981
Separation Coefficient = 7.10
No. of Reliably Distinct Bands of Ability = 14.53

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.733
Average Estimated Error = 0.483
Reliability Index = 0.928
Separation Coefficient = 3.58
No. of Reliably Distinct Bands of Difficulty = 7.50

Appendix 12e

TABLE ((43a). RASCH PARTIAL CREDIT ANALYSIS OF CR(C) TASK

GROUP 1. EMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-5.04	-5.04	-3.98	-2.68	-3.98	-5.04	-0.45	-0.45	-3.33	---	2.43	PIMC
	MOD	-2.68	-5.04	-5.04	-5.04	-2.68	-5.04	-3.98	-2.28	-3.97	---	2.10	
	'DO'	-1.38	-3.98	-5.04	-3.19	-5.04	-3.98	-3.19	-1.65	-3.43	---	1.93	
	MEAN	-3.03	-4.69	-4.69	-3.64	-3.90	-4.69	-2.54	-1.46	-3.58	---	2.15	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-0.90	-2.28	-2.68	-0.67	0.35	-1.38	2.26	1.08	-0.53	-2.68	3.14	PIC
	MOD	0.73	-1.95	-0.67	-0.90	-1.65	-3.19	-0.45	0.16	-0.99	-3.19	2.95	
	'DO'	1.76	0.73	1.08	1.26	1.43	1.60	0.91	1.93	1.34	0.16	2.10	
	MEAN	0.53	-1.17	-0.76	-0.10	0.04	-0.99	0.91	1.06	-0.06	-1.90	2.73	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
O-OP	COP	0.35	-0.24	0.54	0.73	3.53	1.26	4.52	4.24	1.87	1.76	0.91	MIMC
	MOD	0.16	-0.04	-0.24	0.35	0.16	-0.67	-0.04	0.35	0.00	-1.13	1.93	
	'DO'	2.10	0.73	0.91	1.93	0.73	0.91	2.78	2.10	1.52	1.76	0.73	
	MEAN	0.87	0.15	0.40	1.00	1.47	0.50	2.42	2.23	1.13	0.80	1.19	
OVERALL MEAN		-0.54	-1.90	-1.68	-0.91	-0.79	-1.73	0.26	0.61	-0.84	-0.55	2.02	

Rasch Analysis on CR(C) Task : EMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 1.461 Standard Deviation= 2.117
Average Estimated Error = 0.438
Reliability Index = 0.959
Separation Coefficient = 4.84
No. of Reliably Distinct Bands of Ability = 10.01

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.988
Average Estimated Error = 0.549
Reliability Index = 0.929
Separation Coefficient = 3.62
No. of Reliably Distinct Bands of Difficulty = 7.57

TABLE (43b). RASCH PARTIAL CREDIT ANALYSIS OF CR(C) TASK

GROUP 2. CMHK

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-5.73	-4.68	-5.73	-3.88	-1.91	-2.97	-1.91	-1.33	-3.52	---	2.43	PIMC
	MOD	-1.33	-2.37	-2.65	-2.37	-1.51	-2.97	-2.65	-2.13	-2.25	---	3.09	
	'DO'	-1.16	-1.33	-3.36	-1.91	-3.36	-1.33	-1.70	-1.16	-1.91	---	2.85	
	MEAN	-2.74	-2.79	-3.91	-2.72	-2.26	-2.42	-2.09	-1.54	-2.56	---	2.79	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-0.53	-2.37	-4.68	-0.84	-0.24	-3.88	-0.53	1.88	-1.40	-2.37	3.65	PIC
	MOD	-0.24	-1.00	0.19	-0.39	-1.00	-1.33	-0.09	-0.53	-0.55	-2.65	2.63	
	'DO'	1.71	-0.09	0.48	0.77	2.43	1.07	0.92	1.22	1.06	-0.84	2.85	
	MEAN	0.31	-1.15	-1.34	-0.15	0.40	-1.38	0.10	0.86	-0.29	-1.95	3.04	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
G-OP	COP	-0.53	-1.00	-0.84	1.22	3.09	1.71	3.09	4.97	1.46	1.38	2.05	MIMC
	MOD	0.63	1.38	0.34	0.92	0.92	0.63	0.92	0.92	0.83	0.48	2.63	
	'DO'	2.24	2.43	1.38	2.05	1.54	2.05	1.88	2.85	2.05	2.05	2.05	
	MEAN	0.78	0.94	0.29	1.40	1.85	1.46	1.96	2.91	1.45	1.30	2.24	
OVERALL MEAN		-0.55	-1.00	-1.65	-0.49	0.00	-0.78	-0.01	0.74	-0.47	-0.33	2.69	

Rasch Analysis on CR(C) Task : CMHK

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.461 Standard Deviation= 1.856
Average Estimated Error = 0.34
Reliability Index = 0.967
Separation Coefficient = 5.45
No. of Reliably Distinct Bands of Ability = 11.24

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 2.048
Average Estimated Error = 0.484
Reliability Index = 0.947
Separation Coefficient = 4.23
No. of Reliably Distinct Bands of Difficulty = 8.80

TABLE (43c). RASCH PARTIAL CREDIT ANALYSIS OF CR(C) TASK

GROUP 3. CMG

		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
WH-P	COP	-3.82	-3.34	-5.61	-2.97	-2.16	-3.34	-0.20	-0.38	-2.73	---	2.25	PIMC
	MOD	-0.75	-2.40	-1.72	-2.16	-1.32	-1.13	-0.75	-0.75	-1.37	---	2.60	
	'DO'	-0.75	-0.75	-2.97	-1.72	-1.93	-1.52	-0.38	-0.20	-1.28	---	2.25	
	MEAN	-1.77	-2.16	-3.43	-2.28	-1.80	-2.00	-0.44	-0.44	-1.79	---	2.37	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
INV	COP	-2.97	-4.58	-5.61	-0.57	-0.75	-2.97	1.40	0.17	-1.99	-3.82	3.37	PIC
	MOD	1.06	0.35	0.53	-0.57	0.71	-1.13	0.35	-0.01	0.16	-2.97	2.60	
	'DO'	1.57	0.17	1.23	0.35	1.91	0.89	0.71	0.71	0.94	0.17	2.42	
	MEAN	-0.11	-1.35	-1.28	-0.26	0.62	-1.07	0.82	0.29	-0.29	-2.21	2.80	
		WHO	WHAT	WHERE	WHEN	WHY	HOW	WHICH	WHOSE	MEAN	YN	EYN	
Q-OP	COP	-0.57	-1.72	-0.75	1.23	2.08	0.71	3.37	2.78	0.89	-0.94	2.08	MIMC
	MOD	0.89	0.89	0.71	0.89	1.23	0.89	0.53	0.71	0.84	1.40	2.25	
	'DO'	1.91	0.53	0.89	2.08	0.53	1.23	0.71	1.23	1.14	0.35	1.91	
	MEAN	0.74	-0.10	0.28	1.40	1.28	0.94	1.54	1.57	0.96	0.27	2.08	
OVERALL MEAN		-0.38	-1.21	-1.48	-0.38	0.03	-0.71	0.64	0.47	-0.38	-0.97	2.41	

Rasch Analysis on CR(C) Task : CMG

Estimated Sample Statistics: Subjects' Ability Scale

Mean Ability= 0.753 Standard Deviation= 2.082
Average Estimated Error = 0.368
Reliability Index = 0.97
Separation Coefficient = 5.65
No. of Reliably Distinct Bands of Ability = 11.64

Estimated Sample Statistics: Item Difficulty Scale

Mean Difficulty= -0.00 Standard Deviation= 1.723
Average Estimated Error = 0.468
Reliability Index = 0.931
Separation Coefficient = 3.68
No. of Reliably Distinct Bands of Difficulty = 7.70

Appendix 13a

A Summary of the EMHK Subjects' Performance in the Production Tasks and the Errors Made During Production

1. Number of Questions Scored as Appropriate in the OP and DC tasks

	OP			DC			Total No. of Tokens
	P6	S2	S4	P6	S2	S4	Per Level:
YN-Qs	65	80	79	68	79	83	90
EYN-Qs	58	79	84	55	68	80	90
WHO	72	79	86	66	77	87	90
WHAT	85	89	90	86	89	90	90
WHERE	89	90	87	86	88	88	90
WHEN	56	58	60	56	59	60	60
WHY	90	90	90	79	86	90	90
HOW	55	71	62	67	83	85	90
WHICH	27	48	66	40	65	68	90
WHOSE	41	44	48	61	70	78	90
	638	728	752	664	764	810	870

2. Erroneous Linguistic Realisations of the Interrogative Systems in the OP, DC and CR(C) Tasks

	OP			DC			No. of Tokens	CR(C)			No. of tokens
	P6	S2	S4	P6	S2	S4	Per Level:	P6	S2	S4	Per Level:
A. Confusion between 3 main types of Questions											
1. YN-Qs for WH-Qs	2 (0.3%)	1 (0.1%)	2 (0.3%)	14(2%)	4 (0.6%)	0	690	0	4 (0.3%)	1(0.06%)	1440
2. WH-Qs for YN-Qs	0	0	0	2 (2%)	0	0	90	0	0	0	135
3. EYN-Qs for YN-Qs	0	0	0	0	0	0	90	0	0	0	180
B. WH-Qs: Varients for: (OP and DC tasks only)											
How											
1. What about	1 (1%)	3 (3%)	5 (6%)	1 (1%)	1 (1%)	2 (2%)	90				
2. How about	7 (8%)	10(11%)	15(17%)	1 (1%)	0	0	90				
3. How to	8 (9%)	1 (1%)	2 (2%)	0	0	1 (1%)	90				
4. How can	3 (3%)	4 (4%)	6 (7%)	10(11%)	2 (2%)	2 (2%)	90				
5. What	7 (8%)	1 (1%)	0	8 (9%)	4 (4%)	0	90				
Which											
1. What	26(29%)	21(23%)	8 (9%)	20(22%)	2 (2%)	1 (1%)	90				
2. Who	10(11%)	11(12%)	10(11%)	15(17%)	17(19%)	14(16%)	90				
3. Where	9 (10%)	0	1 (1%)	7 (8%)	7 (8%)	5 (6%)	90				
Whose											
1. Who	24(27%)	7 (8%)	17(19%)	8 (9%)	5 (6%)	7 (8%)	90				
2. Which	5 (6%)	19(21%)	16(18%)	12(13%)	9 (10%)	3 (3%)	90				
3. What	9 (10%)	10(9%)	2 (2%)	0	0	0	90				
Who											
1. What	12(13%)	4 (4%)	2 (2%)	9 (10%)	4 (4)	1 (1%)	90				
2. Which	2 (2%)	5 (6%)	1 (1%)	3 (3%)	5 (6%)	1 (1%)	90				
3. Whose	1 (1%)	0	0	4 (4%)	0	0	90				

(The following %s of the OP and DC tasks were calculated where the questions were scored as appropriate, the figures of which can be found in Section 1 above.)

	OP			DC			CR(C)			No. of tokens
	P6	S2	S4	P6	S2	S4	P6	S2	S4	Per Level:
C. Unpreposed WH-pronouns										
1. Who	14(19%)	2 (3%)	1 (1%)	6 (9%)	0	0	4 (2%)	1 (0.5%)	0	180
2. What	7 (8%)	0	0	0	0	0	1 (0.5%)	0	0	180
3. Where	0	0	0	0	0	0	0	0	0	180
4. When	0	0	0	0	0	0	0	0	0	180
5. Why	0	0	0	0	0	0	0	0	0	180
6. How	0	0	0	0	0	0	0	0	0	180
7. Which	6 (22%)	2 (4%)	3 (5%)	3 (8%)	1 (2%)	0	0	0	0	180
8. Whose	24(59%)	8 (18%)	1 (2%)	8 (13%)	1 (1%)	0	9 (5%)	0	0	180
D. Uninverted Questions (with preposed WH-words in WH-Qs)										
1. Who	5 (7%)	1 (1%)	1 (1%)	3 (5%)	1 (1%)	1 (1%)	1 (0.5%)	0	0	180
2. What	6 (7%)	6 (7%)	7 (7%)	1 (1%)	1 (1%)	0	0	0	4 (2%)	180
3. Where	2 (2%)	1 (1%)	2 (2%)	0	1 (1%)	0	0	0	0	180
4. When	6 (11%)	1 (2%)	3 (5%)	1 (2%)	0	1 (1%)	0	2 (1%)	0	180
5. Why	10(11%)	9 (10%)	7 (8%)	14(18%)	8 (9%)	10(11%)	1 (0.5%)	0	0	180
6. How	2 (4%)	1 (1%)	4 (7%)	3 (5%)	1 (1%)	1 (1%)	0	0	0	180
7. Which	2 (7%)	5 (10%)	3 (6%)	3 (7%)	2 (3%)	1 (2%)	0	2 (1%)	0	180
8. Whose	1 (3%)	5 (11%)	2 (4%)	2 (3%)	5 (7%)	2 (3%)	0	1 (0.5%)	0	180
9. YN-Qs	3 (5%)	4 (5%)	2 (3%)	3 (4%)	0	0	0	0	0	135
E. EYN-Qs										
1. Uninverted and no CON.	12(21%)	2 (2%)	2 (2%)	12(22%)	0	0	9 (5%)	0	0	180
2. Inverted and no CON.	39(67%)	36(40%)	18(20%)	53(78%)	33(37%)	10(11%)	11(6%)	9 (5%)	0	180
F. Incorrect Usage of Q-operator in YN-Qs and WH-Qs										
(Appropriate YN-Qs and WH-Qs in the OP and DC tasks classified according to Q-operators)										
1. COP-Qs	170	179	181	194	212	226				
2. MODAL-Qs	214	241	249	206	235	247				
3. DO-Qs	196	229	238	209	249	257				
Types of Errors										
1. Copula for Do	59(30%)	20(9%)	13(6%)	75(34%)	12(5%)	3 (0.6%)	16(3%)	5 (1%)	5 (1%)	525
2. DO for Copula	19(11%)	14(8%)	8 (4%)	23(12%)	24(11%)	19(8%)	4 (0.8%)	31(6%)	24(4.6%)	525
3. COP....COP	3 (2%)	1 (0.5%)	0	5 (2.5%)	1 (0.5%)	0	1 (0.2%)	1 (0.2%)	1 (0.2%)	525
4. DO.....COP	5 (3%)	0	0	2 (1%)	2 (1%)	0	0	0	0	525
5. COP....MODAL	8 (4%)	0	0	1 (0.5%)	1 (0.5%)	1 (0.4%)	0	0	0	525
6. DO.....MODAL	17(8%)	8 (3%)	4 (2%)	1 (0.5%)	1 (0.5%)	0	1 (0.2%)	1 (0.2%)	0	525

Appendix 13b

A Summary of the CHIK Subjects' Performance in the Production Tasks and the Errors Made During Production

1. Number of Questions Scored as Appropriate

	OP			DC			Total No. of Tokens
	P6	S2	S4	P6	S2	S4	Per Level:
YN-Qs	52	62	61	62	76	82	90
EYN-Qs	61	58	52	62	50	61	90
WHO	74	77	80	82	84	88	90
WHAT	79	88	86	76	88	89	90
WHERE	88	87	90	89	88	88	90
WHEN	54	57	59	56	57	59	60
WHY	78	89	90	80	89	86	90
HOW	23	46	65	39	68	78	90
WHICH	11	27	50	32	59	63	90
WHOSE	24	47	42	62	79	67	90
	544	638	675	640	738	761	870

2. Erroneous Linguistic Realisations of the Interrogative Systems in the OP, DC and CR(C) Tasks

	OP			DC			No. of Tokens	CR(C)			No. of Tokens
	P6	S2	S4	P6	S2	S4	Per Level:	P6	S2	S4	Per Level:
A. Choice of 3 Main Types of Questions											
1. YN-Qs for WH-Qs	15(2%)	7 (1%)	4 (0.6%)	21(3%)	7 (1%)	2 (0.3%)	690	13(0.9%)	3 (0.2%)	0	1440
2. WH-Qs for YN-Qs	5 (6%)	2 (2%)	0	10(12%)	0	0	90	1 (0.7%)	0	0	135
3. EYN-Qs fro YN-Qs	0	0	0	0	0	0	90	0	0	0	180
B. WH-Qs: Variants for (OP and DC tasks only)											
How											
1. What about	1 (1%)	5 (6%)	2 (2%)	1 (1%)	0	0	90				
2. How about	0	4 (4%)	10(11%)	0	4 (4%)	8 (9%)	90				
3. How to	1 (1%)	9 (10%)	2 (2%)	2 (2%)	3 (3%)	0	90				
4. How can	0	6 (7%)	2 (2%)	0	1 (1%)	0	90				
5. What	27(30%)	12(13%)	1 (1%)	33(37%)	10(11%)	4 (4%)	90				
Which											
1. What	38(42%)	34(37%)	15(17%)	24(27%)	10(11%)	5 (6%)	90				
2. Who	11(12%)	9 (10%)	4 (4%)	19(21%)	15(17%)	14(16%)	90				
3. Where	1 (1%)	3 (3%)	0	11(12%)	5 (6%)	4 (4%)	90				
Whose											
1. Who	37(41%)	22(24%)	25(28%)	7 (8%)	3 (3%)	12 (13%)	90				
2. Which	0	1 (1%)	9 (10%)	1 (1%)	1 (1%)	5 (6%)	90				
3. What	4 (4%)	3 (3%)	6 (7%)	0	0	0	90				
Who											
1. What	9 (10%)	8 (9%)	2 (2%)	0	3 (3%)	0	90				
2. Which	0	1 (1%)	4 (4%)	1 (1%)	1 (1%)	2 (2%)	90				
3. Whose	0	0	0	0	0	0	90				

(The following %s in the OP and DC tasks were calculated where the questions were scored as appropriate, the figures of which are shown in Section 1 above)

	OP			DC			CR(C)			No. of Tokens
	P6	S2	S4	P6	S2	S4	P6	S2	S4	Per Level:
C. Unpreposed WH-pronouns										
1. Who	15(20%)	4 (5%)	4 (5%)	18(22%)	5 (6%)	2 (2%)	8 (4%)	1 (0.5%)	0	180
2. What	9 (11%)	3 (3%)	1 (1%)	6 (9%)	0	1 (1%)	3 (1.6%)	3 (1.6%)	0	180
3. Where	5 (6%)	1 (1%)	0	1 (1%)	0	0	0	0	0	180
4. When	0	0	0	0	0	0	0	0	0	180
5. Why	0	0	0	0	0	0	0	0	0	180
6. How	0	0	0	0	0	0	0	0	0	180
7. Which	10(90%)	2 (7%)	3 (6%)	8 (25%)	2 (3%)	0	2 (1%)	0	0	180
8. Whose	17(70%)	17(36%)	5 (12%)	21(34%)	8 (10%)	3 (5%)	7 (3.8%)	1 (0.5%)	0	180
D. Uninverted Questions (with preposed Wh-words in Wh-Qs)										
1. Who	8 (11%)	2 (3%)	2 (3%)	4 (5%)	4 (5%)	2 (2%)	8 (4%)	1 (0.5%)	0	180
2. What	11(14%)	11(12%)	8 (9%)	8 (11%)	6 (7%)	1 (1%)	2 (1%)	3 (1.6%)	0	180
3. Where	18(20%)	6 (7%)	4 (5%)	5 (6%)	3 (3%)	0	2 (1%)	1 (0.5%)	1 (0.5%)	180
4. When	26(48%)	12(21%)	4 (7%)	20(36%)	7 (12%)	1 (2%)	7 (3.8%)	5 (2.7%)	0	180
5. Why	34(44%)	15(17%)	15(17%)	27(34%)	19(21%)	6 (7%)	7 (3.8%)	13(7%)	0	180
6. How	1 (4%)	3 (6%)	3 (5%)	11(28%)	6 (9%)	2 (3%)	2 (1%)	3 (1.6%)	0	180
7. Which	1 (8%)	1 (4%)	6 (12%)	6 (19%)	3 (5%)	6 (9%)	5 (2.7%)	7 (3.8%)	1 (0.5%)	180
8. Whose	0	1 (2%)	7 (16%)	9 (15%)	7 (9%)	7 (10%)	9 (5%)	3 (1.6%)	0	180
9. YN-Qs	23(44%)	1 (2%)	2 (3%)	13(21%)	2 (2.6%)	0	0	0	0	135
E. EYN-Qs										
1. Uninverted and no CON.	28(46%)	6 (10%)	2 (4%)	29(46%)	5 (9%)	12(2%)	10(6%)	8 (4%)	2 (1%)	180
2. Inverted and no CON.	20(34%)	42(73%)	40(77%)	20(32%)	44(88%)	45(74%)	16(9%)	41(23%)	2 (1%)	180
F. Incorrect Usage of Q-operator in YN-Qs and WH-Qs										
(Appropriate YN-Qs and WH-Qs in the OP and DC tasks classified according to Q-operators)										
1. COP-Qs	156	170	167	179	206	208				
2. MODAL-Qs	173	216	229	199	236	240				
3. DO-Qs	154	194	227	200	246	252				
Error Types										
1. Copula for Do	37(24%)	103(53%)	60(26%)	75(38%)	88(36%)	41(16%)	34(6.5%)	29(5.5%)	16(3%)	525
2. DO for Copula	5 (3%)	5 (3%)	21(13%)	6 (3%)	13(6%)	21(10%)	12(2.3%)	23(4.4%)	28(5.3%)	525
3. COP.....COP	4 (2%)	1 (0.5%)	6 (3%)	2 (0.5%)	5 (2%)	0	0	0	0	525
4. DO.....COP	2 (1%)	2 (1%)	4 (2%)	1 (0.5%)	4 (2%)	3 (1.4%)	0	0	0	525
5. COP....MODAL	13(6.5%)	23(10%)	3 (1.3%)	5 (2.5%)	15(6.3%)	1 (0.4%)	1 (0.2%)	9 (1.7%)	0	525
6. DO.....MODAL	6 (3%)	4 (1.7%)	4 (1.6%)	2 (1)	0	2 (0.8%)	4 (0.8%)	5 (0.9%)	2 (0.4%)	525

Appendix 13c

A Summary of the CMG Subjects' Performance in the Production Tasks and the Errors Made During Production.

1. Number of Questions Scored as Appropriate

	OP			DC			Total No. of tokens per Level:
	P6	S2	S4	P6	S2	S4	
YN-Qs	39	62	69	43	72	72	90
EYN-Qs	42	64	77	47	56	90	90
WHO	54	72	84	66	83	86	90
WHAT	80	83	84	79	84	88	90
WHERE	80	87	90	76	84	88	90
WHEN	4	47	54	4	52	57	60
WHY	7	76	88	7	87	89	90
HOW	0	30	56	34	64	75	90
WHICH	3	25	40	8	66	73	90
WHOSE	22	51	68	46	79	88	90
	331	597	710	410	727	806	870

2. Erroneous Linguistic Realisations of the Interrogative Systems in the OP and DC Tasks

	OP			DC			No. of Tokens	CR(C)			No. of Token
	P6	S2	S4	P6	S2	S4	Per Level:	P6	S2	S4	Per Level:
A. Confusion between 3 Main Types of Questions											
1. YN-Qs for WH-Qs	48(7%)	20(3%)	7 (1%)	28(4%)	22(3%)	1 (0.2%)	690	11(1%)	4 (0.3%)	0	1440
2. WH-Qs for YN-Qs	10(11%)	4 (4%)	1 (2%)	5 (6%)	4 (4%)	0	90	2 (1.5%)	1 (0.7%)	0	135
3. EYN-Qs fro YN-Qs	0	0	0	0	2 (2%)	6 (6%)	90	0	0	0	180
B. WH-Qs: Variants for:											
How											
1. What about	7 (8%)	0	3 (3)	3 (3%)	0	3 (3%)	90				
2. How about	1 (1%)	1 (1%)	6 (7%)	0	0	7 (8%)	90				
3. How to	0	3 (3%)	11(12%)	0	4 (5%)	2 (2%)	90				
4. How can	0	0	5 (6%)	0	3 (3%)	0	90				
5. What	37(41%)	29(32%)	4 (4%)	38(42%)	6 (7%)	0	90				
Which											
1. What	8 (9%)	36(40%)	26(29%)	28(31%)	5 (6%)	1 (1%)	90				
2. Who	5 (6%)	7 (8%)	8 (9%)	17(19%)	7 (8%)	3 (3%)	90				
3. Where	1 (1%)	1 (1%)	2 (2%)	9 (10%)	1 (1%)	7 (8%)	90				
Whose											
1. Who	10(11%)	18(20%)	10(11%)	9 (10%)	2 (2%)	0	90				
2. Which	0	0	2 (2%)	0	1 (1%)	0	90				
3. What	18(20%)	8 (9%)	4 (4%)	11 (12%)	0	0	90				
Who											
1. What	27(30%)	12(13%)	1 (1%)	9 (10%)	0	0	90				
2. Which	0	0	1 (1%)	0	0	0	90				
3. Whose	0	0	0	0	0	0	90				

(The following %s in the OP and DC tasks were calaulated where the questions were scored as appropriate, the figures of which are shown in Section 1 above)

	OP			DC			CR(C)			No. of tokens per level:
	P6	S2	S4	P6	S2	S4	P6	S2	S4	
C. Unpreposed Wh-Pronouns										
1. Who	0	3 (4%)	1 (1%)	7 (2%)	3 (4%)	3 (4%)	3 (1.6%)	0	1 (0.5%)	180
2. What	3 (4%)	4 (5%)	0	1 (1%)	1 (1%)	0	1 (0.5%)	0	0	180
3. Where	1 (1%)	1 (1%)	0	0	0	0	0	0	0	180
4. When	0	0	0	0	0	0	5 (2.7%)	0	0	180
5. Why	0	1 (3%)	0	0	0	0	1 (0.5%)	0	0	180
6. How	0	1 (3%)	0	0	0	0	0	0	0	180
7. Which	0	4 (16%)	1 (2%)	0	0	0	18(10%)	1 (0.5%)	0	180
8. Whose	13(59%)	8 (16%)	4 (6%)	9 (20%)	1 (1%)	0	11(6%)	0	1 (0.5%)	180
D. Uninverted Questions (with preposed Wh-wrords in WH-Qs)										
1. Who	5 (9%)	3 (4%)	4 (5%)	0	1 (1%)	1 (1%)	6 (3%)	4 (2%)	5 (2.7%)	180
2. What	1 (1%)	12(14%)	5 (6%)	2 (3%)	2 (2%)	1 (1%)	2 (1%)	0	0	180
3. Where	1 (1%)	4 (5%)	3 (3%)	1 (1%)	1 (1%)	0	3 (1.6%)	1 (0.5%)	0	180
4. When	0	9 (19%)	5 (9%)	2 (3%)	7 (13%)	0	5 (2.7%)	3 (1.6%)	0	180
5. Why	0	9 (24%)	11(13%)	0	21(24%)	11(12%)	6 (3%)	8 (4%)	8 (4%)	180
6. How	0	1 (1%)	5 (9%)	0	3 (5%)	2 (3%)	7 (3.8%)	2 (1%)	0	180
7. Which	0	5 (20%)	3 (8%)	0	3 (5%)	1 (1%)	2 (1%)	3 (1.6%)	1 (0.5%)	180
8. Whose	2 (9%)	6 (12%)	4 (6%)	4 (9%)	3 (4%)	2 (2%)	6 (3%)	6 (3%)	0	180
9. YN-Qs	10(26%)	8 (13%)	2 (3%)	1 (1%)	0	0	0	0	0	135
E. EYN-Qs										
1. Uninverted and no CON.	8 (19%)	24(37%)	8 (11%)	4 (8%)	1 (1%)	2 (2%)	90	9 (5%)	4 (2%)	2 (1%)	180
2. Inverted and no CON.	23(54%)	36(56%)	17(22%)	31(67%)	48(06%)	7 (8%)	90	44(24%)	25(14%)	0	180

F. Incorrect Usage of Q-operator in YN-Qs and WH-Qs

(Appropriate YN-Qs and WH-Qs in the OP and DC tasks classified according to Q-operators)

1. COP-Qs	111	166	181	155	215	215
2. MODAL-Qs	90	177	224	106	224	246
3. DO-Qs	88	190	228	102	232	255

Types of Errors

1. Copula for Do	87(96%)	59(31%)	32(14%)	91(89%)	61(26%)	27(11%)	53(10%)	13(2.5%)	10(1.9%)	525
2. DO for Copula	0	6 (4%)	27(15%)	0	13(6%)	27(13%)	0	20(3.8%)	38(7%)	525
3. COP.....COP	2 (2%)	1 (0.6%)	1 (0.5%)	1 (0.6%)	1 (0.5%)	1 (0.5%)	0	0	0	525
4. DO.....COP	0	0	7 (4%)	0	1 (0.5%)	1 (0.5%)	0	0	0	525
5. COP....MODAL	39(43%)	14(8%)	6 (3%)	47(44%)	1 (0.5%)	0	29(5.5%)	1 (0.2%)	2 (0.3%)	525
6. DO.....MODAL	0	8 (5%)	10(5%)	0	3 (1%)	6 (2%)	0	7 (1.3%)	13(2.5%)	525

Appendix 14a

A Summary of the EMHK Subjects' Performance on the Grammaticality Judgment Task

A.WH-Q	G-Q						WH-P						-INV						I.Q-OP					
	5	4	3	2	1	S	5	4	3	2	1	S	5	4	3	2	1	S	5	4	3	2	1	S
P6 WHO	19	12	4	2	8	31	1	6	6	18	14	32	8	12	12	10	3	28	4	14	12	7	8	29
WHAT	23	12	5	2	3	29	4	6	6	10	19	40	15	11	7	5	7	30	10	9	13	8	5	34
WHERE	25	6	6	3	5	29	1	3	12	14	15	38	4	10	11	16	4	34	13	17	6	6	3	30
WHEN	17	13	8	2	5	32	0	3	8	17	17	34	12	9	12	9	3	34	21	8	7	5	4	28
WHY	32	6	1	3	3	36	2	7	8	13	15	34	21	11	5	4	4	34	23	16	3	1	2	36
HOW	17	13	7	4	4	35	4	4	7	10	20	32	4	14	11	6	10	31	14	8	14	8	1	31
WHICH	19	13	10	1	2	31	1	9	9	19	7	37	8	14	14	6	3	31	13	19	5	5	3	30
WHOSE	14	15	8	4	4	24	4	10	10	11	10	31	6	13	11	9	6	29	6	14	9	12	4	28
TOTAL:	166	90	49	21	34	247	17	48	66	111	117	278	78	94	83	65	40	251	104	105	69	52	30	218
%	46	25	14	6	9	69	5	13	18	31	33	72	22	26	23	18	11	68	29	29	19	14	8	61
S2 WHO	28	6	6	4	1	31	0	0	13	14	18	35	3	12	18	9	3	22	1	11	15	13	5	30
WHAT	30	11	2	2	0	24	0	1	9	15	20	36	6	19	14	4	2	30	2	9	13	17	4	27
WHERE	35	7	2	1	0	32	0	0	13	18	14	37	5	12	13	10	5	26	4	6	17	13	5	32
WHEN	29	10	3	3	0	26	0	2	5	16	22	33	1	10	16	10	8	28	2	13	18	9	3	28
WHY	38	5	1	0	1	34	0	1	11	15	18	40	9	11	10	13	2	23	2	16	14	7	6	31
HOW	28	6	8	2	1	25	0	1	9	17	18	33	1	11	12	17	4	30	3	13	13	9	7	29
WHICH	24	17	3	1	0	24	0	3	8	18	16	39	5	13	12	11	4	25	1	14	16	11	3	27
WHOSE	26	8	8	2	1	26	2	6	8	17	12	30	9	12	15	6	3	20	1	12	17	8	7	27
TOTAL:	238	70	33	15	4	222	2	14	76	130	138	283	32	100	110	80	31	204	16	94	123	87	40	231
%	66	19	9	4	1	62	1	4	21	36	38	79	9	28	31	22	9	57	4	26	34	24	11	64
S4 WHO	23	12	6	2	2	36	0	0	5	14	26	42	2	9	17	11	6	38	1	7	16	10	11	40
WHAT	31	8	4	1	1	33	1	0	5	17	22	38	0	13	21	6	5	39	0	7	10	23	5	41
WHERE	36	6	3	0	0	38	0	0	5	14	26	40	1	15	13	8	8	36	1	13	9	15	7	27
WHEN	24	18	2	0	1	36	0	0	6	11	28	43	3	11	10	6	15	39	1	10	14	15	5	39
WHY	35	5	5	0	0	39	0	0	6	20	19	42	4	17	11	8	5	38	2	16	16	6	5	38
HOW	29	6	5	4	1	36	0	0	8	14	23	41	3	9	15	10	8	37	2	11	10	12	10	40
WHICH	16	20	6	2	1	37	1	1	7	17	19	39	4	17	9	10	5	40	5	11	16	9	4	41
WHOSE	28	11	4	2	0	36	1	1	9	16	18	37	2	14	14	9	6	36	4	13	11	10	7	39
TOTAL:	222	86	35	11	6	291	3	2	43	123	181	322	19	105	110	68	58	303	16	88	102	100	54	315
%	62	24	10	3	2	81	1	1	12	34	50	89	5	29	31	19	16	84	4	24	28	28	15	88

B. YN-Qs	G-Qs							-INV						I.Q-OP					
P6 YN-Q	30	6	2	4	3	37	----------	20	14	4	3	4	35	21	15	4	1	4	32
%	67	13	4	8	7	82	----------	44	31	9	7	9	78	47	33	9	2	9	71
S2 YN-Q	32	9	2	1	1	25	----------	7	10	13	9	6	31	3	17	16	8	1	20
%	71	20	4	2	2	56	----------	16	22	29	20	13	69	7	38	36	18	2	44
S4 YN-Q	36	8	0	0	1	38	----------	5	11	12	11	6	36	6	12	13	8	6	37
%	80	18	0	0	2	85	----------	11	24	27	24	13	80	13	27	29	18	13	82

C.EYN-Qs	G-Qs						+INV-CON						-INV-CON						+INV+I.CON					
P6 EYN-Q	13	16	6	5	5	31	25	7	6	3	4	31	7	22	5	9	2	28	10	16	6	5	8	26
%	29	36	13	11	11	69	56	16	13	7	9	69	16	49	11	20	4	62	22	36	13	11	18	58
S2 EYN-Q	37	4	3	1	0	36	9	16	12	6	2	26	3	17	9	14	2	24	6	12	13	10	4	22
%	69	9	7	2	0	80	20	36	27	13	4	58	7	38	20	31	4	53	13	27	29	22	9	58
S4 EYN-Q	38	4	1	0	2	37	9	15	13	5	3	38	2	21	12	4	6	42	3	14	14	9	5	36
%	84	9	2	0	4	82	20	33	29	11	7	84	4	47	27	9	13	93	7	31	31	20	11	80

A Summary of the CMHK Subjects' Performance on the Grammaticality Judgment Task

A. WH-Qs	G-Qs						WH-P						-INV						I.Q-OP					
	5	4	3	2	1	S	5	4	3	2	1	S	5	4	3	2	1	S	5	4	3	2	1	S
P6 WHO	27	8	7	1	2	36	5	9	6	10	15	35	15	9	9	4	8	30	18	11	6	6	4	34
WHAT	22	7	10	5	1	30	1	4	8	16	16	23	17	8	10	6	4	26	20	8	7	7	3	27
WHERE	29	12	2	2	0	26	1	3	6	18	17	36	9	14	6	6	10	24	22	10	7	3	3	28
WHEN	19	13	5	7	1	30	2	5	9	12	17	29	16	9	6	7	7	33	21	11	9	4	0	35
WHY	30	11	1	0	3	38	5	4	7	14	15	30	27	11	4	2	1	33	28	11	4	0	2	31
HOW	13	11	13	4	4	27	5	5	7	16	12	34	15	8	12	3	7	21	9	19	9	4	4	21
WHICH	22	10	6	6	1	25	6	8	10	17	4	33	23	6	4	6	6	28	20	12	11	2	0	28
WHOSE	20	7	8	4	6	29	6	5	9	19	6	27	18	8	7	5	7	30	21	11	6	4	3	32
TOTAL:	182	79	52	29	18	241	31	43	62	122	102	247	140	73	58	39	50	232	159	93	59	30	19	236
%	51	22	14	8	5	67	9	12	17	34	28	69	39	20	16	11	14	64	44	26	16	8	5	66
S2 WHO	28	5	4	5	3	30	1	6	5	8	25	37	7	16	11	9	2	27	12	15	9	7	2	31
WHAT	29	12	3	1	0	34	0	2	9	12	22	38	12	8	17	6	2	24	17	12	7	6	3	31
WHERE	34	5	5	0	1	31	1	4	3	18	19	39	6	10	11	13	5	32	13	13	12	5	2	31
WHEN	21	11	6	6	1	29	0	4	4	13	24	40	11	10	10	8	6	30	17	18	5	3	2	29
WHY	32	8	5	0	0	32	0	2	5	9	29	35	16	13	11	4	1	33	17	17	8	1	2	30
HOW	19	12	9	2	3	31	0	1	12	12	20	36	5	10	12	12	6	34	15	10	12	5	3	25
WHICH	22	13	8	2	0	34	1	2	8	20	14	31	11	13	11	9	1	31	19	15	7	4	0	31
WHOSE	20	10	6	14	5	31	3	3	12	12	15	33	7	15	17	2	4	25	11	11	9	9	5	28
TOTAL:	205	76	46	34	23	252	6	24	58	104	168	289	75	95	100	63	27	241	121	111	69	40	19	236
%	57	21	13	9	6	70	2	7	16	29	47	80	21	26	28	18	8	67	34	31	20	11	5	66
S4 WHO	34	3	3	4	1	36	0	1	3	13	28	41	3	12	20	8	2	29	6	11	15	10	3	27
WHAT	29	10	4	2	0	33	2	2	1	13	28	37	8	14	14	7	2	33	13	9	13	2	2	34
WHERE	36	6	1	0	2	33	3	1	1	5	35	40	5	4	22	12	2	38	10	7	16	9	3	36
WHEN	28	10	4	3	0	31	0	1	3	9	32	36	7	7	13	12	6	31	7	9	19	6	4	24
WHY	35	9	1	0	0	40	0	0	1	5	39	35	9	13	17	3	3	31	11	15	14	2	3	34
HOW	29	5	5	2	3	31	2	1	3	16	23	35	1	7	18	15	4	32	7	13	15	4	6	30
WHICH	22	12	8	2	1	38	2	1	4	8	30	36	8	11	13	12	1	37	11	12	12	7	3	31
WHOSE	31	8	4	1	1	30	2	5	4	15	19	32	8	13	11	9	4	26	6	14	17	7	1	29
TOTAL:	244	62	30	14	8	272	11	12	20	87	234	292	49	81	128	78	24	257	71	90	121	47	25	259
%	68	17	8	4	2	76	3	3	6	24	65	81	14	23	36	22	7	71	20	25	34	13	7	72

B. YN-Qs	G-Qs							-INV						I.Q-OP					
P6 YN-Q	31	5	7	1	1	35	----------	22	6	4	7	6	42	27	11	4	0	3	33
%	69	11	16	2	2	28	----------	49	13	9	16	13	93	60	24	9	0	7	73
S2 YN-Q	33	9	2	1	0	39	----------	2	12	7	3	21	41	22	13	4	4	2	29
%	73	20	4	2	0	81	----------	4	27	16	7	47	91	49	29	9	9	4	64
S4 YN-Q	35	4	4	2	0	42	----------	2	5	10	12	16	33	13	13	14	4	1	29
%	78	9	9	4	0	93	----------	4	11	22	27	36	73	29	29	31	9	2	64

C. EYN-Qs	G-Qs						+INV-CON						-INV-CON						+INV+I.CON					
P6 EYN-Q	11	12	12	2	8	29	25	7	9	3	1	35	24	4	7	6	4	33	16	15	4	6	4	24
%	24	27	27	4	18	64	56	16	20	7	2	77	53	9	16	13	9	73	36	33	9	13	9	53
S2 EYN-Q	11	13	8	3	10	26	25	17	1	1	1	24	9	18	10	3	5	24	11	12	8	9	5	24
%	24	29	18	7	22	58	56	38	2	2	2	53	20	40	22	7	11	53	24	27	18	20	11	53
S4 EYN-Q	35	4	5	1	0	31	12	11	9	12	1	29	4	19	18	3	1	25	11	8	17	7	2	33
%	78	9	11	2	0	69	27	24	20	29	2	64	9	42	40	7	2	53	24	18	38	16	4	73

Appendix 14c

A Summary of the CMG Subjects' Performance on the Grammaticality Judgment Task

A. WH-Qs	G-Qs						WH-P						-INV						I.Q-OP					
	5	4	3	2	1	S	5	4	3	2	1	S	5	4	3	2	1	S	5	4	3	2	1	S
P6 WHO	17	12	6	6	4	34	1	4	6	14	20	33	8	14	12	4	7	30	16	14	6	6	3	29
WHAT	9	13	16	2	5	28	4	5	16	13	7	32	6	11	16	8	4	30	11	13	10	7	4	30
WHERE	17	5	13	6	4	35	4	1	10	12	18	33	9	6	14	11	5	32	19	9	8	3	6	28
WHEN	8	12	10	10	5	23	5	7	13	12	8	31	9	8	16	7	5	26	18	6	11	4	6	27
WHY	17	16	7	4	1	25	4	9	15	11	6	32	10	15	12	6	2	26	26	8	4	5	2	27
HOW	20	8	8	8	1	28	2	3	10	20	10	27	2	6	21	10	3	28	15	9	11	7	3	18
WHICH	9	7	14	8	7	20	2	8	15	10	10	25	11	9	13	10	2	31	7	9	16	12	1	26
WHOSE	14	16	9	3	3	28	9	9	8	15	4	29	16	6	7	12	4	25	6	11	17	9	2	22
TOTAL:	111	89	83	47	30	221	27	46	93	107	83	242	71	75	111	68	32	228	118	79	83	53	27	207
%	31	25	23	13	8	62	8	13	26	30	23	67	20	21	31	19	9	63	33	22	23	15	8	58
S2 WHO	25	8	8	4	0	35	3	2	7	7	26	36	7	11	6	16	5	31	14	14	11	5	1	34
WHAT	19	17	6	3	0	34	7	6	7	7	18	35	9	10	13	10	3	31	19	6	9	8	3	37
WHERE	24	7	12	2	0	33	5	4	5	3	28	37	9	9	9	13	5	39	10	11	9	14	1	29
WHEN	22	12	7	4	0	36	1	4	6	13	21	34	14	9	6	11	5	40	11	9	15	9	1	28
WHY	23	8	10	3	1	35	2	2	7	7	27	40	18	14	5	5	3	33	17	14	7	6	1	39
HOW	22	11	7	5	0	35	5	4	7	10	19	36	7	9	13	9	7	32	16	11	10	7	1	31
WHICH	22	14	4	4	1	32	8	8	8	8	13	33	16	13	11	2	3	35	18	14	7	5	1	36
WHOSE	22	8	9	4	2	36	5	4	11	8	17	30	13	12	10	9	1	30	12	14	10	8	1	36
TOTAL:	179	85	63	29	4	276	36	34	58	63	169	251	93	87	73	75	32	271	117	93	78	62	10	271
%	50	24	18	8	1	76	10	9	16	18	47	71	26	24	20	21	9	75	33	26	22	17	3	75
S4 WHO	32	7	5	0	1	38	2	1	2	18	22	40	6	7	13	17	2	37	6	12	9	15	3	34
WHAT	29	12	3	0	1	33	0	3	5	17	20	39	4	7	13	18	3	31	3	10	8	16	8	35
WHERE	38	5	2	0	0	38	1	2	3	15	24	41	4	10	9	17	5	37	5	9	14	15	2	30
WHEN	24	10	8	1	2	32	1	2	5	12	25	41	5	9	12	11	8	37	11	9	13	10	2	32
WHY	30	6	7	1	1	39	1	1	3	16	24	40	11	13	10	8	3	35	4	15	11	9	6	35
HOW	29	6	7	3	0	28	2	3	2	14	24	41	3	8	11	18	5	36	4	4	14	16	7	31
WHICH	22	11	7	5	0	36	1	5	4	21	14	40	5	13	14	9	4	36	5	15	14	9	2	36
WHOSE	24	10	6	4	1	36	0	5	6	17	20	37	9	6	15	15	0	30	12	11	12	6	4	32
TOTAL:	228	67	45	14	6	380	8	22	30	130	173	319	47	73	97	113	30	279	50	85	95	96	34	265
%	63	19	13	4	2	78	2	6	8	36	48	89	13	20	27	31	8	78	14	24	26	27	9	74

B. YN-Qs	G-Qs							-INV						I.Q-OP					
P6 YN-Q	22	9	7	6	1	26	----------	4	5	14	10	12	39	14	6	13	11	1	30
%	49	20	16	13	2	58	----------	9	11	31	22	27	87	31	13	29	24	2	68
S2 YN-Q	31	5	4	2	3	33	----------	8	6	6	8	17	35	14	12	5	4	10	36
%	69	11	9	4	7	73	----------	18	13	13	18	38	78	31	27	11	9	22	79
S4 YN-Q	31	9	2	3	0	34	----------	3	8	11	5	18	40	14	12	9	6	4	31
%	69	20	4	7	0	75	----------	7	18	24	11	40	89	31	27	20	13	9	69

C. EYN-Qs	G-Qs						+INV-CON						-INV-CON						+INV+I.CON					
P6 EYN-Q	4	16	12	10	3	32	11	18	7	5	4	32	2	16	13	7	7	36	4	15	8	10	8	33
%	9	36	27	22	7	71	24	40	16	11	9	71	4	36	29	16	16	80	9	33	18	22	18	73
S2 EYN-Q	15	9	5	5	11	33	25	8	8	2	1	31	9	12	8	5	11	34	15	7	13	3	7	33
%	33	20	11	11	24	73	56	18	18	4	2	69	20	27	18	11	24	76	33	16	29	7	16	73
S4 EYN-Q	38	4	2	1	0	37	1	7	16	16	5	35	0	9	26	8	2	33	3	12	11	14	5	33
%	84	9	4	2	0	82	2	16	36	36	11	78	0	20	58	18	4	73	7	27	24	31	11	73

Appendix 15a

A Summary of the EMHK Subjects' Performance on the Correction Task

A.WH-Qs	G-Qs	WH-P				-INV				I.Q-OP			
		O	J/L	C	E	O	J/L	C	E	O	J/L	C	E
P6 WHO	42	4	4	23	14	28	3	14	0	36	2	6	1
WHAT	45	0	0	26	19	20	0	25	0	34	0	9	2
WHERE	45	1	0	26	18	24	3	18	0	35	1	9	0
WHEN	45	1	0	22	22	26	2	17	0	39	0	6	0
WHY	45	1	2	22	20	29	1	15	0	40	0	5	0
HOW	45	1	0	25	19	20	3	22	0	33	2	10	0
WHICH	44	4	0	24	17	34	2	9	0	39	2	4	0
WHOSE	42	11	2	20	12	26	2	17	0	41	1	3	0
TOTAL:	353	23	4	188	141	205	16	137	0	297	8	52	3
%	98	6	2	52	39	57	4	38	0	83	2	14	1
S2 WHO	45	0	1	28	16	7	6	32	0	6	2	37	0
WHAT	45	1	0	27	17	3	1	41	0	4	0	41	0
WHERE	45	0	0	26	19	3	0	41	1	6	1	38	0
WHEN	45	0	2	26	17	5	1	37	1	7	3	35	0
WHY	43	0	1	24	20	7	2	36	0	5	7	33	0
HOW	45	0	0	26	19	3	1	41	0	2	2	41	0
WHICH	39	2	4	27	12	9	2	34	0	11	9	25	0
WHOSE	45	2	3	28	12	13	5	26	1	17	2	26	0
TOTAL:	352	5	11	212	132	50	18	288	3	58	26	276	0
%	97	1	3	59	37	14	5	80	1	16	7	77	0
S4 WHO	45	1	0	40	4	4	1	39	1	7	1	36	1
WHAT	45	0	0	43	2	1	1	42	1	4	0	41	0
WHERE	45	0	0	43	2	2	0	43	0	2	1	41	1
WHEN	45	0	2	40	3	3	2	38	2	7	0	38	0
WHY	45	0	0	43	2	2	1	41	1	7	5	33	0
HOW	45	0	0	42	3	4	0	41	1	7	2	35	1
WHICH	37	0	3	36	5	3	5	37	0	10	8	27	0
WHOSE	45	2	1	40	2	6	5	32	2	12	3	30	0
TOTAL:	352	3	6	327	23	25	15	313	8	54	20	281	3
%	98	1	2	91	6	7	4	87	2	15	6	78	1

B. YN-Qs	G-Qs				-INV				I.Q-OP			
P6 YN-Q	45	----			11	0	29	5	38	0	7	0
%	100	----			24	0	64	11	84	0	16	0
S2 YN-Q	45	----			4	1	33	7	9	0	35	1
%	100	----			9	2	73	16	20	0	78	2
S4 YH-Q	42	----			3	0	35	7	7	0	38	0
%	93	----			7	0	78	16	16	0	84	0

C.EYN-Qs	G-Qs	+INV-CON				-INV-CON				+INV+I.CON			
P6 EYN-Q	39	45	0	0	0	37	8	0	0	42	3	0	0
%	87	100	0	0	0	82	18	0	0	93	7	0	0
S2 EYN-Q	42	22	0	23	0	10	1	34	0	23	4	18	0
%	93	49	0	51	0	22	2	76	0	51	9	40	0
S4 EYN-Q	45	9	0	36	0	1	2	41	1	9	5	31	0
%	100	20	0	80	0	2	4	91	2	20	11	69	0

Appendix 15b

A Summary of the CMHK Subjects' Performance on the Correction Task

A. WH-Qs	G-Qs	WH-P				-INV				I.Q-OP			
		O	J/L	C	E	O	J/L	C	E	O	J/L	C	E
P6 WHO	39	8	5	10	22	24	12	9	0	36	2	6	1
WHAT	39	7	7	7	24	26	3	16	0	37	1	6	1
WHERE	44	2	3	11	29	22	4	18	1	35	1	8	1
WHEN	37	1	12	8	24	33	1	11	0	38	2	4	1
WHY	37	2	9	9	25	33	1	11	0	34	8	3	0
HOW	44	6	6	11	22	22	1	22	0	34	2	9	0
WHICH	41	6	6	9	24	32	3	10	0	33	7	4	1
WHOSE	39	9	8	6	22	30	6	9	0	42	3	0	0
TOTAL:	320	41	56	71	192	222	31	106	1	289	26	40	5
%	89	11	16	20	53	62	9	29	1	80	7	11	1
S2 WHO	41	3	7	19	16	13	9	22	1	23	0	22	0
WHAT	44	0	4	19	22	7	1	35	2	22	0	20	3
WHERE	44	0	3	20	22	9	5	29	2	14	5	26	0
WHEN	43	0	3	20	22	12	4	27	2	24	3	17	1
WHY	43	1	8	16	20	20	2	19	4	19	11	14	1
HOW	42	3	3	17	22	11	2	31	1	29	3	13	0
WHICH	42	0	6	20	19	18	5	21	1	25	7	12	1
WHOSE	43	3	8	18	16	14	12	17	2	31	5	9	0
TOTAL:	342	10	42	149	159	104	40	201	15	187	34	133	6
%	95	3	12	41	44	29	11	56	4	51	9	37	2
S4 WHO	45	0	0	4	41	3	4	25	13	11	2	27	5
WHAT	45	0	0	4	41	0	1	28	16	15	2	24	4
WHERE	43	0	0	3	42	2	3	25	15	10	0	33	2
WHEN	45	0	0	3	42	6	0	25	14	18	2	22	3
WHY	42	0	1	3	41	7	3	23	15	13	9	20	3
HOW	44	1	0	2	42	4	0	26	15	19	1	22	3
WHICH	40	1	3	3	38	1	2	24	18	14	10	18	3
WHOSE	44	0	2	4	39	10	4	17	14	24	1	15	5
TOTAL:	348	2	6	26	326	33	17	193	120	124	25	181	28
%	97	1	2	7	91	9	5	54	33	34	7	50	8

B. YN-Qs	G-Qs		-INV			I.Q-OP			
P6 YN-Q	44	----	18	1	14	12	34	3	7	1
%	98	----	40	2	31	27	76	7	16	2
S2 YN-Q	45	----	0	5	24	16	27	0	16	2
%	100	----	0	11	53	36	60	0	36	4
S4 YN-Q	44	----	1	0	14	30	21	0	21	3
%	98	----	2	0	31	67	47	0	47	7

C. EYN-Qs	G-Qs	+INV-CON				-INV-CON				+INV+I.CON			
P6 EYN-Q	36	34	11	0	0	42	3	0	0	40	5	0	0
%	80	76	24	0	0	93	7	0	0	89	11	0	0
S2 ENY-Q	32	34	9	2	0	23	18	4	0	36	7	2	0
%	71	76	20	4	0	51	40	9	0	80	16	4	0
S4 EYN-Q	44	21	1	23	0	11	5	25	4	20	5	20	0
%	98	47	2	51	0	24	11	56	9	45	11	45	0

Appendix 15c

A Summary of the CMG Subjects' Performance on the Correction Tasks

A.WH-Qs	G-Qs	WH-P				-INV				I.Q-OP			
		O	J/L	C	E	O	J/L	C	E	O	J/L	C	E
P6 WHO	38	6	16	12	11	15	12	18	0	35	4	6	0
WHAT	30	9	9	16	11	23	6	16	0	34	2	9	0
WHERE	38	4	8	21	12	16	11	18	0	35	1	9	0
WHEN	37	11	8	14	12	30	6	9	0	41	4	0	0
WHY	38	7	4	19	15	31	3	11	0	40	4	1	0
HOW	36	14	7	8	16	19	8	18	0	37	0	8	0
WHICH	29	24	14	2	5	33	10	2	0	36	6	3	0
WHOSE	33	18	15	5	7	30	8	6	1	38	6	1	0
TOTAL:	279	83	81	97	49	197	64	98	1	296	27	37	0
%	78	23	23	27	14	55	18	27	1	82	8	10	0
S2 WHO	43	2	2	2	39	12	6	21	6	17	4	19	5
WHAT	42	3	1	4	37	8	2	29	6	13	0	19	13
WHERE	45	0	1	2	42	12	2	21	10	14	3	21	7
WHEN	44	1	0	1	43	9	1	26	9	19	2	20	4
WHY	40	1	5	5	34	22	0	16	7	10	6	20	9
HOW	43	1	1	4	39	7	3	23	12	20	5	17	3
WHICH	43	3	2	0	40	17	2	13	13	13	10	14	8
WHOSE	41	5	6	4	30	13	1	16	15	20	6	11	8
TOTAL:	341	16	18	22	304	100	17	165	78	126	36	141	57
%	95	4	5	6	84	28	5	46	22	35	10	39	16
S4 WHO	43	1	3	0	41	5	5	19	16	4	3	31	7
WHAT	37	1	0	0	44	1	0	26	18	4	0	32	9
WHERE	45	0	0	1	44	2	3	21	19	3	3	31	8
WHEN	44	0	0	0	45	3	1	23	18	7	5	24	9
WHY	35	0	7	0	38	9	0	22	14	5	11	20	9
HOW	45	2	0	1	41	0	2	22	21	5	3	30	7
WHICH	38	1	3	0	41	4	2	18	21	4	11	22	6
WHOSE	40	1	2	0	42	2	5	16	22	6	5	23	11
TOTAL:	327	6	15	2	336	26	18	167	149	38	41	213	66
%	91	2	4	1	93	7	5	46	41	11	11	59	18

B. YN-Qs	G-Qs		-INV				I.Q-OP			
P6 YN-Q	44	----	7	11	20	7	31	3	10	1
%	98	----	16	24	44	16	69	7	22	2
S2 YN-Q	45	----	5	1	11	28	12	2	18	13
%	100	----	11	2	24	62	27	4	40	29
S4 YN-Q	45	----	1	0	7	37	11	0	24	10
%	100	----	2	0	16	82	24	0	53	22

C.EYN-Qs	G-Qs	+INV-CON				-INV-CON				+INV+I.CON			
P6 EYN-Q	20	38	7	0	0	37	8	0	0	28	17	0	0
%	44	84	16	0	0	82	18	0	0	62	38	0	0
S2 EYN-Q	28	42	3	0	0	36	7	2	0	36	9	0	0
%	62	93	7	0	0	80	16	4	0	80	20	0	0
S4 EYN-Q	42	2	3	30	10	2	0	17	26	8	4	23	10
%	93	4	7	67	22	4	0	38	58	18	9	51	22

Appendix 16a

A Summary of the Subjects' Performance on the Three Q-operators in the Grammaticality Judgment Task:

	WH-Qs TOTAL: (5-1=120)															YN-Qs TOTAL: (5-1=15)													
	COP					MOD					DO					COP					MOD					DO				
	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
EMHK P6	36	34	23	15	12	22	30	28	26	8	46	35	18	11	10	4	7	1	1	2	6	5	3	0	1	11	3	0	0	1
S2	8	34	42	27	9	3	21	29	44	23	5	39	52	16	8	0	6	7	2	0	0	4	5	5	1	3	7	4	1	0
S4	9	25	30	40	16	1	13	36	38	32	6	50	36	22	6	0	5	6	1	3	0	1	6	6	2	6	6	1	1	1
TOTAL:	53	93	95	82	37	26	64	93	108	63	49	124	106	49	24	4	18	14	4	5	6	10	14	11	4	20	16	5	2	2
%	15	26	26	23	10	7	18	26	31	18	14	34	29	14	7	9	40	31	9	11	13	22	31	25	9	44	36	11	4	4
CMHK P6	42	33	28	11	6	49	37	22	9	8	68	28	9	10	5	6	3	3	0	3	8	6	1	0	0	13	2	0	0	0
S2	27	44	27	15	7	30	36	23	18	9	64	27	19	7	3	7	5	2	0	1	5	3	2	4	1	10	5	0	0	0
S4	13	33	42	21	11	14	29	44	17	15	44	27	35	12	2	2	7	5	1	0	2	3	6	3	1	9	3	3	0	0
TOTAL:	82	110	97	47	24	93	102	89	44	32	176	82	63	29	10	15	15	10	1	4	15	12	9	7	2	32	10	3	0	0
%	23	31	27	13	7	26	28	25	12	9	49	23	18	8	3	33	33	23	2	9	33	27	20	16	4	71	22	7	0	0
CMG P6	25	27	31	25	12	54	20	25	17	3	39	31	27	11	12	1	4	4	5	1	5	0	7	3	0	8	2	2	3	0
S2	29	36	23	24	8	43	26	32	16	2	45	30	23	22	0	4	3	3	2	3	4	4	2	2	3	6	5	0	0	4
S4	13	40	32	27	8	11	12	30	47	17	26	30	33	22	9	5	3	4	3	0	4	3	4	1	3	5	6	1	2	1
TOTAL:	67	103	86	76	28	108	58	87	80	22	110	91	83	55	11	10	10	11	10	4	13	7	13	6	6	19	13	3	5	5
%	19	29	24	21	8	30	16	24	22	6	31	25	23	15	3	22	22	24	22	9	29	16	29	13	13	42	29	7	11	11

Appendix 16b

A Summary of the Subjects' Performance on the Three Q-operators in the Correction Task

	WH-Qs TOTAL: (0 TO E=120)												YN-Qs TOTAL: (0 TO E=15)									
	COP				MOD				DO				COP				MOD				DO		
	0	J/L	C	E	0	J/L	C	E	0	J/L	C	E	0	J/LC	E	0	J/LC	E	0	J/LC	E
EMHK P6	100	5	14	1	80	3	35	2	117	0	3	0	15	0	0	8	0	7	0	15	0	0
S2	23	17	80	0	6	6	108	0	29	3	88	0	5	0	10	0	0	15	0	4	0	10
S4	27	14	79	0	8	3	106	3	21	3	96	0	3	0	12	0	0	15	0	4	0	11
TOTAL:	150	36	173	1	94	12	249	5	167	6	187	0	23	0	22	0	8	37	0	23	0	21
%	41	10	48	1	26	3	69	1	46	2	52	0	51	0	49	0	17	82	0	51	0	47
CMHK P6	78	14	23	5	100	7	11	0	111	3	6	0	10	1	3	1	12	2	0	12	1	2
S2	50	16	52	2	57	15	49	0	80	4	32	4	9	0	6	0	8	6	1	10	0	4
S4	42	21	54	3	18	6	74	23	64	1	53	2	9	0	5	1	2	11	2	10	0	5
TOTAL:	170	51	129	10	175	28	134	23	255	8	91	8	28	1	14	2	22	19	3	32	1	11
%	47	14	35	3	49	8	37	6	71	2	25	2	62	2	31	4	49	42	7	71	2	24
CMG P6	76	10	34	0	105	9	2	0	115	4	1	0	5	1	8	1	13	1	1	0	13	1
S2	36	17	41	26	35	13	64	8	55	6	36	23	1	0	7	7	7	1	6	1	4	1
S4	20	27	53	20	5	11	73	31	13	3	87	17	6	0	7	2	4	0	5	6	1	0
TOTAL:	132	54	128	46	145	33	139	39	173	13	124	40	12	1	22	10	24	2	12	7	18	2
%	37	15	36	13	40	9	39	11	48	4	34	11	27	2	49	22	53	4	27	16	40	4