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*The Relationship between Metacognition and Fossilization in the Course of
the Acquisition of English as a Second Language
The Case of Second Year Students of English
University of Constantine*

**Dissertation submitted to the Faculty of Arts and Foreign Languages in partial
fulfilment of the requirements for the Degree of Magister in Applied Linguistics and
English Language Teaching**

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Dedication

To Whom I Owe

Everything

We think so because other people all think so; or because – or because – after all we do think so; or because we were told so, and think we must think so; or because we once thought so, and think we still think so; or because, having thought so, we think we will think so...

Henry Sidgwick

(Cited in Osler, 2009, p.300)

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Abstract

This study investigated the relationship between second year students of English metacognition and fossilization at the morphosyntactic level of the acquisition of English as a second language; hypothesising that students with a high degree of metacognition would exhibit a low degree of fossilization

Data collection involved three sources: (1) The Language Learning Orientations Scale – Intrinsic Motivation, Extrinsic Motivation, and Amotivation (LLOS-IEA); an adaptation of a questionnaire developed by Noels, Clement & Pelletier (2001). This scale was used to isolate the motivated students since we cannot speak about fossilization without the students being motivated to learn a second language, (2) an adaptation of Schraw and Dennison's (1994) 52 item self-report instrument; The Metacognitive Awareness Inventory (MAI) which was used to assess students' awareness of knowledge of cognition and regulation of cognition, the two main components of metacognition; and (3) three different written performances of each student participating in this study that serve to assess their morphosyntactic errors, a mirror that reflects their fossilization.

The subjects in this study were randomly selected from the entire population of students enrolled at the second year of English (LMD stream) at Mentouri University of Constantine.

The results of this study indicate that there is absolutely no relationship between students' domain general metacognition and fossilization.

In this study no distinction was made between a second and foreign language on the basis that any language that is not the mother tongue is a second language. Moreover, no distinction was made between learning and acquisition on the basis that a language is acquired either by natural exposure to it or by learning it. Thus, the terms second/ foreign language and learning/ acquisition were used interchangeably.

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Introduction

I. Statement of the Problem

Fossilization has captured the attention of many second language acquisition researchers over many decades. It has been conceptualized as a cognitive process. Studied extensively by researchers, the process is not fully understood or defined. Researchers, however, agree that the role of cognition is important in fossilization. Metacognition or thinking about thinking is a component of cognition. This study is an attempt to better understand the unique influence of metacognition on fossilization.

Han (2004a) analyzes fossilization from both the cognitive and empirical levels: fossilization involves those cognitive processes, or underlying mechanisms that produce permanently stabilized interlanguage (IL) forms; fossilization involves those stabilized interlanguage forms that remain in the learner's speech or writing over time, no matter what the input or what the learner does. The term fossilization is interpreted from different perspectives by different researchers. Fossilization is interpreted both as a process, a cognitive mechanism, and as a product of learning. As to the origins of fossilization, scholars and researchers agree on the following points: both internal and external factors contribute to fossilization. In terms of internal factors, cognitive, affective, and biological factors are taken into consideration; in terms of external factors, pedagogical, social and cultural factors are deeply involved. In addition to this, fossilization can take place at the level of pronunciation, spelling, morphological and syntactic structures, and discourse structures etc. Studies on fossilization have greatly captured the attention of scholars in the field of second language acquisition. Understanding the relationship between both dimensions of metacognition as a domain independent construct i.e. metacognitive knowledge and metacognitive regulation on the one hand and fossilization at the morphosyntactic level in the acquisition of English as a second language on the other hand is the focus of this study.

II. Purpose of the Study

The purpose of this study is to determine the extent to which domain general metacognition influences fossilization in second language acquisition. One of the purposes of this study is to verify the relationship of domain general metacognition used by non fossilized learners of English as a second language versus fossilized learners of English as a second language. If the metacognition used by non fossilized learners of English as a second language can be verified and can be predictive of successful second language acquisition, then fossilized learners of English as a second language can likewise use domain general metacognition to improve their English language performance and get rid of their fossilization.

III. Research Questions and Hypothesis

The focus is on the following questions:

1. What is the predictive contribution of domain general metacognition on successful second language acquisition i.e. fossilization free English as a second language acquisition?
2. What is the predictive contribution of knowledge of cognition on successful second language acquisition i.e. fossilization free English as a second language acquisition?
3. What is the predictive contribution of regulation of cognition on successful second language acquisition i.e. fossilization free English as a second language acquisition?

Based on these research questions, we stated the following hypothesis: students with a high level of metacognition would exhibit a low degree of fossilization.

IV. Significance of the Study

The questions in this study are presented to address issues that will contribute to the body of knowledge in both the metacognition and second language acquisition literature. The

research questions provide a basis for testing the hypothesis, which will indicate the specific relationships to be examined. Thus, the questions assume a positive relationship between domain general metacognition and fossilization in the course of the acquisition of English as a second language.

The metacognition literature would benefit from this study by better understanding metacognition since no single book gave a detailed account of metacognition. Second language acquisition literature will benefit because this study will provide a bridge to research, associated with the possibility of using metacognition as a component of a possible defossilization process.

V. Organization of the Study

This dissertation consists of three chapters: two chapters that represent the theoretical background of the research and a third chapter that represents its practical part.

Chapter one deals with fossilization; its definitions, differentiation from other constructs, key issues, and causal variables.

In Chapter two metacognition is discussed; its research origins, its definitions, differentiation from other constructs, key issues, its components; and its relation to second language acquisition.

Chapter three provides a description of the methodological approach in this study. Research design, subject sample, and instrumentation are presented. Then the collection and analysis of data and limitations of the study are recorded. Chapter three also provides the interpretation of the data as collected utilizing the literature and based on the prescribed methods. It also summarizes the study, presents conclusions, and makes recommendations about practical applications and implications of the findings.

Chapter One

Metacognition

Introduction

Origins of the Research on Metacognition

The concept of thinking about thinking can be traced back to at least Plato and Aristotle who emphasized the importance of reflecting through dialogue. Yet, the beginning of metacognition as an independent research subject, one that is considered different from "plain" cognition, dates back to Hart's Ph.D. thesis at Stanford in 1965 on feeling of knowing (Metcalf and Shimamura, 1994). However, the term "metacognition" for this notion of thinking about or controlling one's own thinking, was not introduced until 1976 by Flavell (Dickson et al, 1998). A brief review of the evolution of metacognition in psychology and education is presented in this part.

Historically, modern metacognitive research arose from two parallel origins, one is the emerging cognitive psychology of the 1960s which was interested in already-developed processes in adults (e.g. Hart, 1965) and the other is the post-Piagetian developmental psychology of the 1970s (e.g. Flavell, 1979). To some extent, these two lines have remained largely separate. Recently, however, there have been more cooperative efforts to bring them closer together (e.g. Hacker, 1998).

Coming from an adult cognition tradition, Hart (1965, 1967) was interested in his subjects' accuracy of judgments made about memory. He assumed that adults have conscious experiences such as "feelings of knowing." What was important to discover was whether they were valid predictors of behaviour.

Developmentalists were also interested in metacognition, but opted for a different path to explore it. Flavell wanted to find out whether the improvement in children's memory abilities was a result of greater conscious understanding of the rules that govern memory and cognition or not (Schwartz & Perfect, 2000). This idea of conscious understanding and goal-directed thinking applied to one's thoughts to accomplish cognitive tasks is snugly enclosed in the presentation of the theory of formal operations in which higher ordered levels of thought operate on lower ordered levels, is advocated by Piaget, a likely contributor to Flavell's idea of "knowledge and cognition about cognitive phenomena"(Hacker, 1998 & Moshman, 1999). As Piaget began his method of inquiry into concrete operational thought, he paved the way to the study of metacognition. Rather than being interested in the answers that children gave to the questions he asked, he was interested in how they accounted for their answers. How they know what they know (Newman & Newman, 2006).

When Flavell and his colleagues conducted their metamemory research in the early 1970s, the term "metamemory" was introduced. As a result of this introduction, the term "metacognition" came into vogue around 1975. Flavell became known as the founding father of the concept "metacognition" (Manning, 1991). Soon after Flavell's introduction, interest in metacognition thrived. Brown (1980) applied metacognitive theory to reading and distinguished cognitive from metacognitive processes. She defined metacognitive processes as reader-controlled strategies that included selecting and studying the most important part of text, selecting retrieval cues, and estimating readiness for tests (Dickson et al, 1998).

Theoretical and empirical interest in metacognition tended to diminish later on. Some thought that metacognition was no longer a beneficial subject. Flavell (1982) wrote that "none of us has yet come up with deeply insightful, detailed proposals about what metacognition is, how it operates, and how it develops" (p. 28). However, starting with the epoch-making work of Thomas Nelson and his fellow researchers (e.g. Nelson, 1984; Nelson et al., 1982; Nelson

et al., 1986), metacognition made a strong comeback (Son & Schwartz, 2000). Nelson stressed that metacognition is a model of cognition, which operates at a meta-level, and is related to the object-world, i.e. cognition, through the monitoring and control function. The meta-level is informed by the object-world through the monitoring function and modifies the object-world through the control function (Efklides, 2001). Almost immediately, educational researchers embraced metacognition as an explanation for why some students were more successful than others. Instructional interventions to promote metacognition soon followed, along with recommendations to practitioners. Metacognition is now soundly established in theories of learning (Baker, 2002).

Origins of the Psychological Development of Metacognition

To deal with the psychological development of metacognition, one needs to deal with some important questions. Question 1 pertains to whether metacognitive knowledge is innate or constructed. Question 2 pertains to how is metacognitive knowledge constructed and what intellectual mechanisms contribute to its construction? Question 3 pertains to where does metacognitive knowledge come from? Question 4 pertains to what factors influence the development of metacognition.

Schraw (1998) answered the first question quite easily, he strongly believes that metacognitive knowledge is not innate stating that: “there is no compelling evidence that I know of that suggests that metacognitive knowledge exists at birth or is in any way innate” (p.97).

Pinard (1992) goes in the same direction when pointing out that metacognitive knowledge is not innate or immanent in the individual, but must be constructed.

Research generally suggests that metacognition develops in the early years and continues to be used throughout life in the same way that thinking and language develop at an early age and go on being used throughout life too (Hill ,1998).It indicates that the development of metacognition may arise at the age of five to seven years and is built up during and through schooling (Hartman,2001).Research also indicates that metacognition develops with age and through practice (Metcalfe & Shimamura,1996).

Studies examining younger children typically report poor cognitive self-appraisal as well as poor metacognitive regulation. Young students have an illusion of comprehension following what they hear or read because they rarely monitor their knowledge (Paris &Winograd, 1990).Researchers observed that learners in the early years of primary school make accurate judgments of learning but will not use those judgments when allocating additional study time across the items. In contrast, studies of older children and adolescents report a far greater degree of metacognitive regulation. Older children will use their judgments when allocating extra study time. While older children did not allocate additional study time to items they judged to have learned and allocated extra study time to items they judged to have not yet learned, the younger children were not systematic in allocating extra study time mainly to the items that have not been learned (Nelson, 1999 & Schraw, 1998).We have seen that metacognition is not innate and develops with age. This leads us to ask the second question.

To answer question 2 is not an easy task because ‘how is metagonition constructed?’ is an ill-defined problem (Pinard, 1992).

Flavell (1992) proposed that there is an inner consistency between the concept of metacognition and Piaget's developmental stage of formal-operational thinking. At this phase of development children manifest hypothetico-deductive reasoning, which requires metacognitive control. Flavell contended that Piaget would not expect metacognition to

appear before reaching the stage of formal-operational thinking as he argued that young children's egocentrism hinders them from introspecting or treating their own thoughts as an object of thought. He claimed that there is an early phase of development i.e. "proto-metacognition" at which children acknowledge that different people may see different things, although they cannot handle the various perspectives of others (Veenman & Spaans, 2004).

Shraw (1998) proposed three levels as to the acquisition of proficiency at thinking. At level 1, the individual adopts cognitive skills and strategies. Next, he constructs metacognitive knowledge i.e. level 2 to regulate the first level. Finally, he develops level 3 conceptual theories of his own cognition.

Concerning what intellectual mechanisms contribute to the construction of meta cognition, Shraw (1998) believes that metacognitive awareness and regulation do not seem to be strongly related to ability or to domain knowledge. He believes that metacognitive growth is an incremental by-product of practice and developing expertise within a domain. And over the years, domain-specific knowledge and metaknowledge are integrated into domain-general knowledge. Shraw claims that metacognition develops at least through early adulthood, and is not strongly related to other eminent cognitive variables such as ability. In contrast, Pellegrini and Bjorklund (1998) think that competent cognition influences metacognition and metacognition influences cognition as well with the two being intimately interrelated.

To answer the third question, Schraw (1998) summarized that metacognitive knowledge arises from three primary sources. The first is direct learning, during which learners receive instruction from the teacher where strategies are taught and modeled to increase declarative, procedural, and conditional knowledge. Techniques such as modeling instructors, guided practice and independent practice can enhance the use of reading strategies, study skills, and other cognitive activities. The second is peer-regulated learning, which is inspired by Vygotsky's "zone of proximal development", which proposes that learning occurs best just

beyond one's current level of independent functioning. Thus learners learn best from the interaction with other learners who are slightly more advanced. Peer-mediated activities in which learners exchange ideas and practice are excellent for increasing strategy selection, conditional knowledge, and self-regulation of learning. The third source of metacognitive knowledge is autonomous learning, during which learners spontaneously construct knowledge and strategies for domain-relevant tasks. Existing strategies may be modified, adapted or combined with creative input as the learner encounters new situations.

To answer question 4 we need to consider Flavell's view .Concerning this point, Flavell (1978) indicates that metacognitive development is influenced by many factors other than the simple fact of possessing knowledge about one's cognition. These factors are: metalanguage, moral judgments, or as Flavell puts it: social cognition, and other topics (p. 213). He adds that metacognitive development is influenced by factors such as attention, communication, comprehension, and problem solving.

1.1 What is Metacognition?

1.1.1 A Fuzzy Concept

Because metacognition derives from various disciplines and is a fairly new construct, definitional vagaries abound. Vagaries arise because: (a) metacognition has been used as a "blanket term" (Brown, 1987) to denote a multifaceted range of interventions varying widely in scope, purpose, and dimension; (b) educators and psychologists disagree on the range of knowledge and activities classified as metacognitive (Billingsley & Wildman, 1990); and (c) it is difficult to distinguish "meta" from "cognitive" (Borkowski, 1992; Brown, 1987).

Metacognition is acknowledged by its first user to be a fuzzy concept (Flavell, 1981). Research on it has stemmed independently from distinct disciplines (cognitive psychology, developmental psychology, and philosophy of mind) (Schwartz & Perfect, 2002) and has been

investigated for a wide variety of purposes which resulted in little consensus concerning the exact meaning of the word and made the concept of metacognition even fuzzier (Hacker, 1998). Paris and Winograd (1990) go as far as to say that: “The definition of metacognition remains a thorny issue. Any cognition that one might have relevant to knowledge and thinking might be classified as metacognition, and thus inclusive definitions are impossible ... thus metacognition remains open-ended and definitions of metacognition almost become projective tests” (Paris & Winograd, 1990, p.19).

Borkowski (1996) described the theoretical work on metacognition as mini-theories that are weakly related and whose boundaries are so poorly delineated that any endeavor at synthesizing them empirically or theoretically is almost impossible.

Although much research work has been done for decades in the area, the complexity and multifaceted aspect of metacognition creates difficulties for its researchers to build sound theories, to design completely reliable measurements, to find an explanatory power, and to advocate prescriptions for instruction (Paris & Winograd, 1990). Currently, one can find in the literature several terms used to describe the same basic phenomenon (e.g. self-regulation, self-management, executive control), or an aspect of that phenomenon (e.g. metamemory, metalearning - metacognitive aspects of memory and learning).

1.1.2 Definitions of Metaognition

To define metacognition is a rational starting point, but most researchers elude giving operational definitions. Instead, they use prototypical examples of students' thinking about thinking in order to illustrate metacognition. In the literature the term has been defined in various ways. Experts offer many different definitions and models of metacognition because any cognition that might have relevance to knowledge and thinking might be classified as a metacognition (Paris & Winograd, 1990). Although there is no single agreed upon definition,

most researchers agree that a definition of metacognition should involve at least these notions: knowledge of one's knowledge, processes, and cognitive and affective states; and the ability to consciously and deliberately monitor and regulate one's knowledge, processes, and cognitive and affective states (Hacker, 1998).

According to Paris and Winograd (1990) in his pioneering work Flavell (1978) emphasized the learners' metacognitive knowledge of person, task, and strategy variables on one hand. On the other hand, Brown (1978) emphasized aspects of executive cognition like planning, monitoring ,and revising one's thinking .Most researchers now blended these two twin views into definitions that integrate both knowledge of one's processes and cognitive states on the one hand and regulation of one's metacognitive knowledge on the other hand (Borkowski1985, e.g.).Recently ,researchers added to these blended views an affective component of metacognition such as metacognitive beliefs or attributions (Paris & Winograd, 1990). Paris and Winograd believe that this dichotomy of the mind is compatible with information processing explanations of declarative and procedural knowledge and seizes two important properties of metacognition: self-appraisal and self-management of cognition. Martinez (2000) states that: "Executive or metacognitive functions lend a hierarchical structure to information-processing models. In Sternberg's model metacognitive ability stands at the apex of the information-processing pyramid directing lower-level and more specific components" (p.31).

1.1.2.1 Flavell's Definition of Metacognition

In his 1976 article, Flavell recognized that metacognition consisted of both monitoring and regulation aspects. It was here that the term metacognition was first formally used in the title of his paper. He defined metacognition as follows:

Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g.,

the learning-relevant properties of information or data. For example, I am engaging in metacognition (metamemory, metalearning, metaattention, metalanguage, or whatever) if I notice that I am having more trouble learning A than B; if it strikes me that I should double-check C before accepting it as a fact; if it occurs to me that I had better scrutinize each and every alternative in any multiple-choice type task situation before deciding which is the best one; if I sense that I had better make a note of D because I may forget it;.... In any kind of cognitive transaction with the human or non-human environment, a variety of information processing activities may go on. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective (Flavell, 1976, p. 232).

This definition of metacognition focuses on two aspects i.e. metacognitive knowledge and metacognitive regulation. Metacognitive knowledge is divided into three components: (a) knowledge of cognitive processes, (b) knowledge of cognitive products, and (c) knowledge of learning-relevant properties of information or data. Metacognitive regulation refers to the orchestration of these processes in relation to the cognitive objects or data on which they bear, in order to achieve a concrete goal.

The above mentioned definition has been used frequently by authors, yet has invited a lot of criticism as being too vague and broad to be useful (Lesh et al, 2003). Noël (1997) for example finds that this too broad definition has left room for a lot of confusion. She states that research based on a definition encompassing so many different aspects has faced serious difficulties and has led to ambiguous conclusions and usually abusive generalizations. She

also believes that when we study the learners' knowledge of learning facilitating factors we usually conclude by malapropos using the term metacognition instead of reserving it to the learners' knowledge of their mental processes which is quite different.

1.1.2.2 Other definitions

Definitions of metacognition generally fall under three subcategories; like Flavell's definition there are definitions that focus on the components of metacognition. Others like that of Brown stress the control and regulation component. And a third subcategory like Borkowski's definition shed the light on the affective component of metacognition.

1.1.2.2.1 Definitions stressing the components of metacognition

Metacognition is a construct that describes people's cognition about their own cognition (Schraw, 1998). While generally speaking, it comprehends a number of individual components, and all of these components generate two main components that correspond to *knowledge about cognition* and *regulation of cognition*. Most researchers distinguish between these two principal components of metacognition (Schraw, 2001).

Büchel (1998) divides the concept of metacognition into two different elements: The first element is metacognitive knowledge and the second is executive functions. According to Doly (2005), metacognition comprises two components: on the one hand, *metacognitive knowledge* – true or not – that the individual possesses: (1) About “cognitive processes”: cognitive functioning; particularly one's own. (2) About strategies; those he has got and those he has not got. (3) About task; writing for example. And (4) about “cognitive products”: what he knows and does not know about knowledge. And on the other hand, the *control processes*: predicting, guessing, planning, monitoring (self-regulation) and evaluation.

Westwood (2004) refers to metacognition as the ability to ‘think about our own thinking’ and she isolates its two main components through the example of a student trying to

solve a problem. She states that the student thinking, 'This isn't working out correctly', is effectively *monitoring* his or her own performance. And when he thinks, 'I need to write this down to help me remember it', he is engaging in a metacognitive *self-regulating strategy*.

Magalhães & Rojo (1994) in their paper when stating (Baker & Brown, 1984) say that: "Metacognition is understood, in this paper, as a person's knowledge of and control over his or her own thinking and learning".

According to Niemi (2002) metacognition has traditionally been differentiated into two central components, namely: (1) knowledge about peoples' cognitive states and processes, and (2) the ability to control or modify these states. The knowledge component refers to the learner's understanding of his/her own schemes, strategies and processes on the one hand and his/her own understanding of him/herself as a learner on the other hand. The executive control component guides the selection of the strategies to be accurately and skilfully applied in any given situation.

Hill (1998) believes that metacognition is a theoretical construct used to describe two components. The first of these components is the *monitoring or self-appraisal* component, the second component involves *self-regulated use of strategies*. Hill gives a detailed list of the individual components subsumed under these two general components, stating that:

The behaviours which together constitute the theoretical construct of metacognition have been described as:

- one's knowledge concerning one's cognitive processes and products or anything related to them (Flavell 1976)
- the reflecting upon and the monitoring of the products of one's thought processes, as the result of an increased awareness of the nature of cognitive functions (Pratt and Grieve 1984)
- the means by which one can understand the status and capabilities of one's information processing system (De Stefano

and Gordon 1986)

- the use of planning strategies, and of higher order processing in response to situational demands, producing conscious evaluation and guidance of performance components during problem solving (De Stefano and Gordon 1986)

- knowing what one knows and knowing what one needs to know to achieve a goal (Wallach and Miller 1988) (Hill, 1998, p.107).

In fact, currently, one can find in the literature several terms used to describe the same basic components e.g. (monitoring or self-appraisal, metacognitive knowledge, knowledge about cognition) and (self-regulation, self-management, executive control, regulation of cognition).

Schraw (1998, & 2001,) gave a thorough classification of all these components of metacognition which he believes to be divided into knowledge of cognition and regulation of cognition.

Knowledge of cognition refers to what people know about their cognition, and usually includes three components. The first, *declarative knowledge* refers to knowing "about" things. It includes people's knowledge about themselves as learners and what factors influence their performance. The second component, *procedural knowledge*, refers to knowing "how" to do things. It refers to knowledge about strategies and other procedures. The third component, *conditional knowledge*, refers to knowing the "why" and "when" aspects of cognition. It refers to knowing why and when to use a strategy or in other words to knowing when and why to use declarative and procedural knowledge.

Regulation of cognition consists of at least three components: *planning*, *monitoring*, and *evaluation*. Planning involves the selection of appropriate strategies and the allocation of resources. It involves setting goals, activating relevant background knowledge, and allocating

time or attention. Monitoring refers to one's online awareness of comprehension and task performance. It involves self-testing skills necessary to control learning. Evaluation refers to appraising the products and efficiency of one's learning.

1.1.2.2.2 Definitions stressing the affective component of metacognition

According to Dickson et al (1998), metacognition refers to thinking about one's own thinking or controlling one's own learning. They state that motivation is often added as a third category to what most researchers agree that metacognition comprises i.e. the knowledge and self-regulation categories. Dickson & al believe that motivational beliefs include beliefs about: one's general competency, one's competency to perform specific tasks, one's ability to control or influence academic outcomes, causes and extent of academic success and failure, and benefits of using a strategy.

In the same vein go Hertzog and Hultsch (2000) when stating Wellman's 1983 definition of metacognition as cognitions about cognition, they identify and treat three major components of metacognition: (a) knowledge about cognition and cognitive functions, (b) the monitoring of the current state of the cognitive system, and (c) beliefs about cognition (including beliefs about one's own cognition).

McCombs (2001) also stresses the affective component of metacognition. Metacognition according to her can be defined as the use of higher order thinking, reasoning, and learning skills during learning. She says that it involves among other things the self in control and self-regulation of emotions.

Manning (1991) when referring to (Flavell, 1987, p. 21) defining metacognition as "Knowledge and cognition about cognitive objects, that is, about anything cognitive", includes under the umbrella of "anything cognitive" in addition to the cognitive, perceptual, and motoric human characteristics the affective human characteristics.

Paris and Winograd (1990, p.15) define metacognition as “knowledge about cognitive states and abilities that can be shared among individuals” and at the same time expand this notion to encompass the affective and motivational properties of thinking. They concur that “cognitive evaluations are rarely dispassionate assessments”. If children are asked whether or not they are good readers, why they got a high or low grade, or whether or not they think they can solve a given problem; they will respond with strong emotions. According to them these emotions that accompany metacognitive knowledge are referred to as “metacognitive experiences” by Flavell (1985). Paris and Winograd believe that metacognitive knowledge can be interpreted in terms of different motivational frameworks. For example in an expectancy- value orientation, a child with low expectations for success attributes a low value to the task at hand .In an attributional frame, this child attributes his failure to his poor ability or to the teacher’s lack of help regarding the task and may feel angry at himself and at the teacher. They conclude by saying that the child’s expectations, perceptions of the task, and attributions for success and failure can all be viewed as “emotionally charged metacognitions”.

1.1.2.3 An Alternative Definition of Metacognition: Noël’s Definition

According to Noël (1991), there is a great deal of confusion affecting researchers’ definitions of metacognition .She believes that a large part of confusion is sometimes due to the fact that there is no clear cut distinction between the different aspects and the different phases of the metacognitive process and sometimes it is due to the fact that there is no distinction between the mental process that is metacognition and the cognitive activity on which it bears. In order to remedy the lack of precision that strikes the accepted definitions of the construct of metacognition, Noël suggests the following definition:

La métacognition est un processus mental dont l'objet est soit une activité cognitive, soit un ensemble d'activités cognitives que le sujet vient d'effectuer ou est en train d'effectuer, soit un produit mental de ces activités cognitives. La métacognition peut aboutir à un jugement (habituellement non exprimé) sur la qualité des activités mentales en question ou de leur produit et éventuellement à une décision de modifier l'activité cognitive, son produit ou même la situation qui l'a suscitée (Noël ,1991, p. 17).

According to Noël (1991) the metacognitive activity comprises three steps: (1) The mental process that consists of the learner's awareness of his or her cognitive activities or their product.(2) The judgment the learner makes about the quality of the cognitive activities in question and their product.(3) The decision the learner takes in order to modify or maintain the cognitive activity, its product, or even the situation that entailed it according to the demands of his or her metacognitive judgment.

We notice that Noël's definition of metacognition includes three components :(1) Metacognitive knowledge (The learner's awareness of his or her cognitive activities or their product). (2) Metacognitive experiences (The judgment the learner makes about the quality of the cognitive activities in question and their product). (3) Metacognitive regulation (The decision the learner takes in order to modify or maintain the cognitive activity, its product, or even the situation that entailed it).

What is striking about this definition is the focus on metacognitive judgments; the bridge that fills in the gap between the two commonly agreed on components of metacognition i.e. metacognitive knowledge and metacognitive regulation. These judgments are no more than the affective component of metacognition. Noël's definition has combined the two previous types of definitions to yield a more operational definition.

1.1.3 Differentiation from Other Constructs

Metacognition and Cognition

The Greek term, **meta**, means "beyond or transcendent" and the Latin term, **cognition**, means "knowing." Thus, **metacognition** means "transcending knowing" (Cohen & Frydenberg, 2006). But how is metacognition different from cognition?

Cognition refers to knowing and thinking. In addition to taking in, storing, retrieving, transforming, and manipulating information that is acquired via the senses, it also includes perception; awareness; judgment; and the understanding of emotions, memory and learning (Ashman & Conway, 1997).

Distinguishing between what is cognitive and what is metacognitive has always been a thorny issue. Distinctions are difficult because metacognition is, by its very nature, a "fuzzy concept" (Hacker, 1998). Geiger (1993) points out that

... there exists as yet no recognizable consensus about the exact nature of the difference between cognition and metacognitiongenerally, however, psychologists interested in studying the two do so by measuring cognition as a person's ability to accomplish assigned tasks which require thinking, and by measuring metacognition as a person's ability to reflect on that cognition (Geiger, 1993, p.268).

Dickson et al. (1998) mention five reasons they believe to be at the origin of the difficulties to distinguish *meta* from *cognitive*. First, the difficulty to distinguish metacognitive strategies from other processes such as thinking, reasoning, and perceiving. Second, some strategies once considered cognitive are now considered metacognitive; they include among other things (a) identifying important ideas; (b) activating prior knowledge; (c) compensating for failure to understand input; and (e) assessing one's level of comprehension.

Third, the interchangeability in function of some activities such as, asking questions about the input that might function either to improve one's knowledge (a cognitive function) or to monitor it (a metacognitive function). Fourth, some strategies are embedded in complex behavioral sequences and decision hierarchies, which makes the subsets difficult to isolate. Finally, the developmental influences on strategy application; metacognition develops slowly over time.

Some researchers believe that metacognition is a model of cognition which acts at a meta-level and is connected to cognition (the object-world) through the monitoring and control functions (Efklides, 2006). Efklides borrows Nelson's 1994 ideas about the meta-level that is informed by the object-world (i.e. cognition) through the monitoring function and that modifies the object-world through the control function. She advocates the dual role of metacognition in relation to cognition (a) on account of monitoring processes, metacognition maps a representation of cognition; and (b) exerts control on cognition thanks to this representation of cognition. Nelson (1999) contends that:

metacognition is more of a subset of cognition than something other than cognition. Put differently, metacognition is a particular kind of cognition..... the difference between an aspect of metacognition versus the aspect of cognition that it is "about" is *relational* rather than *absolute*. Put differently, there is no particular aspect of cognition that is always at the meta-level in any absolute sense. Instead, we say that if one aspect of cognition is monitoring or controlling another aspect of cognition, then the former aspect is metacognitive in relation to the latter aspect (Nelson, 1999, p.625).

To clarify this idea of metacognition being a subset of cognition, Nelson gives the example of metacognitive monitoring: when we recall the answer to a given question (e.g., the

question "What is the capital of Australia?"), and then we ask how sure we are that our answer is correct. Thus we would make a confidence judgment about our recall of that answer. This is an example of our cognition (namely, confidence) about one of our own cognitions (namely, recall).

In this same direction goes Wells (2000), believing that metacognition which can be defined as any knowledge or cognitive process that is involved in the appraisal, monitoring or control of cognition, is thought of as a general aspect of cognition that is involved in any cognitive enterprise.

Metacognition and cognition are respectively referred to as higher order thinking and lower order thinking (Lesh, 2003). Martinez (2000) posits the hierarchical structure that metacognitive functions lend to information-processing models. He states that metacognitive abilities stand at the vertex of the information-processing pyramid and direct lower-levels in Sternberg's model.

Sternberg (1990) points out that metacognition is defined as knowledge about and control of one's cognition and ordinary cognition is defined as what is known and controlled by metacognition. He states that both cognition and metacognition comprise two aspects i.e. process and knowledge. He states awareness of what one does and does not know as an example of metacognition as knowledge; whereas, cognition as knowledge is the knowledge itself. The formation of a strategy to solve a problem is the example he gives of metacognition as control processes, whereas, the mental steps that are actually used to solve the problem are the example of cognition as cognitive processes. According to Sternberg, metacognition and cognition interact in the same way processes and knowledge do: In order to function intelligently, one must adjust one's metacognition to tune one's cognition, and vice versa.

Some researchers tried to demarcate a clearer distinction between cognition and metacognition. Schraw (1998) believes that metacognition differs from cognition in that

cognitive skills are those that help a person perform a task; while metacognitive ones are those that help him or her understand and regulate cognitive performance. Schraw (2001) strongly believes that metacognitive knowledge and regulation are qualitatively different from other cognitive skills. He states some reasons for this idea: (a) metacognition appears to be more durable and general than domain encapsulated cognitive skills; (b) while high levels of domain specific knowledge may facilitate the acquisition and use of metacognition, domain knowledge does not guarantee higher levels of metacognition; and (c) individuals high on the metacognitive awareness scale may use this knowledge to remedy weaknesses in domain-specific knowledge.

Studies held to distinguish cognition from metacognition postulate that cognition is concerned with doing whereas, metacognition is concerned with selecting and planning what to do and monitoring what is being done (Garafalo & Lester cited in Zaccaro, 2001).

Gourgey (2001) distinguishes between cognitive strategies and metacognitive ones. He points out that cognitive strategies help individuals make progress in order to build knowledge, while metacognitive strategies help them monitor and improve their progress in order to evaluate understanding and apply knowledge to novel situations. Metacognition is essential to cognitive effectiveness because it is monitoring and control of cognition through miniature task-specific models and understandings of factors that influence cognition (Butterfield & al, 1995).

1.1.4 Key Issues

1.1.4.1 Is Metacognition A Multidimensional And Domain General Construct?

Questions arise regarding the domain-specificity of metacognition. A relevant one is whether metacognition is domain-specific versus general and domain-independent. According to Veenman and Spaans (2005) research on the general or domain-specific nature of

metacognition gave divergent results so far. From an intelligence model perspective, metacognition is general by nature, surpassing tasks and domains as part of intelligence. In both the independency and mixed model, however, metacognition may be general or domain-specific to some extent. A developmental outlook, on another hand, yields different patterns. According to the ceiling hypothesis, metacognition starts out as a general construct that may end up as a more or less domain-specific one, whereas according to the acceleration hypothesis metacognition may initially be domain-specific then in the end it turns out to become more general. The monotonic development hypothesis does not put any restraint on the general or domain specific nature of metacognition.

Schraw (1998) summarizes these divergent views on this matter under three hypotheses. (1) The strict encapsulation hypothesis that maintains that metacognitive knowledge does not differ at all from any other kind of domain-specific knowledge. This view is based on two assumptions. First, metacognitive knowledge is encapsulated within strict domain confines that prevent transfer to other domains. Second, metacognitive knowledge is qualitatively similar to other kinds of domain knowledge like declarative and procedural knowledge for example.(2) The hierarchical encapsulation hypothesis that holds that metacognitive knowledge is qualitatively different from other kinds of knowledge within a domain because it is of greater self-regulatory importance, but is notwithstanding, encapsulated within fairly impermeable domain boundaries.(3) The domain-general hypothesis that assumes that metacognitive knowledge differs qualitatively from other kinds of domain-specific knowledge and may span a variety of domains in a way that domain-specific knowledge does not. Schraw (1998) is a fervent proponent of the domain-general hypothesis; he points out: “My view is that metacognition is a multidimensional array of self-constructed, regulatory skills that span a variety of diverse cognitive domains” (p.89).

He states that very little evidence supports any of the abovementioned hypotheses. According to him, supporters of the strict encapsulation hypothesis often acknowledge research focusing on poor between-domain transfer in support of their position. However, several recent studies (e.g. Kuhn, Schauble, & Garcia-Mila, 1992), indicate that problem-solving strategies in one domain can be transferred to another given extended practice and the opportunity to observe other skilled learners. Schraw believes that his view is congruent with available research from several perspectives. One is the literature of children's theory of mind that strongly argues against innate metacognitive knowledge and supports the idea of the rapid growth of cognitive and metacognitive abilities. Another is adult self-regulation research, which points out that aspects of metacognition such as metamemorial knowledge, global planning, strategy implementation, and monitoring are linked to effective learning, and go on to develop well into adulthood. A third is evidence that knowledge is represented at multiple levels. A fourth is the accrual in the understanding of the constructive processes that permit children and adults to model knowledge at multiple levels.

Dickson et al. (1998) also believe that metacognition is a domain general construct. They report Dixon et al. (1992) definition of big *ideas* as concepts or principles within or across content areas that have the greatest potential for enabling students to apply what they learn in varied situations. According to them metacognitive knowledge and self-regulation can be regarded as big ideas because they become *conspicuous strategies* that enable students to generalize the use of cognitive strategies across varied situations. In support of their idea they state two examples. First, the metacognitive knowledge of when or when not to use a given cognitive strategy eases the application of the strategy in various settings. Furthermore, the metacognitive knowledge of the value of a cognitive strategy may increase students' motivation to apply it independently, and enhance self-regulation. Second, Self-regulation meets the criteria of a big idea since students who were taught to self-monitor while

summarizing simple reading passages demonstrated greater reading comprehension on complex social studies passages than students who were taught the summarization strategy without the self-monitoring subset.

In the same vein goes Gourgey (2001). She believes in the suggestion that effective learners perceive all kind of knowledge acquisition as a form of problem solving and that metacognitive processes, unlike expertise in a specific area, stand beyond subject-matter boundaries. According to her, metacognition in mathematics is, in principle, no different from metacognition in reading. That is, once learners have acquired the basics (namely computation in mathematics as opposed to decoding in reading), their ability to think in the domain is based on clarifying goals, understanding important concepts, monitoring understanding, clarifying confusion, predicting appropriate directions, and choosing appropriate actions which all cut across multiple domains.

White's (1998) position is compatible with Gourgey's. He suggests that: "Perhaps research on metacognition should not be limited to reading or science or any single subject. Metacognition can pervade all learning and all thinking. If people are to be metaeognitive, they must be able to be so in all subjects, if willing" (White, 1998, p.1209).

1.1.4.2 Is Metacognition Conscious or Unconscious?

A very important theoretical question lies at the heart of research on metacognition: Is metacognition a conscious or an unconscious process? Little consensus has been reached in answer of this question that has been raised by many researchers in the field (e.g. Hacker, 1998; Paris, 2002; and Cary & Reder, 2002). Paris (2002) notes that:

A fundamental question is whether metacognition implies awareness of thoughts and conscious control of thinking or whether metacognition can be implicit and unconscious. This question ...is unlikely to be resolved by consensus because

researchers become attached to their operational definitions and methodological orientations that often lead to opposite answers (Paris, 2002, pp. 105 & 106).

Consciousness is generally believed to be an indispensable condition of metacognition. This assumption is clearly expressed by some researchers (e.g., Paris, 2002 & Hacker, 1998). Others, however, assert that metacognition can be implicit and unconscious (e.g., Cary & Reder, 2002). Another group of researchers hold an alternative position, they suggest that there are metacognitive processes that do not depend on conscious awareness making of metacognition a combination of explicit and implicit processes (e.g., Koriat, 2000).

Paris (2002) stresses the importance of defining metacognition in a way that clearly distinguishes it from other kinds of cognitions. For him, there are two key properties; one, metacognition must pertain to a cognitive (as opposed to a noncognitive) state, ability, or process and two it must be available for public scrutiny, this means it must be verbalized, reported, and conscious. He also notes that the major reason he favors a restricted definition of metacognition as conscious, aware, and often deliberate is that it allows these types of thoughts to be measured, verified, or disproved. He maintains that if metacognitions are defined as a broad set comprising implicit, unconscious and unmeasured thoughts, then they cannot be available for empirical testing and distinguishable from cognitions. According to him, there may be many other kinds of implicit and unconscious feelings, dreams, and associations about cognitions that influence how, when, and why people think in a particular way, but they should be regarded as a category of cognitions distinct from people's awareness of their own thinking. Paris concludes by saying that he is most concerned with a subcategory of thoughts that affect thinking that are conscious and reportable.

Hacker (1998) gives a vignette that illustrates a 12th-grade student using the simple strategy of increasing concentration to improve her understanding of a mathematics lesson. He mentions that the use of the strategy may have been a conscious and deliberate choice, as

well as an unconscious automatic response developed over the years and that stems from the belief that learning difficult material needs greater effort. Hacker believes that automatic cognitive processes may enfold cognition about one's own cognition just as metacognitive processes do. However, because people are aware of only the outcomes of unconscious automatic processes and not the processes themselves, it is difficult if not impossible for people to report on them. Hacker believes that whether the thoughts that were once metacognitive but have since become unconscious and automatic should be described as metacognitive remains a thorny issue of debate, because the unconscious and automatic nature of these thoughts sharply contrasts with the conspicuous features of metacognition as a process that involves an awareness of oneself as an actor in his or her environment and an intentional storer and retriever of information. He contends that it would be sensible to allocate the term *metacognitive* for conscious and deliberate thoughts that have other thoughts as their object.

A common idea is that metacognitive processes, such as the choice of a strategy, involve conscious decision making. However, Cary & Reder (2002) deny that conscious awareness is a prominent component of strategy selection. They state that adaptations in strategy use occur when people seem to be unaware that there were shifts in their strategy use or that there were changes in the features of the environment that influenced their choice of strategy. Participants in their study were asked at the end of the experiment about their level of awareness and they were not consciously aware of either the strategies they were using or the different rates of success for using a strategy. Cary & Reder (2002) clearly note that they do not distinguish between strategies and procedures because :(1) both terms refer to means that people use to accomplish a task; and (2) what matters is the nature of the mechanisms that result in an individual using one of multiple means to accomplish a task, no matter whether the alternatives are procedures or strategies.

These views have been criticized by Paris (2002) who points out that an approach that does not distinguish between procedures and strategies is obfuscating a prominent characteristic of human reasoning; the role of explicit and intentional knowledge in guiding thinking. He believes that a definition of metacognition and strategies as explicit, conscious, and deliberate processes bestows on them a special status and permits more accurate research and explanation. Paris contends that it is important to distinguish between implicit processes and explicit strategies. For example, a problem may be solved with automatic processes or deliberate strategies. The difference between these two conditions is important and requires different terms for the cognitive processes used because this will focus attention on the role of awareness in the guidance of thinking.

A third position that gained impetus as to the relation between metacognition and consciousness is that of Koriat (2000), he believes that metacognitive processes are double-sided by nature: They interface between an implicit, unconscious, and automatic functioning mode and a more explicit, conscious, and controlled mode. Koriat (2007) suggests a “crossover model” that grants metacognition a crucial role in the mediation between unconscious and conscious determinants of information processing. Metacognitive experiences are believed to be the best example to illustrate this idea. According to Koriat, metacognitive experiences are unconscious as far as their antecedents are concerned, but conscious as far as their consequences are concerned. He posits that although a strong feeling of knowing is certainly a pivotal part of conscious awareness, it may be the product of an unconscious inference. Once formed, however, such a metacognitive feeling can serve as the basis for the conscious control of information processing and action. According to this view, subjective feelings, which pertain to the essence of consciousness, may themselves be the product of unconscious processes. These feelings encapsulate a miscellany of unconscious influences, and it is in this sense that they are informative i.e. comprise information that is

relevant to conscious control, as opposed to the implicit, unconscious processes from which they stem.

1.2 components of Metacognition

1.2.1 Metacognitive Knowledge: Definition, Types, and Characteristics

1.2.1.1 Definition of Metacognitive Knowledge

Though diverse terms have been used to refer to metacognitive knowledge, there is a general consensus as to its definition.

Flavell (1987, p. 21) defines it as "one's acquired world knowledge that has to do with cognitive matters"(Manning, 1991, p. 22).

He also says that it refers to one's stored world knowledge that "has to do with people as cognitive creatures and with their diverse cognitive tasks, goals, actions, and experiences" (Flavell, 1979, p. 906 cited in Hacker, 1998, p. 05).

Büchel (1998) states that Flavell & Wellman (1977) defined metacognitive knowledge as the knowledge learners possess about themselves, about task properties, and about strategies.

Schraw (2001) calls metacognitive knowledge, knowledge of cognition and believes that it pertains to what one knows about his or her own cognition or about cognition in general.

Schraw (1998) also believes that knowledge of cognition refers to storable information about one's cognitive processes.

Wong (1999) uses the term Awareness to refer to metacognitive knowledge and maintains that it is defined as knowledge of one's cognitive strengths and weaknesses.

Veenman and Spaans (2005) believe that metacognitive knowledge refers to the declarative knowledge one has about the interaction between personal features, task features, and available strategies in a learning situation.

Efklides (2006) also defines metacognitive knowledge as declarative knowledge about cognition, she believes that it is derived from long-term memory and includes implicit and explicit knowledge or ideas, beliefs, and 'theories'. Efklides (2001) says that metacognitive knowledge concerns what individuals know or believe about themselves and the others as cognitive creatures, their interplay with different cognitive tasks, goals, actions or strategies as well as the experiences they have had in relation to these tasks, goals, actions or strategies.

Wells (2000) notes that metacognitive knowledge is the information that individuals possess about their own cognition and about task factors or learning strategies that influence it. According to him it refers to the beliefs and theories that individuals possess about their own cognitions, like beliefs about the meaning of specific kinds of thoughts, and beliefs pertaining to the efficiency of memory and cognitive control.

Baker (2002) refers to metacognitive knowledge as the knowledge component of metacognition and believes that it is concerned with the ability to reflect on one's cognitive processes.

Paris and Winograd (1990) call metacognitive knowledge cognitive self-appraisal. They state that it comprises personal reflections about one's knowledge states and abilities. In their view, self-appraisal answers questions that deal with specific parts of knowledge or one's capacity to meet a cognitive goal like "Do I know the capital of Idaho? Can I memorize a list of 20 words in 10 minutes? Can I derive a formula to calculate the area of a trapezoid? "

Hill (1998) refers to metacognitive knowledge as monitoring or self-appraisal, which she defines as the executive process of thinking about what a person knows and being aware of shifts in one's knowledge base.

Holschuh and Nist (2000) when talking about metacognitive knowledge in reading point out that it is knowledge about cognition which is relevant to what readers know about their cognitive resources and about the regulation of those resources as well.

1.2.1.2 Types of Metacognitive Knowledge

When dealing with the different types of metacognitive knowledge, there are generally two main views, some researchers divide it in terms of knowledge of person, task, and strategy (e.g. Efklides, 2002; Flavell, 1979; Hacker, 1998; and Manning, 1991), however, others divide it in terms of declarative, procedural, and conditional knowledge (e.g. Brown, 1987; Paris & Winograd, 1990; and Schraw, 1998). According to McCormick (2003) and Veenman & Spaans (2005) Flavell (1979) divided the declarative knowledge component along the dimensions of knowledge of person, task, and strategy.

So, metacognitive knowledge comprises three different types of metacognitive awareness: declarative, procedural, and conditional knowledge. Declarative knowledge refers to knowing "about" things (Schraw, 2001); it comprises knowledge about person, task, and strategy (McCormick, 2003). Procedural knowledge refers to knowing "how" to do things; it is represented as heuristics and strategies. Conditional knowledge refers to knowing the "why" and "when" facets of cognition, it is knowing when and why to use declarative and procedural knowledge (Schraw, 2001).

Declarative knowledge which is also labelled Factual knowledge (Wolfgang, 1998) refers to knowing about person, task, and strategy variables.

According to Manning (1991) person variables are relevant to what individuals know about themselves and others as thinking organisms. She further divides person variables into three more subcategories: intraindividual, interindividual, and universal. An intraindividual-person variable occurs within individuals. She gives the example of knowing that one is better at math than reading. Interindividual variables are comparisons between, rather than within, persons. Manning states the examples of knowing that one is better at math than the teacher or that one's teacher is more reflective than the principal. Manning points out that universal

variables refer to the knowledge individuals acquire from living within a culture such as, the concept of a mistake, thinking there is understanding and later discovering there is not, and knowing that short-term memory is of limited capacity. In Efklides (2006) words universal variables are relevant to knowledge (i.e., beliefs, ideas, and theories) about the different cognitive functions, such as memory or thinking, concerning what they are and how they operate. In Efklides's view universal variables also involve knowledge of the criteria of validity of knowledge i.e. "epistemic cognition".

The second type of declarative knowledge pertains to task variables. People acquire knowledge about a task, its demands, and how those demands can be accomplished under various conditions (Hacker, 1998). Individuals also gain knowledge about the effects, and constraints of cognitive tasks (Manning, 1991). Manning believes that the nature of the task imposes certain cognitive rules and that individuals learn that different types of cognitive tasks require different types of processing on their part. She states the following example: if the information is difficult, dense, and without much repetition, the learner recognises that to operate more carefully and slowly; and to process deeply and self-critically will be very beneficial.

Strategy variables are the third type of declarative knowledge according to the division adopted by researchers like Manning, Efklides, and Hacker; and they are no different from what other researchers like Paris and Schraw call procedural knowledge i.e. the second type of metacognitive knowledge, they are the knowledge of how to proceed with a task and how to meet a goal (Manning, 1991). Procedural knowledge refers to knowledge about strategies and other procedures (Schraw, 1998). It can also be defined as knowledge about doing things and much of it is represented as heuristics and strategies. For example, most learners have a basic repertoire of helpful strategies such as note taking, slowing down for important

information, skimming unimportant information, summarizing main ideas, and periodic self-testing (Schraw, 2001).

Flavell (1987, p. 23) provides the following distinction between cognitive and metacognitive strategies: "A cognitive strategy is one designed simply to get the individual to some cognitive goal or subgoal, such as adding numbers; whereas the metacognitive strategy is for monitoring cognitive progress, such as reading the numbers to check the answer "(cited in Manning, 1991, pp.23 & 24). Hacker (1998) notes that cognitive strategies are invoked to make progress toward goals, while metacognitive strategies are invoked to monitor the progress of cognitive strategies.

The third type of metacognitive knowledge is conditional knowledge, it refers to the knowledge of why and when to use a strategy (Schraw, 1998). In other words to the knowledge of when and why to use declarative and procedural knowledge (Schraw, 2001). For instance, good learners know when and what information to rehearse and are better able to assess the demands of a given learning situation and, as a result, choose the most appropriate strategies.

1.2.1.3 Characteristics of Metacognitive Knowledge

Research suggests that metacognitive knowledge is stable, stable, fallible, and late developing. It is stable in that it is constant and predictable (Manning, 1991) and that individuals understand their cognitive resources, including information about themselves as cognitive beings (Baker & Brown, cited in Holschuh & Nist, 2000).

Büchel (1998) says that according to Brown, Bransford, Ferrara & Campione (1983) this particular kind of knowledge is stable in that individuals can reflect on their own cognitive processes and articulate them to someone else. It is not considered "knowledge" unless

individuals can reflect on their own cognitive processes and be able to discuss them with others in a meaningful way (Manning, 1991).

Metacognitive knowledge is often fallible (one can perfectly well know certain facts about cognition that are not correct) (Büchel, 1998) and a person can be incorrect concerning which is which (Main, 1993). Another characteristic of metacognitive knowledge is that it is late-developing, it is not understood by young thinkers even in its simple forms until around the age of 4 (Main, 1993).

1.2.2 Metacognitive Experiences

The term “metacognitive experiences” was coined by Flavell around 1979, who postulated that there are two facets of metacognition ,i.e., metacognitive experiences and metacognitive knowledge (Efklides,2002).Metacognitive experiences is what the individual experiences during a cognitive endeavor (Efklides,2001,). They can be defined as the manifestation of the use of metacognitive knowledge and as the conscious realization or awareness of the individual’s own cognition, most frequently a concurrent, ongoing one (Manning, 1991 & Wells, 2000). Metacognitive experiences are present when the individual is processing a task and are affected by person, task, and context features. They form the interface between the task and the individual, and inform the individual on his or her progress on task processing and on the produced outcome (Efklides, 2006).According to Manning (1991) some examples of metacognitive experiences are: (1) Reading a whole passage and suddenly discovering you do not understand a single word. (2) Driving a familiar route and then suddenly discovering you do not remember driving through a certain town. (3) Saying a word or answering a question you did not know you knew until uttering the word or the answer and discovering that you were not aware of knowing it. These realizations, when you tell yourself that comprehension is lacking, that you do not remember driving through a given

town, and you were not aware of knowing a given piece of information all constitute cases of metacognitive experiences.

These metacognitive experiences which are conscious cognitive or affective experiences that accompany a cognitive endeavor and are task based and usually deal with progressing towards the goal of a particular activity, have metacognitive knowledge as a basis for them (Hacker, 1998 & Sugden, 1989). Though one serves as a basis for the other, metacognitive experiences and metacognitive knowledge are different. Efklides (2001) states three major differences between them. One characteristic that differentiates between them is that, metacognitive experiences result from online monitoring of cognition while metacognitive knowledge is the product of monitoring memory knowledge and/or beliefs about persons, tasks, and strategies. Metacognitive experiences are based on information present in short-term memory. This implies that they are closer to actual cognitive processing than metacognitive knowledge which is more distant because it is based on information retrieved from long-term memory. A second difference mentioned by Efklides is that metacognitive experiences are specific in scope, they pertain to properties of specific tasks or of their processing whereas, metacognitive knowledge is general in scope because it pertains to categories of similar tasks, to models of cognitive processes, to ideas or beliefs about the individual and or the others dealing with tasks, to experiences with tasks in different situations, and to strategies used on various occasions. A third difference between metacognitive experiences and metacognitive knowledge as stated by Efklides (2006) is the fact that metacognitive experiences can be affectively charged, they are personal in character, they have a sense that what occurs during the cognitive enterprise is the individual's own personal, subjective spur of the moment experience rather than something that he or she knows from past personal experiences or from sources outside the individual's own self.

Metacognitive experiences comprise appraisals of the significance of specific mental events, they include metacognitive feelings and metacognitive judgments of the status of cognition /estimates that stem from the monitoring of task-processing properties and/or from its outcome (Efklides, 2006 & Wells, 2000).

1.2.2.1 Metacognitive Feelings

According to Frijda (1986), metacognitive feelings are products of self- appraisal of cognition and manifest the quality of pleasantness or unpleasantness; they are affectively charged, as the term “feeling” suggests. Thus, metacognitive feelings inform the individual about a property of cognitive processing; they make him or her aware of the smoothness or hindrance and breakdowns that take place during processing, the match/mismatch between goal and actual conditions as well as the extent to which the produced solution meets the individual’s interests. All this is done in an experiential way while dealing with a specific task as processing goes on, namely, in the form of a feeling, such as feeling of knowing, feeling of difficulty, and feeling of familiarity for example (Efklides, 2001 & 2006).

As stated by Narens & Nelson (1994) feeling of knowing occurs during or after acquisition and pertains to whether a given currently nonrecallable piece of information is known and/or will be remembered on a future retention test. However, researchers have recently concluded that feeling of knowing is not a phenomenon that operates only after retrieval failure and that it is dependent not so much on the individual’s self-appraisal of nonrecalled information, but instead on an inference based on the retrieved aspects of memory (e.g., recognition of the question as having been previously dealt with or recall of some elements of the answer like the first letter or the number of syllables it comprises) (Nelson, 1999). Miner & Reder (1994) state that this revised perspective suggests that feeling of knowing is a rapid, preretrieval metacognitive stage, that is, it generally precedes the point at

which individuals either judge the expected retrievability of a queried piece of information or determine an answer to a question. They believe that this stage becomes strikingly conspicuous to subjects and researchers as well when a question cannot be answered or when successful retrieval does not occur. This is known as a tip-of-the-tongue state, a special kind of feeling of knowing (Hertzog & Hultsch, 2000).

According to Smith (1994) a tip-of-the-tongue state is a disconcerting experience in which an apparently well-known word seems to be currently irretrievable. He mentions that R. Brown and McNeill (1966) described it as similar to the feeling of an imminent sneeze. It is a vehement and frustrating experience that an answer is known but currently blocked from conscious awareness (Miner & Reder, 1994). It refers to a particular type of retrieval block—a momentary unattainability of information held in memory—often escorted by access to some properties of the information. Persons experiencing the retrieval block are often able to describe the target and offer fragmentary information about it; they can say that it starts with the letter s, for example (Hertzog & Hultsch, 2000). The resolution of such a state, i.e., finally recollecting the target, is a source of alleviation (Smith, 1994).

Feeling of difficulty makes the individual aware of the lack of available response to the performed task and/or of the breach of cognitive processing. It is associated with negative affect that stems from this lack of fluency while feeling of familiarity denotes fluency of processing and is associated with positive affect (Dermitzaki, & Efklides, 2001 & Efklides, 2006). Dermitzaki and Efklides (2001) point out that feeling of difficulty is an intricate experience rather than a simple reflection of task difficulty. They believe that there is no plain, direct relationship between objective task difficulty and feeling of difficulty. Efklides (2006) asserts that feeling of difficulty results from the interaction of a number of factors that include in addition to the objective task difficulty: (a) task context, i.e., presence of other tasks, (b) person's characteristics, like cognitive ability, (c) one's self-concept, (d) affective

factors, like mood, (e) the affective tone of instructions, like ‘interesting’ or ‘difficult’, and (f) extrinsic feedback valence, that is, whether it is positive or negative. Moreover, Efklides believes that the reported feeling of difficulty changes while processing a task, it can be higher, similar, or lower than the initial one. She also adds that due to the influence of feeling of familiarity, there can be “illusions of feeling of difficulty”, i.e., objectively easy or difficult tasks may be felt as difficult or easy, respectively.

Metacognitive feelings trigger metacognitive regulation (Wells, 2000). For example feeling of knowing guides metacognitive regulation actions such as search duration and the selection of question-answering strategies (Miner & Reder, 1994). When the individual works on a learning task and feels unpleasantly if it is difficult and the progress made in task processing is not the desired one, two metacognitive judgments associated with feeling of difficulty which are estimate of effort and estimate of time required for problem solving call for action (Efklides, 2006).

1.2.2.2 Metacognitive Judgments

While learning, students consistently face situations where they have to make judgments about themselves or the task they are performing. For instance, learners can judge their level of comprehension while reading, or preparedness for a test while studying and may ask themselves questions such as: "What do I know about this subject? Is this task easy or difficult? How much should I try? Do I need to review my work? What are the consequences of doing well or poorly?" All these questions are judgments that involve self-appraisal of cognition in some way or another (Paris & Winograd, 1990).

However, a distinction should be drawn between prospective judgments that concern judgments about how likely information will be retrieved in the future (e.g., a judgment about future responding such as judgments of learning and ease-of-learning judgments) and

retrospective judgments that refer to the subjective accuracy of already-retrieved information (e.g., a confidence judgment about a previous recall response) (Narens & Nelson, 1994 & Schwartz, 2002).

Judgments of learning occur during or soon after the acquisition of knowledge, they are evaluations of how sufficiently a given item has been learned. They are predictions of the likelihood that an item will subsequently be remembered (Nelson, 1999) and strike into the confidence that learners have that an item has been successfully studied (Schwartz, 2002). According to Nelson (1999) people's judgments of learning can be extremely accurate, if not perfectly accurate, if they make them not immediately after studying a given item but rather after a short delay. He calls this the delayed judgment-of-learning effect. However, exactly what mechanisms are behind the delayed judgment-of-learning effect is not yet resolved an issue.

Ease-of-learning judgments are made just prior to a study trial and occur in advance of acquisition (Schwartz, 2002). They are largely inferential, and pertain to items that have not yet been learned. These judgments are predictions of what will be easy or hard to learn, either in terms of which items will be the easiest ones or in terms of which strategies will make learning easier (Narens & Nelson, 1994) and they are also predictions of how easy or difficult the items will be to acquire. For example, the individual might believe that château/castle will be easier to learn than boîte/box (Nelson, 1999).

According to Nelson (1999) judgments of learning are more accurate than ease-of-learning judgments for predicting eventual recall, probably because individuals' judgments of learning can be based on what they notice about how well they are mastering the items during acquisition.

As opposed to the previous judgments, in which individuals attempt to predict their future performance, retrospective confidence judgments occur after people recall or recognize

an answer and can be made with respect to how confident they are that their answer was correct (Nelson, 1999). Retrospective confidence judgments express how sure people are about the correctness of their own performance, belief or knowledge state (Jonsson & Allwood, 2003). For instance, if a person were asked to recall the English equivalent of château, one might say, "castle" (the correct answer) or might say, "red" (the incorrect one), after which he or she would make a confidence judgment about the likelihood that the recalled answer was correct (Nelson, 1999).

Paris and Winograd (1990) believe that students' metacognitive judgments are the harbingers of their actions. This realization or cognitive awareness serves as the metacognitive signal; once individuals have the signal they can ignore it or convert it into self-directed learning techniques (Manning, 1991). Manning believes that cognitive self-instruction focus should be to teach students to heed their metacognitive judgments and to translate them into self-regulation.

1.2.3 Metaconitive Regulation: Definition, Types, and Characteristics

1.2.3.1. Definition of Metaconitive Regulation

Definitions, when dealing with the construct of metacognition, have always been a thorny issue because various terms may be used to refer to the same concept and in most cases components overlap.

Wong (1999) refers to metacognitive regulation as self-regulation. According to her metacognition comprises two components: awareness and self-regulation. Awareness can be defined as knowledge of one's cognitive strengths and weaknesses, and self-regulation refers to orchestrating one's awareness with befitting action.

Hill (1998) believes that the second component of metacognition involves self-regulated use of strategies, or acting on knowledge of what one knows, in the aim of improving performance. She says that it may include various control processes.

Paris and Winograd (1990) call this same component, self-management and state that it refers to "metacognitions in action" or to how metacognition helps to coordinate cognitive aspects of problem solving.

Schraw (2001) calls metacognitive regulation: regulation of cognition and states that it refers to a bundle of activities that aid students control their learning.

Manning (1991) refers to metacognitive regulation as regulation-of-one's-own-cognition and defines it as the supervising and control of one's own learning.

Armbruster (1989) and Baker (2002) also use the term "control" to refer to the self-regulation of one's own cognitive efforts.

Westwood (2004) borrows Gougey's (2001) definition pointing out that the metacognitive processes that oversee and control people's cognition are sometimes called internal executive processes.

In the same line go Schneider (1998) and Wells (2000) who respectively state that self-regulation or metacognitive regulation refers to a range of central executive activities or executive functions.

Hacker (1998) calls metacognitive regulation: "Executive regulation processes" and says that according to Kluwe (1982) they are "directed at the regulation of the course of one's own thinking" (p. 212). Hacker believes that along with executive monitoring, executive regulation is subsumed under the executive processes that involve both monitoring and regulating other thought processes and that correspond with Flavell's (1979) metacognitive strategies and Brown's (1978) metacognitive skills.

Efklides (2006) adopts almost the same perspective, she believes that metacognitive skills are what the individual intentionally does to control cognition .She says that they are a division of the so called “executive processes” or “metacognitive strategies”. And she adds that Pintrich, Wolters, and Baxter (2000) regard these skills as part of the self-regulation process, although she believes that there should be awareness that self-regulation cannot be relegated to metacognitive skills.

1.2.3.2 Types of Metacognitive Regulation

Although a lot of regulatory skills have been described in the literature three crucial components of metacognitive regulation are included in all accounts: planning, monitoring, and evaluation (Schraw, 1998 & 2001). Planning strategies were to the highest degree the most popular of the metacognitive strategies (Oxford et al., 1996).

According to Schraw (1998 & 2001) planning involves the selection of optimal strategies and the allocation of resources that influence performance.

Selecting the appropriate strategies is very important because the choice of a non convenient body of strategies can lead to incorrect or inefficient performance (Davidson & Sternberg, 1998).This selection involves: (a) Setting goals (Schraw, 1998) and subgoals (Armbruster, 1989). Completing a series of “subgoals” often requires fewer steps, and results in fewer errors, than attempting to accomplish the overall goal for the entire task (Holyoak, 1995, cited in Davidson & Sternberg, 1998). (b) Strategy sequencing (Schraw, 2001) and planning the steps to be taken for task completion (Efklides, 2006) to determine the order of steps to be taken to process the task (Hacker, 1998). Here a task is divided into parts and a sequence of strategies is developed for how to reach the goal of each part (Greeno, 1980 & Hayes, 1981, cited in Davidson & Sternberg, 1998).According to a study carried by Levine et al. (1996) devising a sequential plan for learning was the most popular planning strategy. One

of the ways their subjects used in order to express their sequential planning was numbering the specific steps (e.g., "To study vocabulary, (1) read carefully; (2) pronounce correctly; (3) write out the word at least five times; (4) try it in a sentence").

The allocation of resources that affect performance (Hacker, 1998 & Manning, 1991) includes budgeting time and (Schraw, 1998 & Schraw, 2001) allocating attentional resources selectively (Davidson & Sternberg, 1998; Schraw, 1998 & 2001) to set the speed or the intensity at which one should deal with the task at hand (Hacker, 1998). There is a tendency to spend relatively more time on higher level planning (or metapanning) and to exercise more intentional control over the planning process on the part of good learners as compared to poor ones (Goldin & Hyese-Roth, 1980 cited in Davidson & Sternberg, 1998).

Davidson and Sternberg (1998) point out that while dealing with a task, learners need to update their plans based on metacognitive monitoring.

Metacognitive monitoring pertains to one's online awareness of comprehension and task execution (Schraw, 2001) and targets the acquisition of information about the person's thinking processes (Kluwe, 1982 cited in Hacker, 1998). It refers to one's aptitude to consciously trail one's progress of reasoning and decision making, detect defects and discrepancies in relevant "online" cognitions, and modify one's modus operandi to a problem and plan for goal attainment in response to these findings (Klaczynski, 2005). Learners who monitor their own ongoing activity discern the necessity to identify the task at hand; to pause; to check on current progress of performance; to begin again before moving on, when necessary; to seek outside help; and to prognosticate the subsequent outcome of that progress (Hacker, 1998 & Westwood, 2004). Wallin (2007) states that:

Metacognitive monitoring involves a stance of active self-scrutiny that situates us at once inside and outside our experience. This reflective stance enables us to step back from experience in order

to be aware of aspects of our ideas about experience that may be contradictory, biased, or implausible. It also tends to prompt efforts to understand or resolve such contradictions or potential "errors." Metacognitive monitoring thus entails observation of and curiosity about, the habits of mind that shape our experience (Wallin, 2007, p. 41).

Evaluating is a substantial component of metacognitive regulation and is a substantial concept in its own right (Bower & Stevahn, 2000). It pertains to the appraisal of the products and effectiveness of one's learning (Schraw, 2001) and deals with the examination of progress towards goals in order to go back to more planning and more monitoring (McCormick, 2003). It refers to the ability of learners to judge the quality of their performance for the aim of doing better work (Bower & Stevahn, 2000) by understanding the criteria on which they will be evaluated and the standards expected of them (Black & Wiliam, 1998; Sadler, 1989 cited in Gipps & Stobart, 2003). This involves consonance between self generated and other sources of data (Quirk, 2006). According to Warkentin, Bol, and Wilson (1997) evaluating includes a metacognitive self-appraisal of one's efforts to learn or a self-assessment of the relationship between effort and attainment. Bower and Stevahn, (2000) believe that evaluating takes place when one makes judgments about their attainment and reacts to these judgments. Peculiar instances comprise re-evaluating one's goals, revising prognostications, and consolidating intellectual acquisitions (Schraw, 1998).

1.2.3.3 Characteristics of Metacognitive Regulation

Many researchers in the field of metacognition deem that regulatory processes, including planning, monitoring, and evaluation, are relatively unconscious or non-stable in many learning settings (e.g. Büchel, 1998; Manning, 1991 & Schraw, 1998). According to Schraw (1998) the reason is that many of these processes are greatly automated and some of

them may develop without any conscious reflection and as a result are difficult to report to others. Büchel (1998) and Manning (1991) believe that metacognitive regulation activities are somewhat unstable, relatively age independent, and task and situation dependent.

1.3 Second Language Acquisition and metacognition

1.3.1 Can We Teach Metacognition?

One of the great virtues of metacognition is that the constructive, personal, strategic thinking that is comprised in it is learnable (Paris & Winograd, 1990). Metacognition pertains to processes that are amenable to classroom instruction (though distinguishable from other forms of knowledge) and possession and use of it determine learners' capacities to learn (White, 1998). According to Gavin (1998) metacognition has a pivotal role in how students learn and can be an integral tool to help in the transfer of learning from one situation to another. Westwood (2004) states that there is a general consensus that the application of metacognitive strategies facilitates the accomplishment of all academic and intellectual tasks, such as essay writing, reading comprehension, solving a mathematical problem, and analysing data for a project. He also believes that many learning difficulties stem from learners' relative absence of metacognitive skills. Manning (1991) doubts whether learners would ever acquire this type of skill without instruction. She points out that Flavell says: "Teachers in schools may sometimes model, as well as teach and encourage metacognitive activity". However the critical word according to her is "may". She states that teachers "must" model metacognitive strategies in an intentional, informed manner so that learners will master metacognitive processes that are so vital to classroom learning. According to her, if all academic and intellectual tasks involve metacognition and teachers are not taught how to promote it, then this may construe why many learners become poor students, even drop-outs.

Instruction within the information-processing paradigm highly recommends teaching cognitive and metacognitive strategies in academic settings. Furthermore, research emphasizes the positive effects of such instruction for learners with learning difficulties (e.g., Chan, Cole, & Barfett, 1987; Malone & Mastropieri, 1992; Paris et al., 1991; Schunk & Rice, 1992) (Dickson & al, 1998). However, as interest in strategies instruction expanded, many educators became aware that the mere fact of teaching a list of cognitive strategies did not help every student become a better learner. As it happens, successful cognition must be guided and monitored by higher levels of cognition, i.e. metacognition (Eskey, 2005). Learners can foster their learning by becoming aware of their own thinking as they write, read, and solve problems. Teachers can enhance this awareness by choosing metacognition as a tool for learning because it is at the same time: (a) a way to transfer responsibility for monitoring learning from teachers to learners themselves by using self-control over their own activity, and (b) it is a good way to develop motivation, throughout the promotion of self-perceptions, the knowledge of oneself as a learner, the feeling of self-efficacy and internal locus of control. (Doly, 2005; Paris & Winograd, 1990). According to Hartman (2001) there are six reasons why metacognition should be taught. She states that although cognitive skills are important Wagner and Sternberg (1984) believe that teaching needs to focus on metacognitive skills because:

1. Particular strategies teaching, like the order in which to perform a given task, will not provide learners with the long term skills they eventually need. Learners must acquire how to apply general principles such as planning over various tasks and domains.
2. Metacognition is essential for competent cognitive performance. The long-term benefits of cognitive skills tutoring as well as the capacity to apply these skills to new tasks seem to depend on tutoring at both the metacognitive and cognitive levels.

3. Customarily learners are known for unmindfully following instructions. While performing academic tasks, they do not question themselves in order to reach their goals.
4. Learners with the greatest shortcomings in metacognition appear to have no idea what they are doing while task performing.
5. Learners suffer from the following shortcomings in metacognition: a) determining the difficulty of a task; b) effectively monitoring their comprehension, i.e. they are not able to pinpoint when they don't understand task directions and information in textbooks for example; c) planning ahead; d) monitoring the success of their performance ,i.e. whether or not they have studied enough to master the material at hand; e) using all relevant information; f) using a systematic bit-by-bit approach; g) systematically arriving to conclusions, and h) using appropriate representations.
6. Metacognition, as consequential as it is, is not frequently taught in most parts of the curriculum.

With respect to teaching metacognition, questions arise about whether to teach it as an isolated, stand-alone course or to embed or infuse it in one or more subjects or in all parts of the curriculum. White (1998) believes that teaching metacognition should not be confined to any separate subject like science or reading, for example. According to him if learners are to be metacognitive, they must be so in all subjects because all learning and all thinking are imbued with metacognition. He states that though, Baird (1986) had some success dealing with learners in their science classes to foster their metacognition, the learners' experience in other subjects disaffirmed much of the effect of his tutoring. From this, White (1998) implies that teaching metacognition should extend over all learning, either by being infused in all subjects as by cooperative teams of instructors or by an instructor who has entire responsibility for a class like in a primary school, or by lessons on thinking that stand-alone apart from any subject but that are directed at transferring

learners' metacognitive abilities across to all areas of the curriculum. However, Gavin (1998) holds an opposite view to this last suggestion by White; he states that:

Wray (1994) suggests that teachers should teach metacognitive strategies directly, and always within the context of meaningful experiencesMetacognition therefore should be an integral part of the learning process and, to be an effective component, it should be embedded within the curriculum and within curricular activities (Gavin, 1998, p.134).

Gaskins (1994) states Derry and Murphy (1986) who recommended that teaching learning strategies be embedded into standard subject-matter courses because stand-alone courses cannot sufficiently enhance executive learning abilities. She also states Weinstein and Underwood (1985) who suggested a "metacurriculum"; a program that is part of all areas of the curriculum and that aims at teaching learners how to process knowledge and how to learn. The program stems from their belief that opportunities to practice strategies and to receive feedback about strategy use are very important for strategy acquisition. From this Gaskins (1994) concludes that the best way to teach metacognition is to infuse it within real subject-matter teaching, without, however, dismissing from consideration the advantages of blending infused and stand-alone courses as suggested by Nickerson (1988).

Schraw (2001) believes that promoting metacognition can be met through various instructional practices. His preference though is for an interactive approach that combines direct instruction, peer-regulated learning, and autonomous learning.

Direct instruction

Metacognitive behaviour is not instinctively adopted by learners and is not perceived in situations where the instructor has not anticipated and scheduled it precisely (Doly, 2005). To succeed in mediating and/or teaching metacognition, instructors themselves need to obtain solidly built background knowledge about cognition and metacognition as well as learning

theory (Gaskins, 1994). Establishing awareness among learners that metacognition exists, differs from cognition, and amplifies academic success is the first step towards enhancing it. Modelling it is the second step; instructors should model their own metacognition for their learners. In most of the cases, instructors model their cognition (i.e. how to perform a task) and neglect modelling their metacognition (i.e. how they think about and monitor their performance) (Schraw, 2001). While modelling, the instructor should think loudly in order to make perceivable his involved operations that are unperceivable in essence (Gaskins, 1994). Instruction has to foster learners' awareness and help them to execute metacognitive control over their own performance without doing this instead of them. This way of helping must be internalized by learners so that they will be capable of helping themselves (Doly, 2005). Because the ultimate goal of instruction is for instructors to progressively relinquish the responsibility for implementing the strategies to learners, while providing them with supportive feedback and reexplanations (Gaskins, 1994).

Peer-regulated learning

According to Schraw (1998) advocates of peer learning maintain that students become better learners via interactions with other peers who are a bit ahead of them. He states that many strategy-training programs that use peer-assisted instruction are based on Vygotsky's concept of the *zone of proximal development*, which holds that: "Within this zone of proximal development optimal learning occurs if the parent, teacher or peer adjusts her level of input to take account of the child's actual ability level" (Carr, 1999). Frequently, compared to teachers, peers are better able to model cognitive and metacognitive skills, and provide mighty grounds for these skills (Schraw, 2001). "More able peers" push "less able peers" into the "zone of proximal development," where optimal learning takes place (Henton, 1996). One way this happens, according to Schraw (1998), is through peer modelling that permits learners to observe the proficient use of a skill, and in cases of efficient modelling, gain access to the

regulatory strategies of experts. Another way stated by Schraw, is interactive peer problem solving, in which learners participate rather than just observe. Rouiller (2005) believes that peer interactions can be very effective stimuli for active self-regulation because they elicit verbalizations that bring processes placed at the borderline of awareness to an explicit, conscious level. According to her, dialogues entail repeated verbalizations that the learner would not make on his own under other conditions, and consequently generate metacognitive processes that lead to the automatization of new ways of self-regulation.

Autonomous Learning

Knowles (1975) defines autonomous learning as environments in which learners spontaneously, with or without external support diagnose their learning needs, formulate learning goals, identify human and material resources for learning, select and implement suitable learning strategies and assess learning results. It is plausible that learners structure metacognitive knowledge even as they create more effective strategies. They utilise metacognitive skills more efficiently, and transfer them to new learning settings when asked to construct their own repertoire of strategies and the metacognitive knowledge to regulate them (Schraw, 1998). Gourgey (2001) believes that the point of metacognition is self-regulation, not regulation by others so she deems that to learn better, learners must take an active role because metacognitive activities that are externally dictated (i.e., the instructor generates questions or prescribes strategies) are less effective than those generated by the learners themselves.

1.3.2 Place of Metalinguistic Awareness in Metacognition

For the past two decades, a conspicuous position in the developmental literature has been allotted to abilities described as “meta”. Metalinguistic development earned the most significant share of this research attention (Bialystok, 2001). Kecsk es and Papp (2000)

believe that the development of metalinguistic awareness is a component of the child's overall cognitive and linguistic development. Metalinguistic awareness appears at about the age of twelve, after exposure to formal schooling (Titone, 1996).

According to Gombert (1997) the child is able to befittingly handle language comprehension and production at a very early age. Later he/she becomes able to reflect upon and purposely control its use. Gombert insists that the outgrowth of these metalinguistic capacities be differentiated from that of common verbal communication. The prefix meta came into prominence only a short time ago around 1970 and was applied to various cognitive activities, like metacognition and metamemory. Since then, it has been used by linguists and psychologists to describe concepts or activities that require some additional knowledge or effort (Bialystok, 2001). But what does it mean when it is used to describe an aspect of language?

Gombert (1997 & 1992) points out that for linguists the term metalinguistics has germinated from Jakobson's ideas and designates anything associated with metalanguage, a language whether natural or formalized (like in logic), which is itself used to refer to a language and whose lexicon is made up of the entirety of words constituting linguistic terminology (like *syntax*, *semantics*, *phoneme*, as well as more ordinary terms like *word*, *sentence*, *letter*, etc.). Gombert (1997 & 1992) also states that from a functional viewpoint, which focuses on how language works as it is used by real speakers, in this metalinguistic level of language the language's signifiers become the signified. Gombert (1992) writes that according to Benveniste (1974) the metalinguistic ability designates 'the possibility of raising ourselves above language, of abstracting ourselves from it, of contemplating it, whilst making use of it in our reasonings and our observations'. He comments that from this perspective, metalinguistics is limited by its dependence on the capacity of language to speak of itself. But if this capacity lies at the core of metalinguistic activity, then it also implies, from the

psychological perspective a cognitive effort which transcends the confines of strictly linguistic activity which in isolation cannot possess any psychological reality.

This perspective progressively brought forth the meaning of the term as it is actually used in psycholinguistics where it refers to the capacity to think about and reflect upon the structural features of language (Gillon & Gail, 2004). Bialystok (2001) states that this capacity is described by Cazden (1974, p. 29), one of the first researchers who made references to metalinguistic awareness as a unique construct, as follows: “The ability to make language forms opaque and attend to them in and for themselves, is a special kind of language performance, one which makes special cognitive demands, and seems to be less easily and less universally acquired than the language performances of speaking and listening.” Bialystok adds that despite the fact that Cazden stated the manner in which metalinguistic uses of language were to be distinguished from speaking and listening, she did not specify what was “special” about their cognitive demands.

Thus for psychologists metalinguistic awareness is a concept that refers to the executive monitoring and control exercised by the learner over his or her use of language (Hill, 1998). It has been described as the ability to reflect and focus attention upon and manipulate the structural properties of language, treating language itself as an object of thought i.e. thinking abstractly about language as opposed to engaging in pure use of it (Gass & Selinker, 2000; Jessner, 2006). Hill (1998) includes under this construct the capacity to talk about language, analyse language, think about language, perceive language as a phenomenon separate from its content, and judge language for its grammaticality, phoneme segmentation, word equivalents or homonyms.

Gombert (1997) maintains that following Flavell’s ideas many psychologists deem metalinguistic capacities to be part and parcel of the general heading metacognition which “refers to one's knowledge concerning one's own cognitive processes and products or

anything related to them”. According to Hill (1998) metalinguistic awareness is a sub-process of metacognition and both are thought to function inter-dependently. Metalinguistic awareness is metacognition specifically related to linguistic matters, particularly in the case of reading and writing (Smith, 2004) and not only is metacognition important in language understanding, it is important in language generation as well (Cox & Ram, 1999).

Thus, from a metacognitive perspective the psycholinguistic meaning of the term *metalinguistic* is more inclusive than that which linguists attribute to the concept. From a linguistic perspective, *metalinguistic* covers anything related to metalanguage. Linguists identify the *metalinguistic* by examining verbal output in order to discover linguistic properties that express the existence of self-referential processes (the use of language to refer to itself). Psychologists, in contrast, analyze the individual's behaviour (verbal or otherwise) to discover components which allow them to infer cognitive processes of conscious reflection upon and deliberate control over language objects, either as objects per se or in terms of their use (Gombert, 1997).

Conclusion

In this chapter we have seen different definitions of metacognition and an alternative definition by Noël; a definition that bridged the gap between metacognitive knowledge and metacognitive regulation by referring to metacognitive judgments: a component of metacognitive experiences, the third component of metacognition. This same definition helped to isolate the three components of metacognition. In the next chapter we will see definitions of fossilization and an alternative definition of it by Han; a definition that stresses the cognitive level of fossilization and that serves as a missing link between metacognition as a component of cognition and fossilization as a cognitive phenomenon.

Chapter Two

Fossilization

Introduction

Roughly all children succeed in acquiring at least one language. Most of them acquire the sound system of their first language, along with most of its grammar and a vocabulary repertoire of 1000 or more words by the age of five, with no formal instruction (Coelho & Rivers, 2004). While children successfully acquire the language they are exposed to within a relatively short period of time, most post-adolescent learners fail miserably in acquiring a second language (Marinis, 2003). One unsettled issue in second language acquisition is why certain morphosyntactic features of stable grammars deviate from native norms in spite of constant exposure to target input. The fact that some learners appear to be unable to attain nativelikeness in spite of the availability of rich linguistic data is known as ‘Orwell’s Problem’ and contrasts sharply with the observation that children manage to acquire target norms successfully in first language (L1) acquisition in spite of the poverty of the stimulus (Domínguez, 2007). It is incontestable that most second language (L2) learners ‘fail’ if ‘success’ is loosely defined as acquiring nativelikeness in the target language in all respects (Lardiere, 2006). The ultimate attainment of second language (L2) learners varies by a wide margin: some learners attain fully nativelike performance –and arguably nativelike competence – whereas others fail, their end state competence and performance substantially diverge from those of the native speakers of the second language (Goad & White, 2006).

Estimates of the rate of success in second language acquisition defined in terms of nativelikeness typically range from virtually nil as viewed by Bley-Vroman to 5% as stated by Selinker (Birdsong, 1999). Bley-Vroman (1989, p.44) spoke of "ineluctable failure" in second language acquisition. He posited that if there are surpassing second language learners, they

are so scarce as to have the same "pathological,' status as that of the cases of failure in first language acquisition.

Impressed by the seeming observation that the input available to children from adult utterances appears to be deficient to explicate the overwhelming success surrounding first language acquisition, Chomsky mentioned that:

A consideration of the character of the grammar that is acquired, the degenerate quality and narrowly limited extent of the available data, the striking uniformity of the resulting grammars, and their independence of intelligence, motivation, and emotional state, over wide ranges of variation, leave little hope that much of the structure of the language can be learned by an organism initially uninformed as to its general character (Chomsky, 1965, p. 58).

This poverty of the stimulus argument conducted Chomsky to advance his innateness hypothesis, which advocates that children are born with an already existing knowledge of what human languages are, and only need to acquire the details of the language they are exposed to (Trask, 1998). To this end, Chomsky postulated that the language faculty is made up of an innate knowledge system, called Universal Grammar (UG), and an innate language acquisition device (LAD) whose operations are somehow restricted in such a manner as to observe Universal Grammar which is part of it (Carroll, 2001).

In linguistic theory Universal Grammar (UG) is put forth, in part, as a solution to the discrepancy between the degenerate quality and narrowly limited extent of the input available to children, and the striking success in first language acquisition, (variously referred to as the logical problem of first language acquisition ,the learnability problem, projection problem, or

poverty of the stimulus). The logical problem is explained as follows: the ambient linguistic data to which children have access radically underdetermine the rich linguistic knowledge which they attain; therefore children must be innately equipped with cognitive structures specific to language (Sánchez & Toribio) called Universal Grammar, which permit them to acquire the grammar of a particular adult language on the basis of simple positive data available from the input (Clahsen, 1992).

Universal Grammar is the system of principles and rules which define and constrain the form that the grammars of human languages can assume. A 'grammar' of a particular language is the set of rules which generate all and only the grammatical sentences of that language, with adequate specifications for their sound structure and meaning. Universal Grammar is independent of the specific grammars that individuals unconsciously forge on contact with samples of language (the primary linguistic data). The principles and rules of Universal Grammar are specific to the language faculty and are genetically determined. They so tightly place limits on the form that particular grammars can assume that acquisition by first language learners' progresses uniformly, rapidly and with entire success under normal conditions (Hawkins, 2001).

Some researchers believe that the logical problem of second language acquisition is essentially the same as for first language acquisition. Others argue that it is different. A third group claim that there is no logical problem of second language acquisition at all.

White (2003) explains that parallel to the situation in L1 acquisition, principles of UG constrain interlanguage grammars. She posits that the fact that L2 learners acquire abstract, complex, and subtle features of language that could not have been induced from the L2 input is strongly indicative of this and suffices to demonstrate a poverty-of-the-stimulus situation in second language acquisition similar to the one observed in first language acquisition.

Bley-Vroman, one of the leading advocates of the second position, believes that children acquire language naturally because they still have access to Universal Grammar (Gordon, 2006). His Fundamental Difference Hypothesis (FDH) proposes that first language acquisition and second language acquisition are fundamentally different since post-critical-period learners have no access to the domain specific 'innate' learning mechanisms that steer L1 development. According to Bley-Vroman, in addition to domain-general problem-solving procedures L2 learners have to bank upon L1 knowledge in L2 learning (Robinson, 2001). From his perspective, the mere exposure to the target language is not sufficient: rather noticing is pivotal for second language acquisition because L2 learners add specific structures as they notice and add patterns to their developing pattern-stores in a conservative way (Yoshinaga, 1999).

Carroll (2001) maintains that L2 learners transfer knowledge which has been reached in a variety of ways. Accordingly one cannot claim that access to UG is logically indispensable in second language acquisition in order to account for the fact that L2 learners are able to represent language in terms of linguistic structures. Carroll believes that the logical problem of language acquisition has been misrepresented and incorrectly reduced to the claim that the stimulus is impoverished with respect to ultimate attainment. She holds that "there is no separate logical problem of language acquisition for each particular language that an individual might acquire. Consequently, there is no logical problem of second language acquisition" (p.210).

The polemic on the logical problem of second language acquisition persists. However, it is to a great extent obvious that unlike in first language acquisition where success prevails; in second language acquisition success and failure co-exist. Failure in this context refers to the permanent cessation of learning of a target language (TL) despite exposure to adequate input,

motivation to learn, and sufficient opportunity for practice. In second language acquisition literature, such type of failure has largely been referred to as “fossilization” (Han, 2004a).

2.1. What is Fossilization?

2.1.1. Definitions of Fossilization

2.1.1.1. Selinker’s Definitions of Fossilization

The concept of 'fossilization' dates back to researchers like Weinreich (1953) and Nemser (1971). Weinreich, for instance, dealt with 'permanent grammatical influence' and Nemser with 'permanent intermediate systems and subsystems'. Both scholars not only were aware of the existence of the phenomenon but also incorporated it into their theoretical orientations (Han, 2004a). The term 'fossilization', however, was coined in 1972 by the American linguist, Larry Selinker, who in his seminal article on interlanguage (IL) depicts as 'fossilized' those second language learners who plateau at some less than advanced phase of acquisition and are apparently unable to advance any further in the acquisition of their second language (Celce-Murcia, 1991). The term fossilization then delineates the persistence of non-native features in the speech of second language learners (Gordon, 2006). Simply put, fossilization takes place when learners integrate erroneous forms or grammatical structures into their relatively definite and final version of the target language (TL) (Acton & Walker de Felix, 1986).

In his 1972 landmark article, Selinker refers to fossilization as follows:

Another notion I wish to introduce for the reader’s consideration is the concept of *fossilization*, a mechanism which is assumed also to exist in the latent psychological structure described above. Fossilized linguistic phenomena are linguistic items, rules, and subsystems which speakers of a particular NL will tend to keep into their IL relative to a particular TL, no matter

what the age of the learner or amount of explanation and instruction he receives in the TL.....It is important to note that fossilizable structures tend to remain as potential performance, reemerging in the productive performance of an IL even when seemingly eradicatedthe well observed phenomenon of backsliding by second language learners from a TL norm is not.....either random or toward the speaker's NL, but toward an IL norm.....It should be made clear that the reappearance of such behavior is not limited to the phonetic level (Slinker,1983,pp.177&178).

Although it does not provide an exact definition of fossilization and it indirectly, rather than directly, defines fossilization in terms of putative fossilizable structures, the above conceptualization gives a general picture from which some inferences can be made as to the characteristics of the construct (Han, 2004b; Han & Odlin, 2006).

Fossilization involves both a cognitive mechanism and a performance-related structural notion. As a cognitive mechanism, it is regarded as a component of a latent psychological structure which is responsible for the acquisition of a second language and which differs from the latent language structure of Lenneberg (1967) that was widely assumed to account for first language acquisition through a language acquisition device (LAD) that galvanizes Universal Grammar (Han & Selinker, 2005). As a performance-related structural concept, it designates specifically the regular reappearance of linguistic structures which were thought to be eliminated from the learner's performance (Han, 2004b). The two components are interrelated: it is that cognitive mechanism, which Selinker calls 'fossilization' that underlies the production of fossilized items (Ellis, 1994).

From this conception, several characteristics of fossilization can be deduced. First, fossilizable structures are persistent. Second, they are resistant to external influences. Third, fossilization pertains to interlanguage (IL) properties that are aberrant from the target language (TL) standards. Fourth, it may occur in relation to any linguistic level (e.g. phonology, syntax, morphology), a 'foreign accent' being the result of one form of fossilization. Fifth, it can occur with both adult and child learners. Sixth, it often takes the form of backsliding or retroversion of a learner's language to a previous phase (Han & Odlin, 2006; Han, 2004b; Johnson & Johnson, 1999).

Since 1972, the construct of fossilization has witnessed a gradual abstraction and an extension in its compass. Han (2004b) points out that Selinker and Lamendella (1978: 187) explicitly defined it in terms of “. . . a **permanent cessation** of IL learning before the learner has attained TL norms at all levels of linguistic structure and in all discourse domains in spite of the learner's positive ability, opportunity, and motivation to learn and acculturate into target society (Han, 2004b, pp.215, 216).

Han (2004b) maintains that, from this perspective: (1) Fossilization is the equivalent of permanent cessation of learning and transcends the “backsliding” of linguistic structures that were thought to be eliminated. (2) The compass of “fossilizable structures” expanded from “linguistic items, rules and sub-systems” to “all levels of linguistic structure and in all discourse domains”. (3) The role of the “learner's positive ability, opportunity, and motivation” was played down which suggests the inevitability and innateness of fossilization.

Fossilization as a permanent cessation of learning would, in Selinker's view, climax in ultimate “fossilized competence” or in “The notion of the fossil of competence, petrified at a particular stage of its development” (Brown & al., 1996). The idea is that many second language learners seem to attain a plateau in their learning ceasing to make any further progress (Malmkjaer, 2004) or as Selinker depicts it:

Fossilization is the process whereby the learner creates a cessation of interlanguage learning, thus stopping the interlanguage from developing, it is hypothesized, in a permanent way . . . The argument is that no adult can hope to ever speak a second language in such a way that s/he is indistinguishable from native speakers of that language (Selinker, 1996b, cited in Han, 2004a, p.15).

Commenting on the evolution of Selinker's definitions of fossilization, Han (2004a) concludes that: (1) Since 1972, Selinker has extended the compass of fossilization from "backsliding" to "cessation of learning" and to "ultimate attainment". (2) He gradually shifted from a small percentage of learners, a mere 5%, that are affected by absolute success in a second language to the assertion that no adult second language learner can hope to attain native-like competence in all discourse domains. (3) He expanded the linguistic compass of fossilization, from fossilizable structures (i.e. local fossilization) to a fossilized interlanguage (i.e. global fossilization).

2.1.1.2. Other Definitions of Fossilization

Although, fossilization is widely embraced as both a theoretical construct and a factual occurrence in second language acquisition literature, it appears to be far from being understood either practically or theoretically. As a construct it is, as Hyltenstam (1988) said, scientifically undeveloped (Washburn, 1994). The term fossilization appears to be a protean, catch-all term that proves deficient to capture a unitary or even coherent concept (Birdsong, 2006). It has not been appropriately described empirically and it lacks a unified definition (Fidler, 2006). Though definitions differ, many are an extended version of the concept as suggested by Selinker in 1972. Bokamba (1996, p. 244) for example, borrows Selinker's 1972 dual definition when stating that fossilization is: "A subconscious mechanism which involves the retention of certain "linguistic items, rules, and subsystems" by speakers of a particular L1

in their interlanguage relative to a particular target language (IL), "no matter what the age of the learner or amount of explanation and instruction he receives in the TL"".

Bokamba (1996) stresses that the correct explanation for fossilization is not an inability to ameliorate one's mastery of the target language, but rather a manifestation of one's gratification of having attained the desired communicative competence.

Most researchers, however, have followed and built on the performance dimension of Selinker's dual definition. They refer to fossilization as "being stuck" in different areas of language *form* and rarely use the term to acknowledge that, not infrequently, they are also dealing with "fossilized" *abilities* (Byrnes, 2002). Ellis (1985), for example, gives the following definition of fossilization:

Fossilized structures can be realized as errors or as correct target language forms. If, when fossilization occurs, the learner has reached a stage of development in which feature *x* in his interlanguage has assumed the same form as in the target language, then fossilization of the correct form will occur. If, however, the learner has reached a stage in which feature *y* still does not have the same form as the target language, the fossilization will manifest itself as error (Ellis, 1985, p.48).

According to Han (2004a) the origin of this view that there are fossilized errors as well as fossilized target-like forms stems from Vigil and Oller's view (1976: 282):

[W]e will extend the notion of fossilization to any case where grammatical rules, construed in the broadest sense, become relatively permanently incorporated into a psychologically real grammar... regardless of whether those rules conform or do not conform to the norms of the

language which is being learned. It is not only the fossilization of so-called 'errors' that must be explained, but also the fossilization of correct forms that conform to the target language norms (Vigil & Oller, 1976, p.282; cited in Han, 2004a, pp.16&17).

Johnson & Johnson (1999, p. 135), however, believe that "Fossilization is the phenomenon whereby linguistic items (particularly erroneous ones) become permanent in a learner's interlanguage."

Most researchers do not advocate these opinions; instead, they support the opinion that the term 'fossilization' should be strictly reserved for non-target-like forms. Dodson (1995, p.109), for instance, offers the following view "... a fossilized interlanguage (FI), when errors, even basic grammatical errors, made by L2 learners during communicative L2 acquisition gradually become 'frozen' or fossilized and are almost impossible to eradicate once established".

In addition to this, some researchers focus on the fact that fossilization is a stage in the interlanguage process. Bley-Vroman (1989) points out that:

It has long been noted that foreign language learners reach a certain stage of learning - a stage short of success - and that learners then permanently stabilize at this stage. Development ceases, and even serious conscious efforts to change are often fruitless. Brief changes are sometimes observed, but they do not "take": The learner backslides to the stable state. Selinker (1972) called this phenomenon fossilization (Bley-Vroman, 1989, pp.46 & 47).

Byram (2000) supports this position as he believes that:

Fossilisation is the term used to describe incomplete language learning. This is identified by certain features of the learner's language being different from the speech of the target population, marking the point when progress in that aspect of the target language stops and the learner's language becomes fixed at an intermediate state (Byram, 2000, p.218).

Saville-Troike (2006) equates fossilization with ultimate attainment when asserting that many second language learners:

cease at some point to make further progress toward the learning target in response to L2 input, resulting in a final state which still includes instances of LI interference or creative structures different from any that would be produced by a native speaker of the L2 (a "frozen" state of progress known as fossilization in SLA) (Saville-Troike, 2006, p.21).

Muñoz Lahoz (2005, p.36) point out that fossilization is permanent: "IL may stabilize in what seems a permanent way, that is, the learner stops learning or, in more technical terms, the interlanguage continuum stops a long way from the target language".

White (2003, p.276) endorses this view when defining fossilization as "a phenomenon whereby the L2 speaker's grammar is permanently non-native". Bussmann (1996, p. 171) goes in the same direction when referring to fossilization as the "Permanent retention of linguistic habits which, when taken together, constitute a language- learner's interlanguage".

To sum up, there are different definitions of fossilization within second language acquisition literature. As it is shown by the survey of these definitions, researchers have

endeavoured to elucidate the construct of fossilization over the years, and they have admitted the fact that fossilization is a pivotal feature of second language acquisition. Still there is no unanimous conceptualization of fossilization.

2.1.1.3. An Alternative Definition of Fossilisation: Han's Definition

Though, to date the definitions of fossilisation vary markedly across writers and studies (Long, 2003), the review of the literature stresses the necessity that when defining it, two features should always be taken into account: (a) cessation of learning and (b) despite continuous exposure to input, adequate motivation to learn, and sufficient opportunity to practice (Han, 2003).

In order to remedy the lack of precision that strikes the accepted definitions of the notion of fossilization, Han proposes a two-fold definition, taking into account both the innateness and the external manifestation of the phenomenon. As a result, a cognitive and an empirical level with respective definitions are established:

COGNITIVE LEVEL: Fossilisation involves those cognitive processes, or underlying mechanisms that produce permanently stabilised IL forms.

EMPIRICAL LEVEL: Fossilisation involves those stabilised interlanguage forms that remain in learner speech or writing over time, no matter what the input or what the learner does (Han, 1998, p. 50, cited in Han & Selinker, 2005, p. 457).

Explaining the above definition, Han (2004a) points out that this two-fold definition gives an account of fossilisation at two interrelated levels. At the cognitive level, it stresses that fossilisation is a cognitive mechanism composed of more than one process; at the empirical level, it relates fossilisation to stabilisation over time that is observable in the interlanguage output. The two levels, Han argues, are strictly interrelated in a cause-effect relationship in

that it is the cognitive level of fossilisation (i.e. fossilisation as a process) that causes the empirical level (i.e. fossilisation as a product). In addition to this, fossilization is persistent over time, and resistant to environmental influences such as sufficient exposure to the target language and pedagogic interventions, for example.

What can be noticed about this definition, however, is that it leaves much room for interpretation. For instance, at the cognitive level, there is no precision regarding the cognitive processes or mechanisms involved; what are they? Supposing we know what they are, we still need to know when and how they are activated. At the empirical level, there is no clear distinction between fossilization and stabilization over time. Moreover the length of the stabilization and its manner still need to be determined.

2.1.2. Differentiation from Other Constructs

Fossilization and Stabilization

Stabilisation has been a pivotal characteristic mentioned in most definitions of fossilisation. Gass and Selinker (2000, p. 12) define it as “The plateaus that learners reach when there is little change in some or all of their interlanguage forms”. Some researchers like (Lardiere, 2007 & Franceschina , 2005) have differentiated the two in that stabilisation refers to temporary plateaus in development while fossilisation refers to the case where the cessation of learning is definite .Others such as Schumann (1978), Stauble (1978), and Perdue (1993) have interpreted it as the precursor of fossilisation (Selinker & Han).While Selinker (1991) believes that stabilization is not necessarily a prelude to fossilization, he states that certain stabilized forms can lead to either fossilization or further development. There are questions that should be raised to make clear the relation of stabilization to fossilization: Are they different or synonymous? If they are synonymous, why would we then need two terms to refer to one single construct (Han, 2003)?

According to Selinker and Han (2001) stabilization forms a continuum with fossilization but the two should not be simply equalized. They distinguish three types of stabilization:

- (1) A temporary phase of 'getting stuck', which they view as a natural phase in all learning.
- (2) A permanent cessation of interlanguage development that they consider to be the only case where the issue of fossilization being indistinguishable from stabilization arises.
- (3) Interlanguage restructuring that they consider to be masked by a surface plateau in terms of the progress towards the target language norms.

When stabilisation forms a harbinger to fossilisation, according to Selinker and Han (2001), it is revealed as one of the following manifestations at the level of interlanguage performance:

- (1) Non-variant appearance that pertains to stabilised interlanguage forms which occur invariantly over time.
- (2) Backsliding which refers to the variational reappearance over time of interlanguage forms that seem to have been eliminated.
- (3) Stabilised inter-contextual variation which is the context-based variational appearance over time of interlanguage target-like and non-target-like forms.
- (4) Stabilised intra-contextual variation that refers to the variational appearance over time of interlanguage target-like and non-target-like forms in the same context.

These manifestations are exhibited despite continuous exposure to input, adequate motivation to learn and sufficient opportunity to practice.

Long (2003, p. 490), however, holds the view that stabilization, rather than fossilization itself, should constitute the relevant research focus as far as the cessation of learning of a second language is concerned. He states that: "understanding the causes of *stabilization* (and destabilization) would seem to promise as much for SLA theory as work on fossilization, and do so without fossilization attendant theoretical and empirical baggage".

This view stems from the reaction of Long (2003) to Selinker's view that fossilization refers to a case in which the learner produces a target language form correctly in some contexts and incorrectly in others, thereby demonstrating a fluctuation in interlanguage performance. This fluctuation would persist in the learner's output for an extended period of time in order to qualify as fossilization. Long (2003) argues that if stabilization is the first mark of what he calls (putative) fossilization and if permanence is the only difference between stabilization and fossilization, then including persistent "fluctuation" as a mark of fossilization leaves room for an important problem. Because, as he points out, The Random House Dictionary of the English Language (1987, p. 1852) defines stabilization in terms of the absence of fluctuation. Thus fluctuation is not part of stabilization, yet stabilization is the precursor to fossilization, which can supposedly include fluctuation.

In response to this position Han (2004b) maintains that Long seems to equate stabilization with fossilization which may lead to three problems:

- (1) Confusing learning plateau which is a natural learning process with permanent cessation of learning.
- (2) The inclusion of every instance of stabilization in understanding fossilization, that leads to the creation of an unnecessarily wide scope.
- (3) Also, the view that stabilization and fluctuation are mutually exclusive appears to overlook the well-established fact that interlanguage varies and that these interlanguage variations may themselves stabilize.

Han (2004b) concludes by saying that until there is sound evidence to the contrary, the traditional course should continue to be followed and stabilization and fossilization should be conceptually kept apart as two different constructs while selectively investigating stabilisation as part of the fossilisation process. She adds that if Selinker and Han (2001) are right about distinguishing between different types of stabilization, as Long does not do, then only type 2

(i.e. long-term stabilization being a harbinger of fossilization) should be at the heart of fossilization studies.

2.1.3. Key Issues

2.1.3.1. Is Fossilization Global or Local?

Some researchers seem to regard fossilization as a global phenomenon that affects the entire interlanguage system; others regard it as a local phenomenon that affects parts of the subdomains of the interlanguage system (Han, 2004b). Selinker himself has shifted his perception from local to global to local again. In his 1972 article he maintained that fossilized linguistic phenomena are linguistic *items, rules, and Subsystems* kept into the interlanguage of speakers of a particular native language relative to a particular target language. In 1978, however, he defined fossilization as a permanent cessation of interlanguage learning before learners have reached target language norms at *all levels of linguistic structure* and in *all discourse domains*.

Han (2004b) points out that the dichotomy global/local fossilization is reflected in the second language acquisition literature through the use of “fossilized error”, on the one hand, hinting to local fossilization, and “fossilized competence” and “fossilized learner”, on the other hand, hinting to global fossilization. She gives the example of Tarone, Frauenfelder and Selinker (1976) referring to two types of learners: non-fossilized learners whose interlanguage changes over time, thereby implying continuation of learning and fossilized learners whose interlanguage manifests cessation of learning or stability due to their inability to change the interlanguage system. Supporting the idea of global fossilization, Tarone (2006, p. 158) refers to this phenomenon as “the negative impact of the passage of time on humans' ability to acquire a second language”. Han (2004b) believes that this dichotomy of second language learners is blemished for three reasons :(1) it essentially relies only on learners' production

(i.e. the observable behaviour) to ascertain whether learning is taking place or not,(2) it disregards the underlying internal, invisible, and cognitive processes, and (3) it mirrors an oversimplistic and a behaviouristic approach to learning. In addition to this, Han strongly holds that evidence of global fossilization remains totally impressionistic and that global fossilization is presumed rather than established.

The majority of the available empirical evidence points to local fossilization “namely, permanent local cessation of development i.e. where some but not all parts of the target language are fully attainable” (Han and Odlin ,2006, pp. 08 & 12). Here are some examples:

Han (2006) found out that for her two subjects, part of the subsystem (i.e. unaccusatives) in the two grammars attained its end state and part of it did not. She argues, based on the findings from this study that the approach to linguistic structures as unequal prognosticates differential end states in relation to different parts of the interlanguage system (and its subsystems).She concludes that the development of a second language withstands a global end state, it rather results in the attainment of multiple local end states at different points in time, with some manifesting complete acquisition and others incomplete acquisition (i.e. fossilization).

Lardiere (2006) analysed the interlanguage of her subject Patty and discovered that fossilization of inflectional morphemes did not forestall the development of syntax. She points out that Patty’s data show that in some areas her grammar clearly diverges from that of the native English speakers and in some others it seems quite nativelike. From this study Lardiere concurs that it is not possible to speak of fossilization in any global terms because it applies selectively to different subsystems of language. She agrees with Hawkins’ (2000) reference to this type of divergence and convergence vis-à-vis native speaker grammars as “persistent selective fossilization”.

MacWhinney (2006) asserts that 'fossilization is not an across-the-board phenomenon. He believes that there is rather continual growth in some areas and relative stability of errors in others. He gives the example of older 'fossilized' Hungarian learners of English that may continue to acquire new verbs, structures, and phrases, while continuing to pronounce English water as vater. MacWhinney says that for those particular areas that show little change, it is more accurate to think about localized fossilization.

The above mentioned examples regard fossilization as a local phenomenon that affects *some interlanguage subsystems and structures* but not others. Selinker (1991, p.31) however refers to fossilization as a local phenomenon that may affect *the same subsystem or structure* in some contexts and discourse domains but not in others. He gives the following definition of discourse domain: "Discourse domain, by which we mean the cognitive experiential way an individual 'slices up' the content domains of language use that he/she must talk or write about. Prototypical domains are such things as 'talk about work' and 'talk about life story'".

He states that learners build interlanguages within discourse domains and they own a different interlanguage associated with each domain. He holds that fossilization does not occur globally across interlanguages, but rather differentially within discourse domains and that not only is there interlanguage variation by domain, but fossilization, as well. He mentions the example of a subject who uses modals, and other features, differentially in two different domains. In the work talk domain the subject uses the modals 'can' and 'could' in a target language-like fashion to denote factual or hypothetical possibility. However, in the life story domain, the subject discriminates concrete, specific topics from abstract, general ones by shifting between 'could' and 'can' in his discourse in a non target language-like norm. Selinker concludes that interlanguages can change longitudinally within domains, but that such changes may not carry across domains. This idea is strongly supported by Selinker's

exclamation: How can it be that a native speaker, who controls the oral and written academic Englishes apparently perfectly, will in some contexts produce such fossilized interlanguage sentences as “It did fell down”, “I did found this program strange”, and “I didn't even saw the guy from the next table” (Selinker, 2006, p.203).

Commenting on Selinker's claims Long (2003) maintains that Selinker's focus switched from fossilization as a global interlanguage phenomenon to a more differentiated view. Long believes that this shift has circumscribed the concept, yet made it less confirmable. Because while amplifying the strength of the theory, implying that fossilization may take place in separate "domains" appears to make identification easier for the researcher than demonstrating that change has ceased everywhere in a grammar, yet really makes it harder, since "discourse domain" continues to be a vague concept to this day. Selinker also suggests that fossilization was not only domain-dependent, but context-dependent, and so could be evidenced by variability ("fluctuation") across contexts, not just by uniformity in performance across all contexts. Long commented on this saying that unless it is possible to specify where one "context" (and/or "discourse domain") ends and another starts, verifying a claim that all or part of a grammar has fossilized grows impossible.

2.1.3.2. Is Fossilization a Product or a Process?

Fossilization is alternately understood as a product or a process and sometimes as both. Considered from a phenomenological view point it is a product (Han, 2004a) and as a product, it already is the product of much hypothesizing on the part of the second language acquisition researcher who reports its existence (Nakuma, 2006). The use of the term fossilization as a product should be withheld for interlanguage properties of learners who have been given every occasion to learn, and have the volition to do so, but have failed (Larsen- Freeman, 2006). Historically, the product perspective stems from definitions like the

one of Selinker and Lakshmanan (1992) that views fossilization as the long term persistence of plateaus of non-target-like structures in the interlanguage of non-native speakers (Fidler , 2006). In Selinker's initial conceptualization, fossilization as a product was supposedly a technical term for a particular condition of permanent non-target-like ultimate attainment that was caused by an alteration in a person's underlying capacity to acquire a second language (Long, 2003).

Han (2004a) holds that the word 'permanent' is elusive and should not be taken literally because a literal interpretation of it would necessarily predict that fossilization will never be verified, because there will not be any evidence of it. She states the case of Jung (2002, p.16) who had taken the literal meaning of the word 'permanent':

To make any decisive claims [on fossilization] ... it would be necessary to demonstrate that the fossilized item in question has completely ceased developing towards the L2 norm. However , this would require the researcher analyzing the learner's performance over a sufficient length of time, ideally from the moment of observation of a fossilized item until the learner's death, to be sure that no destabilization had occurred (Jung,2002,p.16 cited in Han, 2004a,22).

According to Han such a kind of proposal, though oversimplistic at best, hints at the hardship in documenting fossilization. She believes that from a phenomenological perspective it would be empirically impossible to verify fossilization as a product. But she stresses that the absence of such evidence must not be regarded as evidence of the absence of fossilization.

Under the cognitive approach fossilization is considered as a process. From this perspective it does not necessarily entail the absence of development in a particular area; rather, the word fossilization can also refer to a strong tendency towards the cessation of development (Han, 2004a). The idea of fossilization as a process originates from Selinker's

(1972) concept of a fossilization mechanism that is part of the underlying psychological structure of language (Long, 2003). According to Fidler (2006) the operation of this mechanism over time was believed to be responsible for the interruption of the development of a second language in perhaps up to 95% of learners. Thus, the word 'fossilization' was used as an explanation for slowing/stopped development, and could be observed empirically only via its symptoms, like 'backsliding'.

Recently, however, this discrimination has dimmed to some extent. Han (2003, 2004a), for instance, states that fossilization is a process at a cognitive level, but is a product at the empirical level with the cognitive level causing the empirical one. She concludes by strongly claiming that fossilization is an observable process, with the product only being inferable. Long (2003) points out that if fossilization is a cognitive mechanism causing the production of the non-target-like end-state also called "fossilization," there is then no need for other explanations. According to him fossilization as a process is not itself an explanation, but a cover word for one or more causal variables in second language acquisition, like transfer, learnability, and markedness for example, that is a process itself in need of explanation. In response to Long's (2003) remark about the ambiguity that potentially results from describing fossilization variously as a process and as a product and sometimes both, Han and Odlin (2006) state that using the verb fossilize risks some confusion, and the noun fossilization involves a similar risk. On the one hand, fossilize as many other verbs (like melt for instance) can designate a process, yet on the other it can also designate a resulting state. They maintain that the problem of combining the explanans (i.e. the process) and the explanandum (i.e. the product) is always hard to escape when English is the metalanguage used to refer to the theoretical issues.

2.2. Causal Variables of Fossilization

An Over View

Han and Selinker (2005) maintain that taking into consideration the multiple dimensions of fossilization, any effort to account for the phenomenon in terms of one universal cause will eventually prove deficient. They state the example of biological maturational constraints as a causal factor. This factor may account for the general failure of the overwhelming majority of adult second language learners to attain native-speaker competence, but is impotent to explain interlearner as well as intralearner differential success and failure. Research to date suggests that there is no one ontological account of fossilization (Han, 2004a). Rather, a number of possible causes both internal and external have been identified to play a role in explaining it (Ellis, 1994). Fossilization is internally determined, due to the continuous influence of maturational and native language constraints, yet it can be modulated (i.e. exacerbated or alleviated) by external factors (Han, 2004a). Future research should therefore focus on exploring the interaction of various factors and ideally seek to specify the differential contribution of the multiple factors and how they interact, but it is a long way from being able to do so (Ellis, 1994). As a result, fossilization is found to be accounted for in the following superabundance of terms, among many others as suggested by Han (2003), Long (2003,) and Franceschina (2005):

External	<ul style="list-style-type: none">. Lack of communicative relevance . Lack of input . Absence of corrective feedback . Reinforcement from linguistic environment . Lack of instruction
-----------------	--

	<ul style="list-style-type: none"> . Lack of written input . Quality of input . Instruction 		
Internal	Cognitive	Knowledge Representation	<ul style="list-style-type: none"> . First Language(L1) influence . Idiosyncratic transfer of L1 elements which particular learners (as opposed to all learners from that L1 background) perceive as equivalent to elements in the Second Language (L2), so as to avoid duplicating them in the new language . A combination of L1 transfer and one or more other factors, such as perceived typological markedness or a desire for symmetry, converging on the same error, as expressed in the weak form of the Multiple Effects Principle (MEP), in which L1 transfer is a

			<p>privileged factor</p> <ul style="list-style-type: none"> . The strong form of the MEP, in which L1 transfer is a necessary factor, in combination with one or more other factors . Lack of access to various components of Universal Grammar (UG), either computational resources, with mapping problems between the lexicon and syntax, representational resources, or representational resources not instantiated in the L1 . Loss of access to UG altogether . Failure of parameter resetting . Learning(i.e. L1) inhibits learning(i.e.L2) . Representational deficits of the language faculty
--	--	--	---

		<p>Knowledge</p> <p>Processing</p> <p>Receptive/Productive</p>	<ul style="list-style-type: none"> . Lack of sensitivity to input . Inability to notice input-output discrepancies, that is, the Matching Problem Hypothesis . False automatisation . Automatization of the first language system . Using top-down processes in comprehension . Lack of understanding . Loss of sensitivity to language data, caused by learners reaching the steady state in the L1 . Lack of opportunity to use the target language . Processing constraints (as distinct from lack of grammatical knowledge) producing fossilized random variation, especially of
--	--	---	---

			<p>semantically light morphology</p> <ul style="list-style-type: none"> . Failure to detect errors . Failure to resolve the inherent variation in the interlanguage . Reduction in the computational capacity of the language faculty . Lack of verbal analytical skills . Lack of sensitivity to input
		<p>Psychological</p>	<ul style="list-style-type: none"> . Inappropriate learning strategy . Change in the emotional state . Reluctance to take the risk of restructuring . Simplification . Natural tendency to focus on content, not on form . Avoidance . Transfer of training

	<p>Neuro- biological</p>	<ul style="list-style-type: none"> . Neural entrenchment . Changes in the neural structure of the human brain . Maturational constraints . Age . Loss of neural plasticity in the brain after a Critical Period (CP) for language acquisition as a result of the completion of brain lateralization and hemispheric specialization around puberty. . Myelination of neural pathways that makes the transmission across the connections between neighbouring neurons difficult
	<p>Socio- affective</p>	<ul style="list-style-type: none"> . Satisfaction of communicative needs . Failure to acculturate . Will to maintain identity . perceptions of embarrassment, risk and other affective aspects of communicative acts impede linguistic input from reaching the Language Acquisition Device (LAD), thus acting as an affective filter as in Krashen's Affective Filter Hypothesis

Table 01 Causal Factors of Fossilization

Conclusion

In this chapter we have explored the concept of fossilization; its different definitions along with an alternative definition that stresses the cognitive aspect of fossilization; its differentiation from other constructs; some key issues relevant to fossilization; and its causal factors. The next chapter is a trial to explore the relationship between metacognition and fossilization in second language acquisition.

Chapter Three

Field Work

Introduction

The previous chapters described metacognition and fossilization in second language acquisition. This chapter presents the main study conducted to investigate the relationship between students' metacognition and fossilization in the course of the acquisition of English as a second language. This chapter, describes the various components comprised in the method of investigation including: (1) the variables and the hypothesis, (2) the population, (3) the sampling procedure employed, (4) the instruments of data collection, (5) the procedures used during questionnaires administration, (6) and the statistical analysis of the results. The chapter ends with the presentation of the limitations of the study, and general conclusions.

3.1. Variables and Hypothesis

The design of this study includes and investigates the following variables. One independent variable: metacognition. The study attempts to determine how this variable influences the dependent variable, i.e. fossilization hypothesising that students with a high level of metacognition would exhibit a low degree of fossilization.

3.2. Population

The population for this study consists of second year university students of English at Mentouri University of Constantine. The total number of second year students during the 2006-07 academic year was approximately 360 individuals divided on 12 LMD groups. Second year students were chosen on the basis that they study grammar for the second and last year which means that they are exposed to adequate input and sufficient opportunity to

practice, two important factors that need to be present along with motivation before talking about any fossilization.

3.3. Sampling

Simple random sampling was used to select about 6 students from each group of approximately 30 students. A list of all students enrolled in the second year was obtained. Then, a random table method was used to choose students for the study. Every fifth student was selected to be included in the survey. The goal was to have a balanced design, i.e., an equal or at least proportional number of participants in each group. Afterwards, each selected student was given two questionnaires to fill out inside the classroom. Due to some absences the number of participants ended up to be 62 students instead of 70. Prior to the administration of the two questionnaires to these 62 students a pilot study was carried out on an other group of students and yielded the decision to explain some words to the participants in the current study.

3.4. Instruments

Two scales were used in the present study. The first scale was a slight adaptation of Noels, Clement & Pelletier's (2001) Language Learning Orientations Scale –Intrinsic Motivation, Extrinsic Motivation, and Amotivation (LLOS-IEA). Only wording changes were made in order to clarify the items and make them more reader-friendly. This scale was used to isolate the motivated students since we cannot speak about fossilization without the students being motivated to learn a second language. The second scale was also an adaptation of Schraw and Dennison's (1994) Metacognitive Awareness Inventory (MAI) which consists of a 52 item self-report instrument to assess students' awareness of knowledge of cognition and regulation of cognition, the two main components of metacognition. Knowledge of cognition

includes three components: declarative knowledge (i.e., knowledge about one's skills), procedural knowledge (i.e., knowledge about how to use strategies), and conditional knowledge (i.e., knowledge about why to use strategies). Regulation of cognition contains five components: planning (i.e., goal setting), information management (i.e., skills and strategies sequences), monitoring (i.e., assessment of one's learning process), debugging (i.e., strategies for correcting one's learning performance errors), and evaluation (i.e., assessment of one's learning performance and strategy effectiveness) (Schraw & Dennison, 1994). Schraw and Dennison (1994) reported that the Cronbach alpha reliability coefficient of this test was .90 for college students.

In the present study the two scales together have 52 items (20 items for the LLOS-IEA and 32 items for the MAI). The LLOS-IEA has seven scales including: (1) Amotivation (Items 1 and 2); (2) External Regulation (Items 3, 4, and 5), (3) Introjected Regulation (Items 6, 7, and 8); (4) Identified Regulation (Items 9, 10, and 11). These scales make up Extrinsic Motivation. Intrinsic Motivation includes: (5) Intrinsic Motivation-Knowledge (Items 12, 13, and 14); (6) Intrinsic Motivation-Accomplishment (Items 15, 16, and 17); (7) Intrinsic Motivation-Stimulation (Items 18, 19, and 20).

The MAI in the current study has seven scales including (1) Declarative Knowledge (Items 4, 8, 9, 12, 13, 15, 28), (2) Conditional knowledge (Items 11, 19) that make up the construct of Knowledge of Cognition; being no different from strategy variables, procedural knowledge statements have been dropped (see page 15 chapter 1), (3) Planning (Items 3, 5, 27), (4) Information management Strategies (Items 7, 10, 20, 21, 23, 24, 26, 29), (5) Comprehension Monitoring (Items 1, 2, 16, 22, 30), (6) Debugging Strategies (Items 18, 25, 31, 32), and (7) Evaluation (Items 6, 14, 17) that make up the construct of Regulation of Cognition. Many statements have been dropped to shorten the questionnaire for administration convenience. The items on the Metacognitive Awareness Inventory (MAI) as

well as on the Language Learning Orientations Scale –Intrinsic Motivation, Extrinsic Motivation, and Amotivation (LLOS-IEA) were rated on a 5-point Likert scale with 5 being “corresponds exactly” and 1 being “does not correspond at all”. In the case of the absence of any choice among the list of 1,2,3,4, and 5 on the scale; a 0 score was given. The two first items of the LLOS-IEA which answer the question “Why are you learning English?” in a negative way were scored with 1 being “corresponds exactly” and 5 being “does not correspond at all”.

The Cronbach alpha reliability coefficient which ideally should be above .7 (DeVellis 2003) is in this study .729 for the LLOS-IEA; a result yielded by the SPSS (statistics package for social sciences) as shown below.

		N	%
Cases	Valid	62	100,0
	Excluded	0	,0
	Total	62	100,0

Table 02 LLOS-IEA Case Processing Summary

Cronbach's Alpha	N of Items
,729	20

Table 03 LLOS-IEA Reliability Statistics

The Cronbach alpha reliability coefficient in the current study is .775 for the MAI; a result yielded by the SPSS (statistics package for social sciences) as shown below.

		N	%
Cases	Valid	60	100,0
	Excluded	0	,0
	Total	60	100,0

Table 04 MAI Case Processing Summary

Cronbach's Alpha	N of Items
,775	32

Table 05 MAI Reliability Statistics

In addition to the above mentioned scales, three different written performances of each student participating in this study were taken into account and analysed to assess the morphosyntactic errors of the students that reflect their fossilization. The first written performance was the students' second term written expression exam. The second one was a written composition that is a part of their second term grammar module exam. In both performances the students were supposed to consciously pay careful attention to their grammar. The third one was a free composition written on the day of the administration of the questionnaires to answer the question "why are you learning English?" this last composition is aimed at assessing both their motivation to confirm the results of the LLOS-IEA and their fossilization through a composition where no careful attention is supposed to be given to grammar since this composition is not a grammar or written expression exam and moreover it

is not an exam at all and in it the students pay more attention to the content rather than to the form which will help to reveal their fossilized mistakes.

Students' fossilization was assessed through the number of mistakes committed by each of them. The number of words in every performance was quantified and so was the number of mistakes per performance, afterwards the percentage of mistakes was calculated and used to account for the students' fossilization.

3.5. Procedures

A pilot study was carried out on two different groups of second year students; the participants were asked to complete the two questionnaires and return them in the classroom and were asked to ask for the clarification of any ambiguous items. This pilot study led to the decision to modify the wording of some items and explain some others in the classroom while the study in hand was carried out. The study in hand took place in late may of the year 2007, a week after the administration of the questionnaires to the pilot study groups.

3.6. Statistical Analysis

The data thus collected were analyzed using the SPSS (the Statistical Package for Social Sciences), version 17 which is a very widely used computer program designed to aid the statistical analysis of data (Brace et al, 2006). The analysis was conducted in the following steps. In the first step, reliability analyses were conducted. This was to test both scales' internal consistency and reliability. Cronbach's alpha coefficient for internal consistency was therefore calculated for the twenty items in the "LLOS-IEA" and the thirty two items in the "MAI". Both scales yielded Cronbach's alpha coefficients of .729 for the LLOS-IEA and .775 for the MAI. The scores of the "LLOS-IEA" were calculated and helped to isolate subjects 13 and 15, who scored under 50-the average- in this questionnaire, as non motivated students.

The scores of subjects 13 and 15 were respectively 47 and 44. These two subjects were the only students who overtly stated that they lack motivation to learn English. In their written performance to answer the question why are you learning English? Subject 13 stated that “The most important reason is that I have to learn regardless of the field I am studying. It is true that I am not the one who chose English (I did not have another choice)...”. Subject 15 stated that she was learning English “because my parents did not let me studying other fields I wanted....so when I was obliged to chose something in teaching, I preferred English...”. These two subjects were excluded from the study because of their lack of motivation as confirmed by the LLOS-IEA scores and the written composition that answers the question why are you learning English? The remaining 60 subjects’ performances were kept to carry out the investigation.

3.7. Data Normality

It is important to check the normality of the data to decide which statistical tests to opt for. For this purpose the Kolmogorov-Smirnov one sample test was used since $N > 50$ (60 in the current study). This test essentially tests the data for ‘goodness of fit’ against pre-calculated ‘normally distributed’ values. The output of this test was supported by the use of a frequency distribution histogram which shows the data distribution relative to a normal distribution curve. The results of the Kolmogorov-Smirnov one sample test are shown in the table below.

	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Fossilization	,121	60	,030

Table 06 Fossilization Kolmogorov-Smirnov one sample test results

•The Kolmogorov-Smirnov Statistic is 0.121.

•The degree of freedom df is 60 it is the sample size since there are no restrictions in calculating this statistic because the number of restrictions subtracted from the sample size is the degree of freedom_ (Frankfort-Nachmias & Leon-Guerrero, 2006).

•The significance p or the two tailed probability estimate (sig.) is 0.03; a value that is inferior to 0.05 the level of risk α . A p value that is smaller than the level of risk indicates an observed sample is not normally distributed (Corder & Foreman, 2009). The sample in question failed to pass the normality test in terms of kurtosis and skewness as well as shown in the table below.

			Statistic	Std. Error
Fossilization		Mean	7,6674	,52123
	95% Confidence Interval for Mean	Lower Bound	6,6244	
		Upper Bound	8,7104	
		5% Trimmed Mean	7,4326	
		Median	6,9507	
		Variance	16,301	
		Std. Deviation	4,03742	
		Minimum	1,65	
		Maximum	17,99	
		Range	16,34	
Interquartile Range		4,65		

		Skewness	,915	,309
		Kurtosis	,468	,608

Table 07 Fossilization Distribution Descriptive Statistics

The skewness is 0.915 it is a positive skewness.

The kurtosis is 0.468 it is positive as well.

In a normal distribution these values equal 0.

The following histogram confirms these results because it shows that unlike in the case of a normal distribution which is symmetric and in which the 2 halves of the histogram appear as mirror-images of one another ;the current study distribution is right skewed i.e. the tail is on the right side.

The current study distribution is leptokurtic i.e. it is more peaked than the normal curve (the highest bar extends above the normal curve line) thus has positive kurtosis (Leech & al 2005).

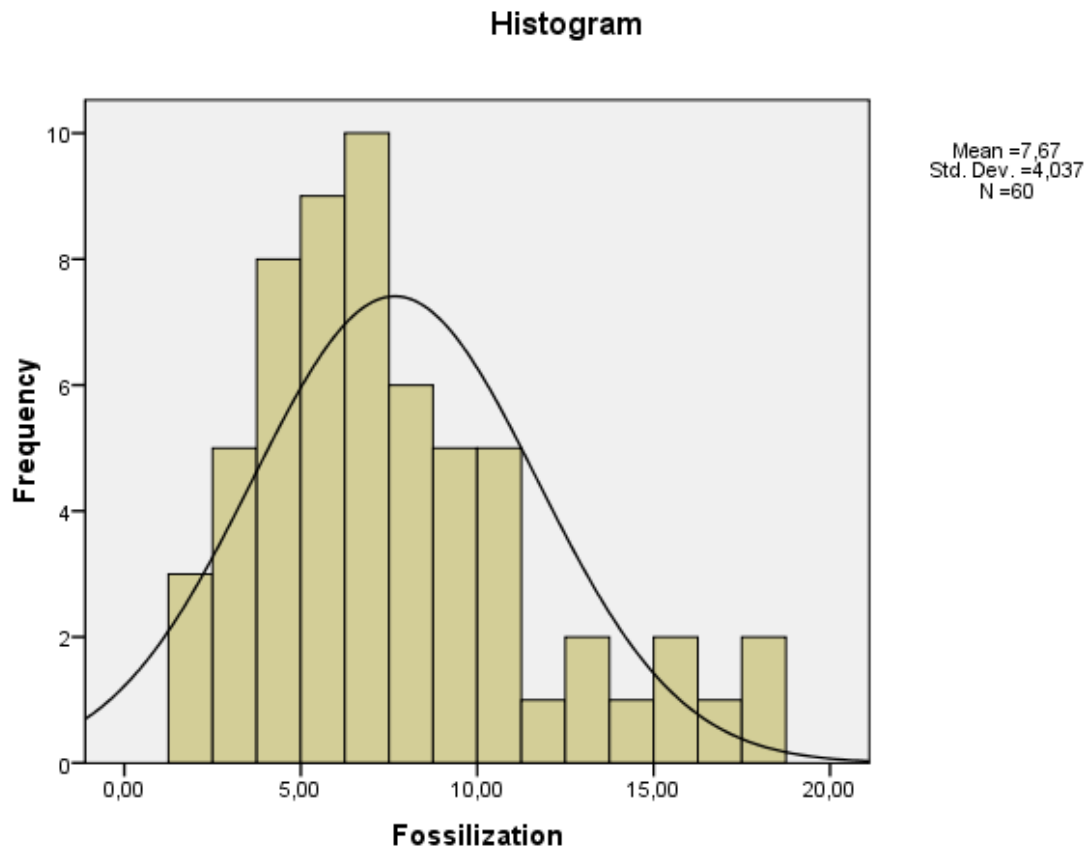


Figure 01 frequency distribution histogram of fossilization

3.8. Correlation

Since the distribution in this study is not normal we have to use nonparametric statistics because if either (or both) of the two variables involved in a correlational design are nonparametric, then we use a nonparametric measure of correlation. Two such tests can be used; Spearman's rho and Kendall's tau_b (Brace & al, 2006). In this study we opted for Spearman's rho.

3.8.1. Correlation between Metacognition and Fossilization

Nonparametric Correlations				
			Metacognition	Fossilization
Spearman's rho	Metacognition	Correlation Coefficient	1,000	-,111
			.	
		N	60	60
	Fossilization	Correlation Coefficient	-,111	1,000
				.
		N	60	60

Table 08 Correlation between Metacognition and Fossilization

The Correlation Coefficient is -0.111. The Correlation Coefficient is very low; it almost equals 0 .We conclude that there is no relationship between students' metacognition and fossilization. This result is confirmed by the following scatter plot.

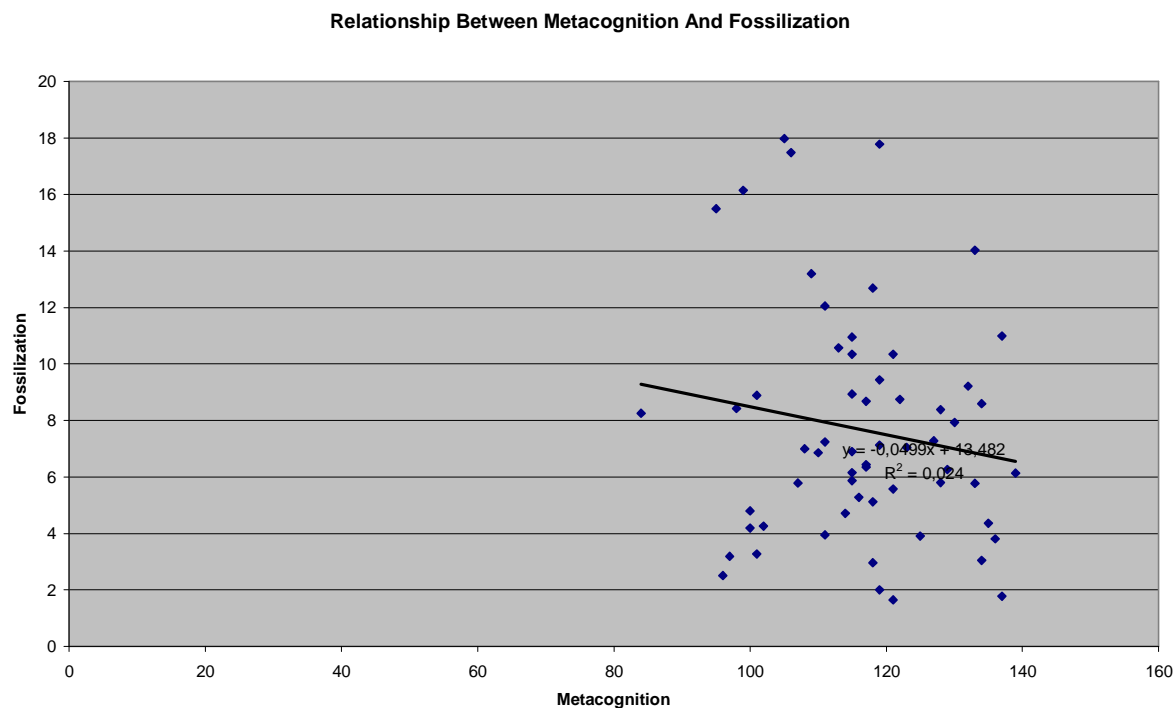


Figure 02 the Correlation between Metacognition and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular form that is assumed by the dots.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

The conclusion is that there is no relationship between metacognition and fossilization which disconfirms our hypothesis that students with a high level of metacognition would exhibit a low degree of fossilization. This means that not only doesn't domain independent metacognition influence fossilization but fossilization doesn't influence domain independent metacognition as well "Sig. (2-tailed)". They are simply not related. Our first research question: -What is the predictive contribution of domain general metacognition on successful second language acquisition i.e. fossilization free English as a second language acquisition? -

is thus answered: **domain general metacognition does not contribute to successful second language acquisition i.e. fossilization free English as a second language acquisition.**

After having studied the relationship between metacognition and fossilization, we move to the study of such a relation between the two main components of metacognition and fossilization i.e. the relation between metacognitive knowledge and fossilization on the one hand and metacognitive regulation and fossilization on the other hand. We also study the relationship between the different subcomponents of metacognition and fossilization.

3.8.1.1. Correlation between Metacognitive Knowledge and Fossilization

Nonparametric Correlations				
			M K	Fossilizati on
Spearman's rho	M K	Correlation	1,000	-,139
		Coefficient		
			.	
		N	60	60
	Fossilizati on	Correlation	-,139	1,000
		Coefficient		
		Sig. (2-tailed)	,00290	.
		N	60	60

Table 09 Correlation between Metacognitive Knowledge and Fossilization

The Correlation Coefficient is -0.139 it almost equals 0 so, we conclude that there is no relationship between students' metacognitive knowledge and fossilization. This result is confirmed by the following scatter plot.

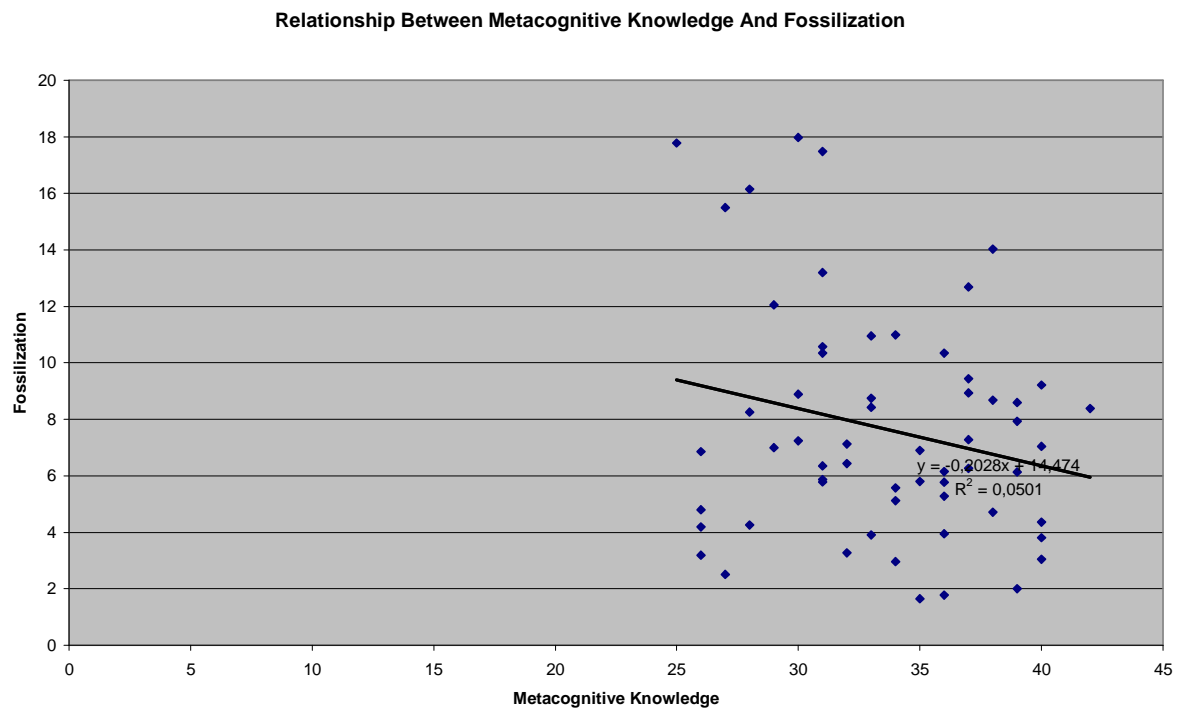


Figure 03 the Correlation between Metacognitive Knowledge and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular form that is assumed by the dots.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

The following step is the study of the relationship between the two subcomponents of metacognitive knowledge i.e. declarative knowledge and conditional knowledge, and fossilization.

3.8.1.1. 1. Correlation between Declarative Knowledge and Fossilization

Nonparametric Correlations				
			D K	Fossilizati on
Spearman's rho	D K	Correlation	1,000	-,122
		Coefficient		
			.	
		N	60	60
	Fossilizati on	Correlation	-,122	1,000
		Coefficient		
				.
		N	60	60

Table 10 Correlation between Declarative Knowledge and Fossilization

The Correlation Coefficient is -0.122 so, we conclude that there is no relationship between students' declarative knowledge and fossilization. This result is confirmed by the following scatter plot.

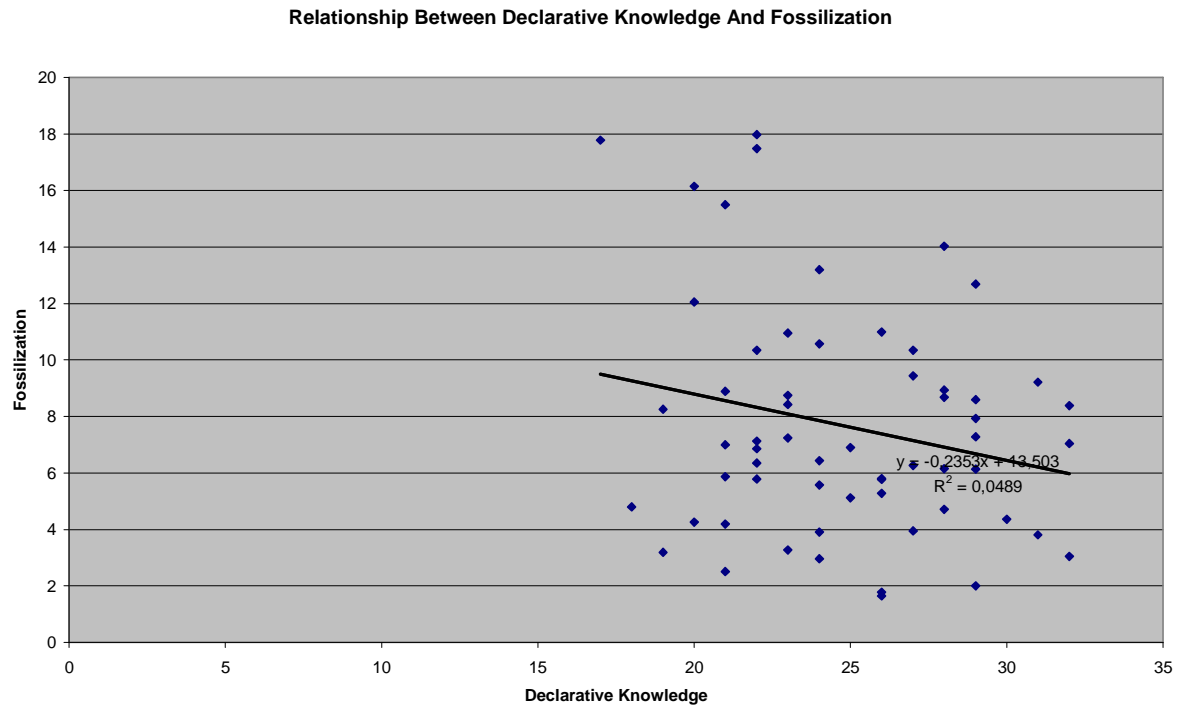


Figure 04 Correlation between Declarative Knowledge and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular form that is assumed by the dots.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

3.8.1.1. 2. Correlation between Conditional Knowledge and Fossilization

Nonparametric Correlations				
			C K	Fossilizati on
Spearman's rho	C K	Correlation Coefficient	1,000	-,121
			.	
		N	60	60
	Fossilizati on	Correlation Coefficient	-,121	1,000
				.
		N	60	60

Table 11Correlation between Conditional Knowledge and Fossilization

The Correlation Coefficient is -0.121 so, we conclude that there is no relationship between students' conditional knowledge and fossilization. This result is confirmed by the following scatter plot.

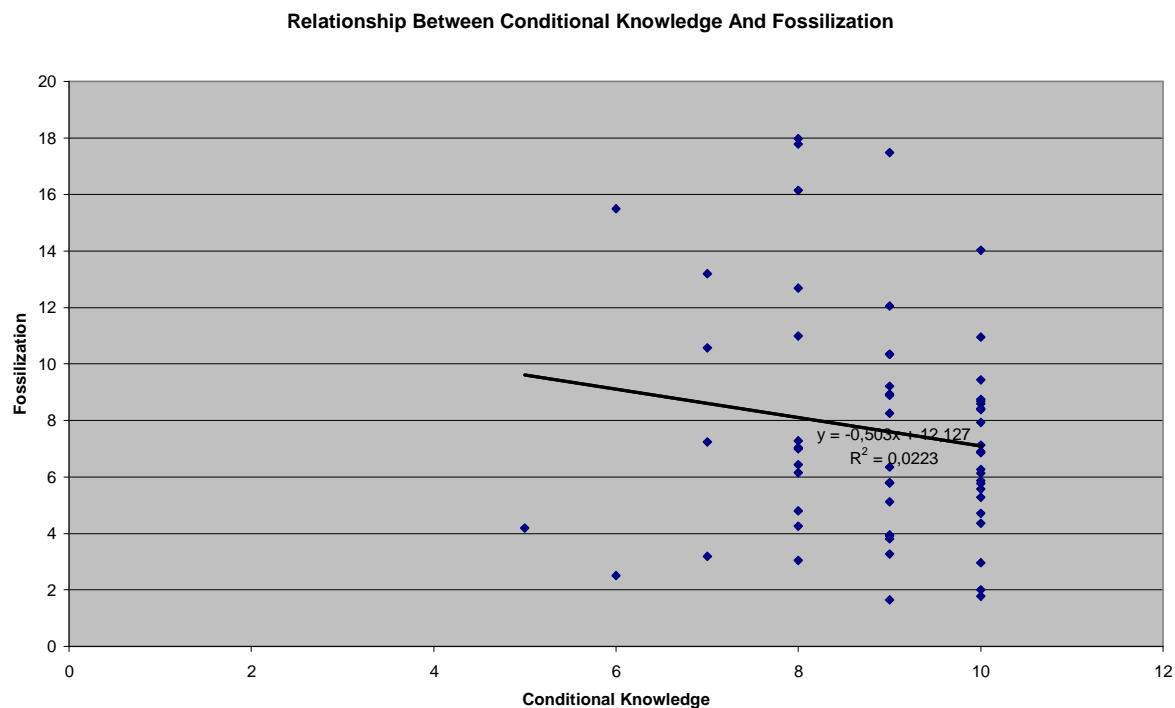


Figure 05 Correlation between Conditional Knowledge and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** We notice that conditional knowledge in this study is typical; it assumes one of the three values 8, 9, or 10 for the majority of students and is rarely different from these values. Despite this, the dots do not assume any particular global form that may indicate a positive or negative correlation.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

The conclusion is that there is no relationship between neither metacognitive knowledge nor any of its components i.e. declarative knowledge and conditional knowledge and fossilization. Our second research question: - What is the predictive contribution of knowledge of cognition (metacognitive knowledge) on successful second language acquisition i.e. fossilization free English as a second language acquisition? - is thus answered:

domain general knowledge of cognition (metacognitive knowledge) does not contribute to successful second language acquisition i.e. fossilization free English as a second language acquisition.

Now we study the relationship between the second main component of metacognition i.e. metacognitive regulation and its subcomponents, and fossilization.

3.8.1.2. Correlation between Metacognitive Regulation and Fossilization

Nonparametric Correlations				
			M R	Fossilizati on
Spearman's rho	M R	Correlation	1,000	-,056
		Coefficient		
			.	
		N	60	60
	Fossilizati on	Correlation	-,056	1,000
		Coefficient		
				.
		N	60	60

Table 12 Correlation between Metacognitive Regulation and Fossilization

The Correlation Coefficient is -0.056 so, we conclude that there is no relationship between students' metacognitive regulation and fossilization. This result is confirmed by the following scatter plot.

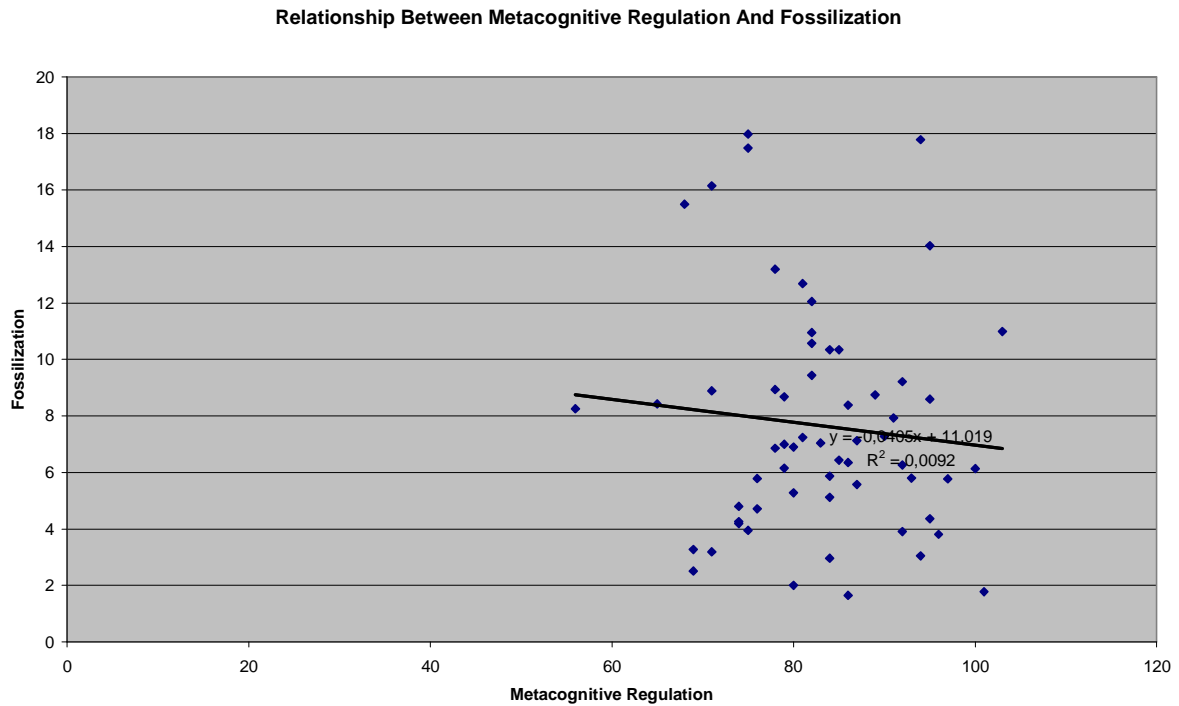


Figure 06 Correlation between Metacognitive Regulation and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular form that is assumed by the dots.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

What follows is the exploration of the relationship between the different components of metacognitive regulation and fossilization.

3.8.1.2.1. Correlation between Planning and Fossilization

Nonparametric Correlations					
			Planning	Fossilization	
Spearman's rho	Planning	Correlation Coefficient	1,000	,092	
			.		
		N	60	60	
		Correlation Coefficient	,092	1,000	
	Fossilization				.
		N	60	60	

Table 13 Correlation between Planning and Fossilization

The Correlation Coefficient is 0.092 so, we conclude that there is no relationship between students' metacognitive planning and fossilization. This result is confirmed by the following scatter plot.

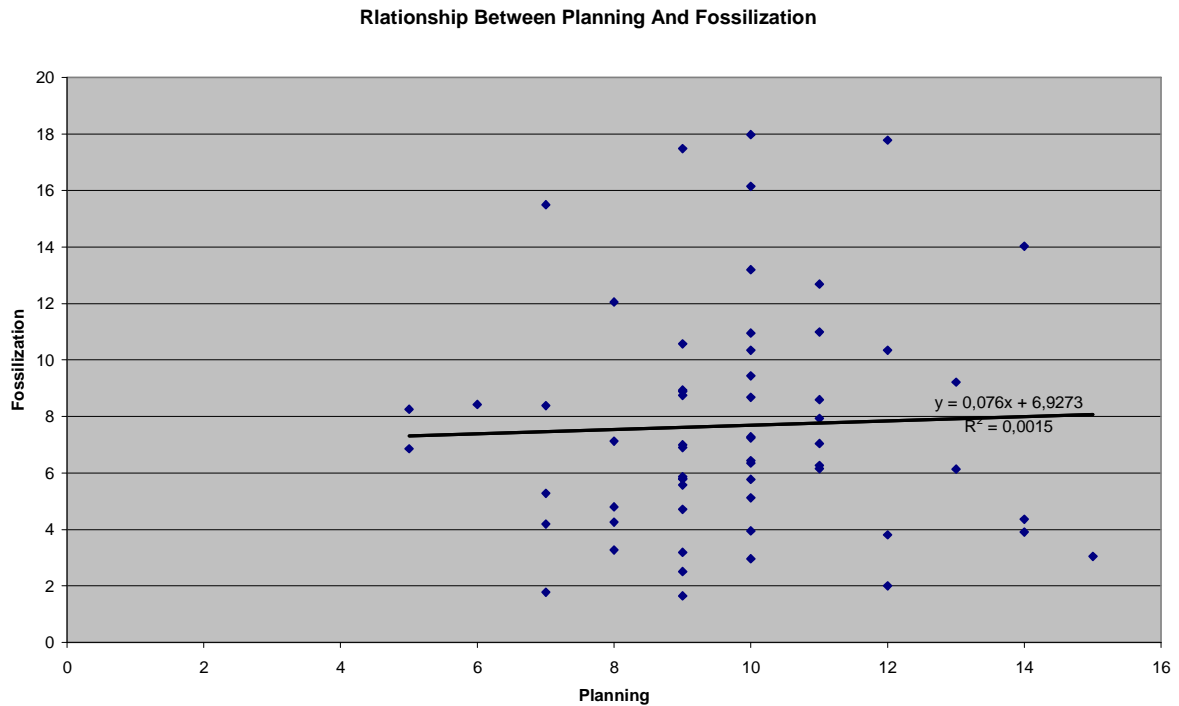


Figure 07 Correlation between Planning and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular global form that is assumed by the dots and that may indicate a positive or negative correlation though there are typical values of planning; for the majority of students. It is 9, 10, or 11.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

3.8.1.2.2. Correlation between Information Management Strategies and Fossilization

Nonparametric Correlations				
			I M S	Fossilizati on
Spearman's rho	I M S	Correlation	1,000	-,148
		Coefficient		
		N	60	60
	Fossilizati on	Correlation	-,148	1,000
		Coefficient		
		N	60	60

Table 14 Correlation between Information Management Strategies and Fossilization

The Correlation Coefficient is -0.148 so, we conclude that there is no relationship between students' Information management strategies and fossilization. This result is confirmed by the following scatter plot.

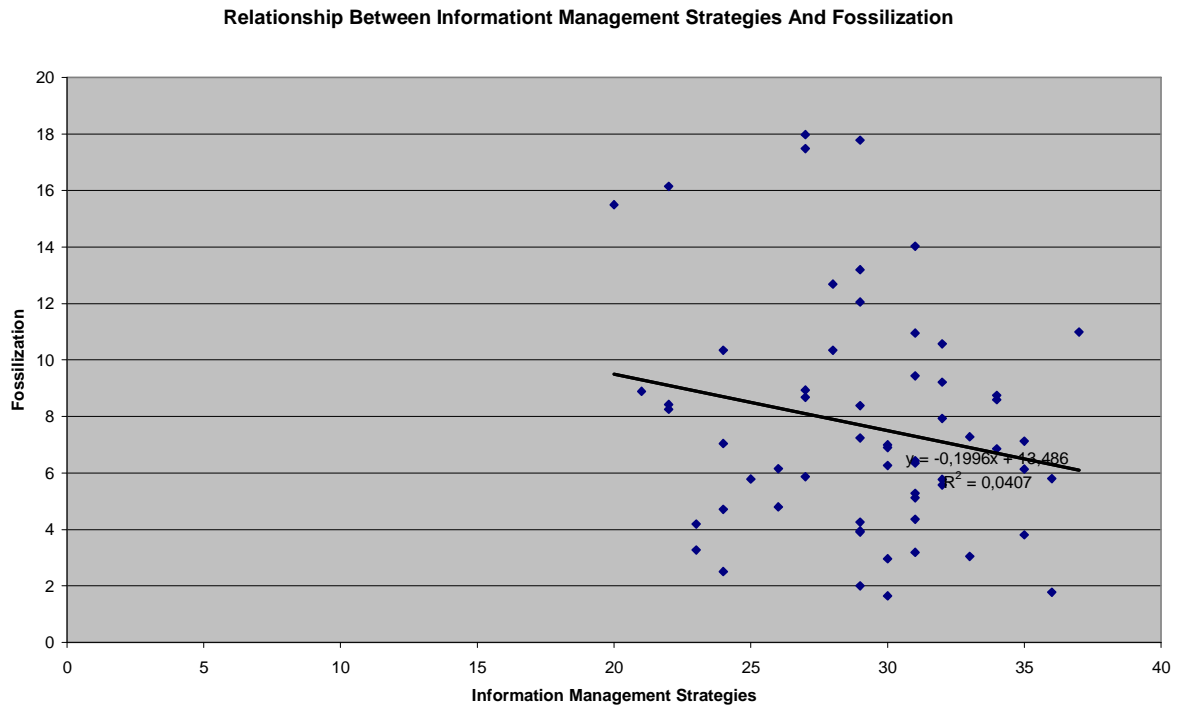


Figure 08 Correlation between Information Management Strategies and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular form that is assumed by the dots.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

3.8.1.2.3. Correlation between Comprehension Monitoring and Fossilization

Nonparametric Correlations				
			C M	Fossilizati on
Spearman's rho	C M	Correlation	1,000	-,107
		Coefficient		
			.	
		N	60	60
	Fossilizati on	Correlation	-,107	1,000
		Coefficient		
				.
		N	60	60

Table 15 Correlation between Comprehension Monitoring and Fossilization

The Correlation Coefficient is -0.107 so, we conclude that there is no relationship between students' comprehension monitoring and fossilization. This result is confirmed by the following scatter plot.

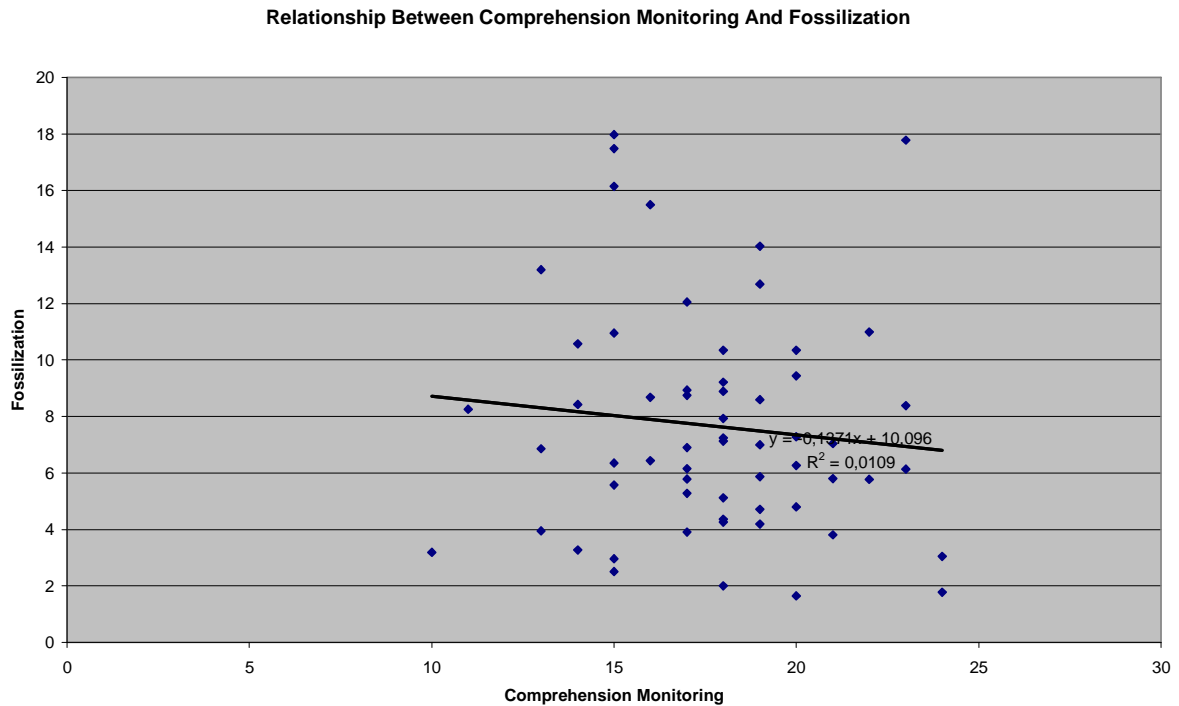


Figure 09 Correlation between Comprehension Monitoring and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular global form that is assumed by the dots and that may indicate a positive or negative correlation. We notice however that comprehension monitoring in this study is typical; it assumes one of the three values 17, 18, or 19 for the majority of students and is rarely different from these values.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

3.8.1.2.4. Correlation between Debugging Strategies and Fossilization

Nonparametric Correlations				
			D S	Fossilizati on
Spearman's rho	D S	Correlation	1,000	,089
		Coefficient		
			.	
		N	60	60
	Fossilizati on	Correlation	,089	1,000
		Coefficient		
				.
		N	60	60

Table 16 Correlation between Debugging Strategies and Fossilization

The Correlation Coefficient is 0.089 so, we conclude that there is no relationship between students' debugging strategies and fossilization. This result is confirmed by the following scatter plot.

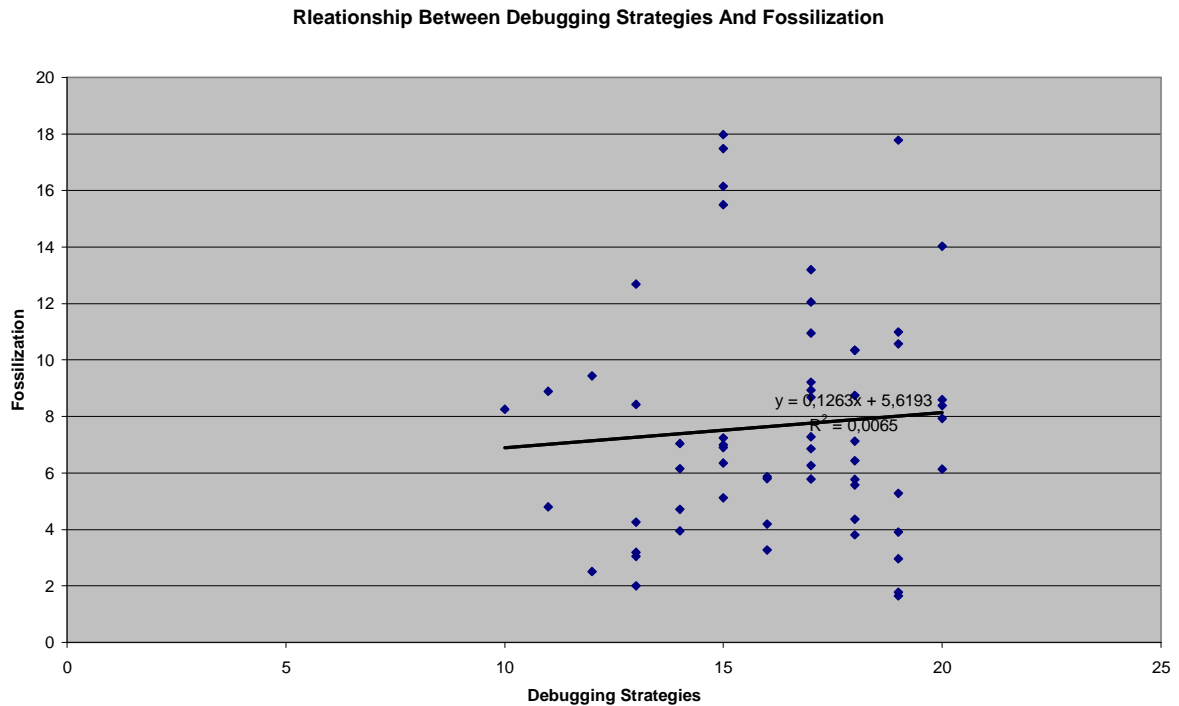


Figure 10 Correlation between Debugging Strategies and Fossilization

- Association:** this scatter plot is a random splattering of dots it has no association or direction.
- Form:** there is no particular global form that is assumed by the dots and that may indicate a positive or negative correlation. We notice however that the debugging strategies in this study are typical; they assume one of the following values 15, 17, 18, or 19 for the majority of students and are rarely different from these values.
- Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.
- Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

3.8.1.2.5. Correlation between Evaluation and Fossilization

Nonparametric Correlations				
			E	Fossilizati on
Spearman's rho	E	Correlation	1,000	,071
		Coefficient		
			.	
		N	60	60
	Fossilizati on	Correlation	,071	1,000
		Coefficient		
				.
		N	60	60

Table 17 Correlation between Evaluation and Fossilization

The Correlation Coefficient is 0.071 so, we conclude that there is no relationship between students' metacognitive evaluation and fossilization. This result is confirmed by the following scatter plot.

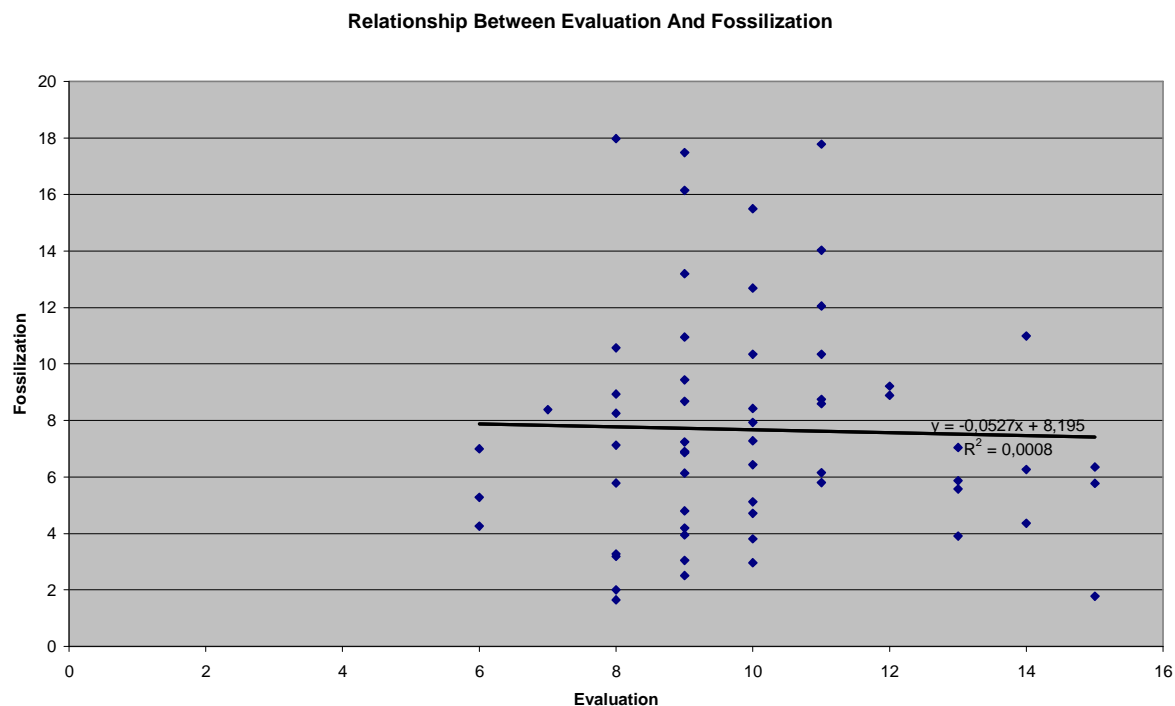


Figure 11 Correlation between Evaluation and Fossilization

•**Association:** this scatter plot is a random splattering of dots it has no association or direction.

•**Form:** there is no particular global form that is assumed by the dots and that may indicate a positive or negative correlation. We notice however that Evaluation in this study is typical; it assumes one of the following values 8, 9, 10, or 11 for the majority of students and is rarely different from these values.

•**Strength:** the scatter plot appears like a vague cloud with no discernable trend or pattern.

•**Outliers:** since there is no pattern we cannot speak about any outliers or points that do not follow the pattern.

The conclusion is that there is no relationship between neither metacognitive regulation (regulation of cognition) nor any of its components and fossilization. Our third research question: - What is the predictive contribution of regulation of cognition (metacognitive regulation) on successful second language acquisition i.e. fossilization free English as a second language acquisition? - is thus answered: **domain general regulation of cognition**

(metacognitive regulation) does not contribute to successful second language acquisition i.e. fossilization free English as a second language acquisition.

3.9. General Conclusion

The current study showed that there is no relationship neither between students' metacognition nor any of its components and fossilization at the morphosyntactic level of the acquisition of English as a second language which disconfirms our hypothesis that students with a high level of metacognition would exhibit a low degree of fossilization.

The current study, however, confirmed that the students who underwent it are really fossilized second language learners. Despite their high level of metacognition, they all got a score that is superior to the average score i.e. 80 out of 160 (see appendix D), these students could not get rid of their fossilized mistakes. In this study we investigated the students' overall metacognition i.e. metacognition as a domain independent construct and found out that it is not related to fossilization. Not only does not metacognition influence fossilization but fossilization does not influence metacognition as well (sig. (2-tailed) which shows the relation between the two variables in the two directions i.e. one variable influencing the other and vice versa). This result is very significant because any attempt of a defossilization process would be a failure if reliance is upon boosting these students' domain independent metacognition. Despite the fact that most researchers support the domain generality of metacognition (see pages 22-25), the results of this study are not congruent with its domain independent nature as far as its relation to fossilization is concerned. In the future maybe other studies, for the sake of a possible defossilization process, will attempt to investigate the relationship between students' specific domain metacognition mainly linguistic metacognition or more specifically English as a second language acquisition metacognition and fossilization.

3.10. Limitations

Like any study, this one has its limitations. We recognize that our study has some limitations concerning its design. One strong limitation is the small number of participants in the study. It is normally very difficult to gather volunteers for such a kind of studies, especially if it demands that participants come for an extra session.

There is also another problem concerning the sample used. Despite the randomized process of subjects' selection we ended up with very similar patterns of motivation and metacognition (see appendices C and D). The randomization method for selecting participants proved not to be a good one, since we ended up with a homogeneous group which doesn't reflect the differences that are normally found in a population. Another important limitation of the present study is the fact that it used questionnaires and was not supplemented by interviews or tasks and activities for a more in-depth exploration of students' metacognition and fossilization.

3.11. Recommendations of Future Research

Due to the relatively small number of students in this study, it is recommended that this study be conducted using a larger sample size. More extensive data may help clarify some of the relationships and therefore improve the validity of the results and aid in determining whether these results could be generalized to a wider population.

In addition to this, it may also prove beneficial to explore an alternate method of investigating metacognition. This recommendation is based on the fact that various measures of metacognition conceptualize the notion in a slightly different manner.

The most important thing that is highly recommended for future research is the investigation of the relationship between domain specific metacognition i.e. metacognition as related to the acquisition of English as a second language as opposed to domain independent

metacognition that was explored in this study on the one hand and fossilization on the other hand. Since this study showed that domain independent metacognition does not influence fossilization, it would be very interesting to study the influence of metalinguistic awareness as a form of domain specific metacognition on fossilization.

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APPENDICES

APPENDIX A Language Learning Orientations Scale – Intrinsic Motivation, Extrinsic Motivation, and Amotivation Subscales (LLOS – IEA)

SURVEY QUESTIONNAIRE

1. First name:

2. Surname:

3. Year:

4. Group:

Language Learning Orientations Scale – Intrinsic Motivation, Extrinsic Motivation, and Amotivation Subscales (LLOS – IEA) (Noels, Clement, & Pelletier, 2001)

Instructions: Please read each statement below carefully and circle the number in front of each statement that most corresponds to your reasons to learn English. Remember that there are no right or wrong answers, since people have different opinions.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds a lot	Corresponds exactly
1	2	3	4	5

Why are you learning English?

1. I cannot come to see why I study English, and frankly, I don't care. **1 2 3 4 5**
2. Honestly, I don't know, I truly have the impression of wasting my time in studying English. **1 2 3 4 5**
3. Because I have the impression that it is expected of me. **1 2 3 4 5**
4. In order to get a more prestigious job later on. **1 2 3 4 5**
5. In order to have a better salary later on. **1 2 3 4 5**
6. To show myself that I am an educated person because I can speak English. **1 2 3 4 5**
7. Because I would feel ashamed if I could not speak English with my colleagues at university. **1 2 3 4 5**
8. Because I would feel inferior if I did not know English. **1 2 3 4 5**
9. Because I chose to be the kind of person who can speak more than one language. **1 2 3 4 5**
10. Because I think it is good for my personal development. **1 2 3 4 5**
11. Because I chose to be the kind of person who can speak English. **1 2 3 4 5**
12. For the pleasure that I experience in knowing more about the literature of English-speaking nations. **1 2 3 4 5**
13. For the satisfied feeling I get in finding out new things. **1 2 3 4 5**
14. Because I enjoy the feeling of acquiring knowledge about the English-speaking community and their way of life. **1 2 3 4 5**
15. For the pleasure I experience when surpassing myself in studying English. **1 2 3 4 5**
16. For the enjoyment I experience when I grasp a difficult construct in English. **1 2 3 4 5**
17. For the satisfaction I feel when I am in the process of accomplishing difficult exercises in English. **1 2 3 4 5**
18. For the excitement I feel when hearing English language spoken. **1 2 3 4 5**
19. For the excitement feeling that I experience while speaking in English. **1 2 3 4 5**
20. For the pleasure I get from hearing English spoken by native English speakers. **1 2 3 4 5**

APPENDIX B METACOGNITIVE AWARENESS INVENTORY (MAI)

SURVEY QUESTIONNAIRE

1. First name:
3. Year:

2. Surname:
4. Group:

METACOGNITIVE AWARENESS INVENTORY (MAI) (SCHRAW,G. & DENNISON,R.S.1994)

Instructions: The following statements are about the way you study and learn. Please read each statement below carefully and circle the number in front of each statement that most corresponds to you. Remember that there are no right or wrong answers, since people have different opinions.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds a lot	Corresponds exactly
1	2	3	4	5

1. I ask myself periodically if I am meeting my goals. **1 2 3 4 5**
2. I consider several possibilities to a problem before I answer. **1 2 3 4 5**
3. I can work with the right speed while learning in order to have enough time. **1 2 3 4 5**
4. I understand my intellectual strengths and weaknesses. **1 2 3 4 5**
5. I think about what I really need to learn before I begin a task. **1 2 3 4 5**
6. I know how well I did once I finish a test. **1 2 3 4 5**
7. I slow down when I encounter important information. **1 2 3 4 5**
8. I know what kind of information is most important to learn. **1 2 3 4 5**
9. I am good at organizing information. **1 2 3 4 5**
10. I consciously focus my attention on important information. **1 2 3 4 5**
11. I learn best when I know something about the topic. **1 2 3 4 5**
12. I know what the teacher expects me to learn. **1 2 3 4 5**
13. I am good at remembering information. **1 2 3 4 5**
14. I ask myself if there was an easier way to do things after I finish a task. **1 2 3 4 5**
15. I have control over how well I learn. **1 2 3 4 5**
16. I periodically revise to help me understand important relationships. **1 2 3 4 5**
17. I summarize what I've learned after I finish. **1 2 3 4 5**
18. I ask others for help when I don't understand something. **1 2 3 4 5**
19. I can motivate myself to learn when I need to. **1 2 3 4 5**
20. I focus on the meaning and significance of new information. **1 2 3 4 5**
21. I create my own examples to make information more meaningful. **1 2 3 4 5**
22. I find myself making pauses regularly to check my comprehension. **1 2 3 4 5**
23. I draw pictures or diagrams to help me understand while learning. **1 2 3 4 5**
24. I try to translate new information into my own words. **1 2 3 4 5**
25. I change my methods when I fail to understand. **1 2 3 4 5**
26. I ask myself if what I'm reading is related to what I already know. **1 2 3 4 5**
27. I organize my time to best accomplish my goals. **1 2 3 4 5**
28. I learn more when I am interested in the topic. **1 2 3 4 5**
29. I focus on general meaning rather than details. **1 2 3 4 5**
30. I ask myself questions about how well I am doing while I am learning something new. **1 2 3 4 5**
31. I stop and go back over new information that is not clear. **1 2 3 4 5**
32. I stop and reread when I get confused. **1 2 3 4 5**

APPENDIX C MOTIVATION CASE SUMMARIES

Motivation Case Summaries											
		Item01	Item02	Item03	Item04	Item05	Item06	Item07	Item08	Item09	Item10
1		5,00	5,00	4,00	3,00	2,00	5,00	1,00	1,00	4,00	5,00
2		5,00	5,00	5,00	3,00	5,00	3,00	2,00	5,00	4,00	5,00
3		5,00	5,00	3,00	2,00	1,00	4,00	1,00	5,00	5,00	3,00
4		5,00	5,00	3,00	5,00	5,00	3,00	2,00	3,00	4,00	2,00
5		5,00	4,00	1,00	5,00	5,00	4,00	3,00	4,00	5,00	5,00
6		5,00	5,00	2,00	5,00	4,00	5,00	3,00	2,00	4,00	5,00
7		5,00	5,00	2,00	4,00	2,00	3,00	2,00	3,00	5,00	5,00
8		5,00	5,00	5,00	1,00	1,00	5,00	2,00	3,00	2,00	4,00
9		5,00	5,00	3,00	3,00	2,00	5,00	4,00	5,00	5,00	5,00
10		2,00	5,00	4,00	5,00	5,00	2,00	1,00	1,00	4,00	3,00
11		5,00	5,00	3,00	5,00	2,00	4,00	1,00	1,00	4,00	4,00
12		5,00	5,00	2,00	4,00	3,00	2,00	2,00	3,00	4,00	4,00
13		5,00	5,00	2,00	1,00	1,00	1,00	1,00	1,00	2,00	3,00
14		5,00	5,00	3,00	2,00	1,00	4,00	4,00	5,00	4,00	4,00
15		2,00	4,00	5,00	1,00	1,00	2,00	1,00	1,00	2,00	2,00
16		5,00	1,00	5,00	4,00	4,00	3,00	4,00	2,00	4,00	4,00
17		5,00	5,00	1,00	5,00	5,00	5,00	1,00	1,00	5,00	3,00
18		5,00	5,00	5,00	5,00	1,00	3,00	1,00	2,00	5,00	4,00
19		5,00	5,00	1,00	2,00	3,00	4,00	4,00	1,00	4,00	4,00
20		5,00	5,00	1,00	5,00	5,00	5,00	2,00	2,00	5,00	5,00
21		5,00	5,00	2,00	1,00	1,00	3,00	3,00	1,00	5,00	5,00
22		5,00	5,00	2,00	5,00	5,00	3,00	2,00	2,00	5,00	4,00
23		5,00	5,00	2,00	4,00	3,00	3,00	1,00	2,00	5,00	2,00
24		5,00	5,00	4,00	1,00	1,00	4,00	1,00	4,00	5,00	5,00
25		5,00	5,00	4,00	4,00	5,00	5,00	3,00	4,00	5,00	5,00
26		5,00	5,00	2,00	3,00	1,00	4,00	1,00	3,00	4,00	5,00
27		5,00	4,00	3,00	4,00	4,00	5,00	5,00	5,00	4,00	4,00
28		5,00	5,00	1,00	1,00	1,00	1,00	1,00	2,00	3,00	3,00
29		5,00	5,00	4,00	2,00	2,00	5,00	5,00	4,00	4,00	5,00
30		5,00	5,00	3,00	5,00	5,00	4,00	4,00	3,00	2,00	2,00

	31	5,00	5,00	1,00	4,00	3,00	2,00	1,00	2,00	5,00	5,00
	32	5,00	5,00	1,00	1,00	1,00	1,00	1,00	1,00	2,00	5,00
	33	5,00	5,00	2,00	3,00	2,00	4,00	2,00	5,00	5,00	4,00
	34	5,00	5,00	3,00	4,00	4,00	4,00	2,00	4,00	5,00	5,00
	35	5,00	5,00	2,00	5,00	3,00	5,00	4,00	5,00	5,00	5,00
	36	5,00	5,00	3,00	4,00	4,00	5,00	1,00	1,00	5,00	4,00
	37	5,00	5,00	4,00	5,00	5,00	5,00	3,00	3,00	4,00	5,00
	38	4,00	5,00	4,00	4,00	4,00	3,00	1,00	5,00	5,00	5,00
	39	4,00	5,00	3,00	4,00	5,00	5,00	4,00	4,00	4,00	5,00
	40	5,00	5,00	2,00	2,00	5,00	2,00	1,00	1,00	2,00	5,00
	41	5,00	5,00	1,00	4,00	4,00	5,00	1,00	1,00	5,00	4,00
	42	4,00	5,00	3,00	5,00	3,00	3,00	2,00	1,00	3,00	4,00
	43	5,00	5,00	2,00	5,00	4,00	3,00	1,00	1,00	4,00	3,00
	44	5,00	5,00	1,00	3,00	5,00	5,00	2,00	1,00	5,00	5,00
	45	5,00	5,00	2,00	4,00	2,00	3,00	1,00	1,00	4,00	5,00
	46	5,00	5,00	2,00	5,00	5,00	4,00	5,00	4,00	4,00	4,00
	47	5,00	5,00	2,00	4,00	4,00	1,00	2,00	3,00	5,00	5,00
	48	5,00	2,00	4,00	2,00	5,00	2,00	3,00	1,00	5,00	5,00
	49	5,00	5,00	2,00	4,00	3,00	1,00	1,00	1,00	1,00	4,00
	50	5,00	5,00	4,00	4,00	4,00	4,00	2,00	4,00	5,00	5,00
	51	5,00	5,00	1,00	5,00	5,00	4,00	1,00	1,00	5,00	4,00
	52	4,00	5,00	2,00	4,00	4,00	4,00	2,00	4,00	4,00	5,00
	53	4,00	4,00	5,00	2,00	5,00	1,00	4,00	5,00	1,00	5,00
	54	5,00	4,00	2,00	5,00	5,00	4,00	3,00	4,00	4,00	4,00
	55	5,00	5,00	1,00	4,00	2,00	4,00	2,00	2,00	5,00	1,00
	56	5,00	5,00	2,00	2,00	2,00	2,00	2,00	1,00	3,00	4,00
	57	5,00	5,00	2,00	4,00	3,00	5,00	1,00	1,00	3,00	2,00
	58	5,00	5,00	1,00	4,00	5,00	2,00	1,00	4,00	5,00	3,00
	59	5,00	4,00	3,00	4,00	5,00	5,00	5,00	4,00	4,00	4,00
	60	4,00	5,00	5,00	5,00	2,00	3,00	1,00	4,00	5,00	4,00
	61	5,00	5,00	1,00	5,00	1,00	1,00	5,00	1,00	4,00	5,00
	62	5,00	5,00	4,00	5,00	5,00	3,00	3,00	1,00	3,00	5,00
Total	N	62	62	62	62	62	62	62	62	62	62

Motivation Case Summaries										
		Item11	Item12	Item13	Item14	Item15	Item16	Item17	Item18	Item19
1	5,00	2,00	3,00	5,00	4,00	4,00	5,00	4,00	5,00	
2	3,00	2,00	3,00	4,00	3,00	2,00	3,00	2,00	4,00	
3	4,00	1,00	4,00	4,00	5,00	4,00	4,00	3,00	4,00	
4	4,00	4,00	4,00	4,00	5,00	4,00	4,00	4,00	4,00	
5	5,00	4,00	4,00	5,00	5,00	5,00	5,00	4,00	4,00	
6	5,00	4,00	3,00	3,00	4,00	3,00	3,00	4,00	4,00	
7	5,00	3,00	5,00	3,00	5,00	4,00	5,00	5,00	5,00	
8	4,00	4,00	4,00	4,00	5,00	5,00	5,00	4,00	5,00	
9	5,00	4,00	4,00	4,00	5,00	5,00	5,00	5,00	4,00	
10	4,00	2,00	2,00	1,00	2,00	2,00	4,00	4,00	4,00	
11	2,00	1,00	3,00	3,00	5,00	5,00	4,00	2,00	4,00	
12	5,00	3,00	4,00	4,00	4,00	3,00	4,00	4,00	4,00	
13	2,00	1,00	4,00	4,00	4,00	3,00	1,00	2,00	2,00	
14	5,00	2,00	2,00	3,00	2,00	3,00	3,00	4,00	4,00	
15	4,00	2,00	3,00	2,00	2,00	1,00	2,00	2,00	3,00	
16	3,00	3,00	3,00	3,00	4,00	3,00	3,00	3,00	3,00	
17	5,00	3,00	5,00	3,00	5,00	3,00	4,00	5,00	5,00	
18	4,00	4,00	3,00	4,00	2,00	4,00	2,00	5,00	4,00	
19	4,00	4,00	5,00	5,00	4,00	5,00	5,00	5,00	5,00	
20	5,00	3,00	5,00	2,00	2,00	5,00	4,00	4,00	4,00	
21	5,00	1,00	4,00	1,00	4,00	4,00	4,00	4,00	4,00	
22	2,00	2,00	1,00	2,00	3,00	3,00	4,00	4,00	4,00	
23	2,00	3,00	4,00	5,00	2,00	3,00	1,00	4,00	3,00	
24	5,00	2,00	5,00	3,00	5,00	4,00	3,00	1,00	2,00	
25	5,00	4,00	5,00	5,00	4,00	3,00	3,00	4,00	5,00	
26	4,00	3,00	3,00	3,00	2,00	2,00	2,00	3,00	3,00	
27	5,00	3,00	3,00	5,00	5,00	4,00	4,00	5,00	4,00	
28	5,00	2,00	4,00	3,00	4,00	5,00	4,00	3,00	3,00	
29	5,00	4,00	5,00	4,00	4,00	5,00	5,00	5,00	5,00	
30	2,00	2,00	3,00	3,00	2,00	4,00	4,00	3,00	4,00	
31	5,00	2,00	4,00	3,00	4,00	5,00	3,00	5,00	5,00	
32	2,00	5,00	5,00	4,00	4,00	4,00	2,00	4,00	4,00	

	33	5,00	5,00	5,00	5,00	3,00	2,00	4,00	1,00	4,00
	34	5,00	5,00	4,00	5,00	4,00	4,00	3,00	5,00	5,00
	35	4,00	5,00	5,00	5,00	5,00	3,00	3,00	5,00	4,00
	36	4,00	3,00	3,00	2,00	5,00	3,00	3,00	4,00	4,00
	37	4,00	3,00	4,00	4,00	2,00	3,00	3,00	4,00	5,00
	38	5,00	3,00	2,00	3,00	3,00	3,00	1,00	4,00	3,00
	39	5,00	3,00	3,00	3,00	5,00	3,00	2,00	2,00	3,00
	40	1,00	2,00	4,00	5,00	2,00	5,00	3,00	4,00	4,00
	41	4,00	3,00	5,00	2,00	5,00	4,00	4,00	5,00	5,00
	42	5,00	3,00	3,00	2,00	5,00	4,00	3,00	2,00	3,00
	43	3,00	1,00	2,00	2,00	4,00	4,00	4,00	4,00	4,00
	44	5,00	5,00	5,00	5,00	5,00	3,00	2,00	4,00	3,00
	45	4,00	5,00	3,00	5,00	2,00	3,00	5,00	5,00	5,00
	46	5,00	3,00	4,00	5,00	5,00	5,00	5,00	4,00	5,00
	47	5,00	5,00	2,00	5,00	3,00	4,00	3,00	5,00	5,00
	48	4,00	2,00	2,00	4,00	4,00	3,00	4,00	4,00	4,00
	49	3,00	5,00	5,00	5,00	5,00	4,00	2,00	5,00	5,00
	50	5,00	5,00	4,00	1,00	4,00	4,00	1,00	4,00	5,00
	51	4,00	1,00	2,00	2,00	3,00	3,00	3,00	4,00	5,00
	52	5,00	5,00	5,00	4,00	4,00	4,00	3,00	2,00	5,00
	53	3,00	1,00	2,00	4,00	1,00	2,00	2,00	4,00	4,00
	54	4,00	3,00	4,00	3,00	3,00	2,00	3,00	3,00	4,00
	55	5,00	2,00	1,00	2,00	4,00	2,00	2,00	5,00	5,00
	56	3,00	3,00	2,00	4,00	2,00	4,00	2,00	4,00	3,00
	57	2,00	1,00	3,00	4,00	4,00	5,00	5,00	5,00	5,00
	58	1,00	1,00	2,00	5,00	4,00	4,00	1,00	3,00	5,00
	59	4,00	3,00	3,00	4,00	5,00	4,00	4,00	5,00	4,00
	60	3,00	1,00	2,00	4,00	2,00	5,00	2,00	5,00	1,00
	61	4,00	1,00	5,00	1,00	5,00	5,00	5,00	1,00	5,00
	62	3,00	3,00	3,00	3,00	4,00	4,00	4,00	5,00	5,00
Total	N	62	62	62	62	62	62	62	62	62

Motivation Case Summaries			
		Item20	Global Score

1	5,00	77,00
2	3,00	71,00
3	5,00	72,00
4	4,00	78,00
5	4,00	86,00
6	4,00	77,00
7	4,00	80,00
8	4,00	77,00
9	4,00	87,00
10	4,00	61,00
11	3,00	66,00
12	5,00	74,00
13	2,00	47,00
14	4,00	69,00
15	2,00	44,00
16	4,00	68,00
17	5,00	79,00
18	5,00	73,00
19	5,00	80,00
20	5,00	79,00
21	4,00	66,00
22	4,00	67,00
23	2,00	61,00
24	2,00	67,00
25	5,00	88,00
26	3,00	61,00
27	4,00	85,00
28	4,00	60,00
29	5,00	88,00
30	2,00	67,00
31	4,00	73,00
32	4,00	61,00
33	1,00	72,00
34	5,00	86,00

	35	4,00	87,00
	36	3,00	71,00
	37	5,00	81,00
	38	4,00	71,00
	39	4,00	76,00
	40	4,00	64,00
	41	3,00	75,00
	42	2,00	65,00
	43	4,00	65,00
	44	5,00	79,00
	45	3,00	72,00
	46	4,00	88,00
	47	5,00	78,00
	48	3,00	68,00
	49	4,00	70,00
	50	5,00	80,00
	51	3,00	66,00
	52	2,00	77,00
	53	4,00	63,00
	54	3,00	72,00
	55	3,00	62,00
	56	2,00	57,00
	57	5,00	70,00
	58	5,00	66,00
	59	4,00	83,00
	60	3,00	66,00
	61	1,00	66,00
	62	5,00	78,00
Total	N	62	62

APPENDIX D METACOGNITION CASE SUMMARIES

Metacognition Case Summaries											
		Item01	Item02	Item03	Item04	Item05	Item06	Item07	Item08	Item09	Item10
1		3,00	3,00	5,00	4,00	4,00	5,00	4,00	3,00	3,00	4,00
2		3,00	4,00	4,00	5,00	3,00	3,00	3,00	4,00	4,00	3,00
3		5,00	5,00	2,00	3,00	4,00	2,00	5,00	4,00	5,00	5,00
4		4,00	4,00	4,00	5,00	4,00	5,00	4,00	4,00	3,00	4,00
5		5,00	4,00	3,00	4,00	5,00	5,00	4,00	5,00	4,00	5,00
6		4,00	2,00	3,00	3,00	4,00	5,00	5,00	3,00	3,00	4,00
7		5,00	3,00	2,00	3,00	4,00	4,00	5,00	5,00	4,00	3,00
8		4,00	5,00	1,00	5,00	5,00	5,00	4,00	5,00	4,00	4,00
9		3,00	4,00	2,00	3,00	4,00	2,00	5,00	3,00	2,00	4,00
10		3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
11		5,00	4,00	3,00	5,00	4,00	3,00	4,00	5,00	4,00	5,00
12		4,00	3,00	2,00	3,00	4,00	3,00	4,00	4,00	4,00	5,00
13		4,00	5,00	2,00	2,00	3,00	4,00	4,00	3,00	5,00	5,00
14		4,00	3,00	3,00	4,00	3,00	4,00	5,00	3,00	3,00	4,00
15		5,00	2,00	1,00	4,00	5,00	3,00	3,00	2,00	4,00	2,00
16		3,00	4,00	4,00	4,00	4,00	5,00	1,00	4,00	5,00	3,00
17		3,00	5,00	1,00	3,00	3,00	4,00	5,00	5,00	3,00	5,00
18		4,00	4,00	3,00	3,00	3,00	3,00	4,00	3,00	4,00	4,00
19		5,00	4,00	5,00	5,00	5,00	4,00	4,00	4,00	3,00	4,00
20		2,00	4,00	1,00	5,00	5,00	5,00	5,00	2,00	3,00	3,00
21		3,00	3,00	4,00	5,00	5,00	4,00	5,00	5,00	4,00	1,00
22		5,00	4,00	4,00	3,00	3,00	4,00	4,00	4,00	2,00	4,00
23		5,00	3,00	2,00	3,00	4,00	5,00	4,00	2,00	3,00	4,00
24		4,00	5,00	5,00	5,00	4,00	4,00	4,00	5,00	5,00	5,00
25		3,00	4,00	2,00	3,00	4,00	3,00	5,00	4,00	3,00	3,00
26		4,00	3,00	2,00	4,00	4,00	4,00	3,00	5,00	4,00	3,00
27		4,00	4,00	2,00	2,00	4,00	3,00	4,00	3,00	3,00	4,00
28		5,00	5,00	3,00	5,00	5,00	4,00	5,00	4,00	4,00	4,00
29		4,00	5,00	2,00	1,00	3,00	3,00	3,00	2,00	3,00	3,00
30		2,00	4,00	3,00	5,00	4,00	4,00	3,00	5,00	2,00	5,00

	31	3,00	4,00	3,00	5,00	3,00	4,00	5,00	3,00	5,00	5,00
	32	5,00	5,00	1,00	5,00	5,00	5,00	5,00	5,00	1,00	5,00
	33	5,00	3,00	2,00	2,00	1,00	4,00	4,00	4,00	3,00	3,00
	34	5,00	3,00	2,00	4,00	4,00	1,00	4,00	3,00	3,00	4,00
	35	5,00	5,00	2,00	2,00	3,00	5,00	5,00	5,00	3,00	4,00
	36	3,00	4,00	2,00	3,00	3,00	4,00	2,00	4,00	4,00	5,00
	37	4,00	4,00	4,00	4,00	4,00	4,00	4,00	5,00	4,00	5,00
	38	4,00	4,00	2,00	3,00	4,00	3,00	3,00	4,00	3,00	3,00
	39	3,00	3,00	3,00	4,00	4,00	3,00	3,00	3,00	2,00	2,00
	40	4,00	4,00	2,00	3,00	4,00	3,00	5,00	4,00	2,00	3,00
	41	3,00	4,00	3,00	3,00	3,00	5,00	4,00	3,00	3,00	4,00
	42	4,00	4,00	2,00	3,00	4,00	3,00	5,00	3,00	3,00	3,00
	43	2,00	2,00	2,00	3,00	4,00	3,00	4,00	4,00	4,00	4,00
	44	3,00	3,00	5,00	4,00	3,00	5,00	3,00	5,00	5,00	5,00
	45	3,00	4,00	4,00	5,00	3,00	5,00	5,00	5,00	3,00	5,00
	46	3,00	3,00	2,00	4,00	5,00	3,00	3,00	5,00	3,00	4,00
	47	5,00	5,00	5,00	4,00	5,00	5,00	3,00	5,00	3,00	5,00
	48	4,00	1,00	1,00	5,00	4,00	1,00	4,00	4,00	3,00	4,00
	49	5,00	5,00	1,00	5,00	5,00	5,00	4,00	5,00	3,00	5,00
	50	5,00	5,00	4,00	4,00	4,00	5,00	4,00	5,00	2,00	4,00
	51	2,00	5,00	4,00	5,00	4,00	4,00	4,00	4,00	2,00	5,00
	52	2,00	3,00	1,00	3,00	3,00	3,00	3,00	3,00	2,00	5,00
	53	1,00	3,00	3,00	3,00	4,00	2,00	3,00	3,00	3,00	4,00
	54	4,00	3,00	2,00	3,00	2,00	3,00	4,00	4,00	3,00	4,00
	55	2,00	4,00	1,00	2,00	4,00	2,00	4,00	4,00	4,00	3,00
	56	4,00	3,00	3,00	4,00	5,00	4,00	4,00	5,00	4,00	3,00
	57	5,00	3,00	3,00	4,00	4,00	3,00	1,00	3,00	3,00	4,00
	58	5,00	4,00	3,00	5,00	4,00	4,00	1,00	5,00	3,00	5,00
	59	5,00	4,00	2,00	3,00	4,00	3,00	4,00	4,00	3,00	4,00
	60	4,00	1,00	2,00	5,00	3,00	3,00	4,00	3,00	2,00	5,00
Total	N	60	60	60	60	60	60	60	60	60	60

Metacognition Case Summaries											
		Item11	Item12	Item13	Item14	Item15	Item16	Item17	Item18	Item19	Item20

1	5,00	3,00	3,00	4,00	3,00	4,00	4,00	5,00	4,00	5,00
2	5,00	2,00	5,00	3,00	3,00	2,00	3,00	5,00	5,00	5,00
3	5,00	4,00	1,00	5,00	4,00	2,00	4,00	4,00	4,00	4,00
4	5,00	4,00	3,00	1,00	5,00	4,00	2,00	3,00	5,00	4,00
5	5,00	4,00	4,00	3,00	5,00	4,00	2,00	5,00	4,00	5,00
6	5,00	2,00	2,00	5,00	4,00	4,00	5,00	5,00	4,00	5,00
7	5,00	4,00	3,00	5,00	3,00	5,00	5,00	5,00	5,00	3,00
8	5,00	4,00	5,00	3,00	4,00	5,00	5,00	3,00	3,00	4,00
9	5,00	3,00	3,00	5,00	3,00	3,00	1,00	5,00	5,00	4,00
10	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
11	4,00	3,00	5,00	2,00	2,00	3,00	5,00	2,00	4,00	5,00
12	5,00	2,00	3,00	4,00	3,00	2,00	3,00	5,00	5,00	5,00
13	4,00	3,00	3,00	3,00	2,00	2,00	1,00	4,00	5,00	3,00
14	5,00	3,00	3,00	3,00	4,00	3,00	2,00	3,00	5,00	5,00
15	4,00	4,00	1,00	5,00	1,00	4,00	1,00	4,00	1,00	4,00
16	3,00	2,00	4,00	2,00	4,00	4,00	4,00	4,00	5,00	4,00
17	5,00	4,00	5,00	5,00	3,00	2,00	1,00	5,00	5,00	5,00
18	4,00	3,00	2,00	3,00	4,00	4,00	3,00	4,00	3,00	4,00
19	3,00	5,00	5,00	1,00	5,00	5,00	4,00	2,00	5,00	5,00
20	5,00	1,00	3,00	4,00	5,00	2,00	4,00	5,00	5,00	5,00
21	5,00	4,00	4,00	3,00	4,00	3,00	5,00	5,00	4,00	5,00
22	5,00	5,00	4,00	3,00	5,00	2,00	2,00	3,00	5,00	5,00
23	5,00	2,00	3,00	4,00	3,00	3,00	4,00	5,00	5,00	4,00
24	5,00	3,00	3,00	5,00	4,00	4,00	5,00	3,00	5,00	5,00
25	5,00	2,00	2,00	2,00	3,00	3,00	3,00	4,00	4,00	4,00
26	4,00	3,00	3,00	2,00	4,00	3,00	2,00	5,00	5,00	4,00
27	5,00	2,00	3,00	1,00	3,00	3,00	2,00	4,00	3,00	4,00
28	5,00	3,00	4,00	,00	4,00	4,00	5,00	5,00	5,00	5,00
29	4,00	1,00	4,00	4,00	3,00	3,00	2,00	2,00	4,00	4,00
30	5,00	2,00	2,00	4,00	4,00	3,00	2,00	4,00	4,00	4,00
31	5,00	2,00	3,00	1,00	3,00	3,00	1,00	5,00	5,00	4,00
32	5,00	1,00	4,00	5,00	5,00	4,00	5,00	5,00	5,00	4,00
33	4,00	2,00	1,00	3,00	2,00	1,00	1,00	2,00	5,00	5,00
34	5,00	3,00	4,00	4,00	4,00	2,00	3,00	5,00	4,00	4,00

	35	5,00	5,00	1,00	5,00	5,00	4,00	5,00	4,00	5,00	5,00
	36	5,00	1,00	3,00	3,00	2,00	4,00	5,00	4,00	4,00	3,00
	37	5,00	4,00	3,00	4,00	4,00	4,00	2,00	3,00	3,00	4,00
	38	5,00	3,00	2,00	2,00	3,00	4,00	4,00	5,00	4,00	3,00
	39	4,00	,00	4,00	4,00	3,00	3,00	2,00	5,00	4,00	3,00
	40	5,00	3,00	3,00	4,00	3,00	3,00	4,00	5,00	4,00	3,00
	41	5,00	3,00	3,00	,00	4,00	3,00	5,00	5,00	3,00	3,00
	42	5,00	3,00	3,00	4,00	3,00	3,00	4,00	4,00	5,00	4,00
	43	4,00	,00	3,00	3,00	,00	3,00	2,00	3,00	3,00	3,00
	44	5,00	5,00	1,00	5,00	4,00	5,00	1,00	5,00	5,00	5,00
	45	4,00	3,00	2,00	4,00	4,00	5,00	5,00	5,00	4,00	5,00
	46	5,00	2,00	4,00	2,00	2,00	3,00	4,00	5,00	5,00	4,00
	47	5,00	4,00	3,00	4,00	4,00	5,00	2,00	5,00	5,00	5,00
	48	2,00	3,00	2,00	3,00	4,00	1,00	5,00	5,00	5,00	4,00
	49	5,00	5,00	4,00	1,00	5,00	3,00	1,00	5,00	5,00	5,00
	50	4,00	,00	2,00	4,00	,00	4,00	2,00	4,00	4,00	2,00
	51	5,00	3,00	5,00	4,00	3,00	3,00	1,00	4,00	4,00	4,00
	52	5,00	2,00	2,00	4,00	5,00	2,00	2,00	2,00	5,00	5,00
	53	4,00	3,00	3,00	4,00	3,00	4,00	2,00	4,00	4,00	4,00
	54	5,00	3,00	3,00	4,00	2,00	4,00	3,00	2,00	5,00	4,00
	55	5,00	4,00	2,00	4,00	3,00	,00	2,00	5,00	2,00	2,00
	56	4,00	3,00	3,00	2,00	3,00	3,00	5,00	5,00	5,00	4,00
	57	4,00	4,00	3,00	4,00	,00	3,00	3,00	4,00	5,00	4,00
	58	5,00	3,00	4,00	4,00	4,00	2,00	2,00	5,00	5,00	5,00
	59	5,00	1,00	3,00	1,00	3,00	3,00	2,00	4,00	3,00	4,00
	60	4,00	2,00	3,00	2,00	1,00	4,00	5,00	4,00	2,00	1,00
Total	N	60	60	60	60	60	60	60	60	60	60

Metacognition Case Summaries											
		Item21	Item22	Item23	Item24	Item25	Item26	Item27	Item28	Item29	Item30
	1	4,00	2,00	2,00	4,00	4,00	3,00	5,00	5,00	3,00	5,00
	2	4,00	4,00	3,00	4,00	3,00	2,00	3,00	5,00	3,00	3,00
	3	4,00	5,00	5,00	3,00	4,00	5,00	3,00	5,00	5,00	4,00
	4	1,00	2,00	4,00	5,00	4,00	4,00	4,00	5,00	3,00	4,00

5	3,00	3,00	5,00	5,00	3,00	4,00	4,00	5,00	4,00	5,00
6	,00	3,00	5,00	3,00	2,00	4,00	3,00	5,00	5,00	2,00
7	3,00	4,00	4,00	3,00	2,00	4,00	5,00	5,00	5,00	3,00
8	4,00	2,00	2,00	4,00	3,00	1,00	5,00	5,00	1,00	5,00
9	3,00	5,00	4,00	5,00	3,00	5,00	2,00	5,00	5,00	3,00
10	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00
11	3,00	4,00	5,00	4,00	5,00	2,00	3,00	5,00	5,00	4,00
12	2,00	4,00	3,00	4,00	5,00	3,00	4,00	5,00	4,00	2,00
13	2,00	,00	1,00	1,00	2,00	3,00	3,00	5,00	4,00	3,00
14	2,00	3,00	3,00	4,00	4,00	3,00	3,00	5,00	4,00	4,00
15	4,00	4,00	1,00	1,00	3,00	3,00	1,00	5,00	5,00	4,00
16	5,00	3,00	4,00	5,00	5,00	2,00	3,00	5,00	2,00	3,00
17	1,00	4,00	1,00	2,00	1,00	3,00	5,00	5,00	2,00	5,00
18	3,00	3,00	4,00	3,00	3,00	4,00	4,00	4,00	3,00	3,00
19	4,00	5,00	1,00	5,00	1,00	5,00	5,00	5,00	5,00	5,00
20	5,00	4,00	5,00	5,00	4,00	2,00	3,00	5,00	2,00	3,00
21	5,00	4,00	4,00	4,00	2,00	3,00	4,00	5,00	5,00	5,00
22	3,00	4,00	4,00	5,00	2,00	2,00	3,00	4,00	4,00	5,00
23	3,00	5,00	5,00	4,00	2,00	2,00	3,00	5,00	1,00	3,00
24	3,00	3,00	3,00	5,00	5,00	5,00	5,00	5,00	1,00	2,00
25	2,00	4,00	3,00	4,00	3,00	1,00	3,00	5,00	3,00	3,00
26	4,00	4,00	5,00	5,00	2,00	1,00	3,00	5,00	2,00	3,00
27	4,00	4,00	3,00	3,00	3,00	4,00	2,00	4,00	3,00	3,00
28	3,00	4,00	5,00	5,00	5,00	5,00	5,00	5,00	3,00	5,00
29	4,00	4,00	4,00	4,00	2,00	2,00	3,00	4,00	2,00	4,00
30	5,00	5,00	4,00	4,00	4,00	2,00	3,00	5,00	4,00	4,00
31	3,00	5,00	1,00	5,00	4,00	4,00	1,00	5,00	4,00	2,00
32	5,00	5,00	4,00	5,00	4,00	5,00	1,00	5,00	3,00	5,00
33	1,00	1,00	1,00	1,00	1,00	4,00	2,00	5,00	3,00	1,00
34	5,00	5,00	5,00	2,00	5,00	4,00	3,00	5,00	2,00	5,00
35	5,00	4,00	3,00	2,00	4,00	3,00	5,00	5,00	5,00	4,00
36	2,00	4,00	1,00	2,00	2,00	3,00	4,00	4,00	3,00	3,00
37	3,00	4,00	2,00	3,00	2,00	3,00	3,00	5,00	4,00	3,00
38	4,00	,00	4,00	4,00	4,00	3,00	3,00	4,00	3,00	3,00

	39	2,00	3,00	3,00	3,00	2,00	3,00	3,00	4,00	3,00	3,00
	40	4,00	2,00	5,00	4,00	5,00	4,00	2,00	2,00	1,00	4,00
	41	4,00	5,00	4,00	4,00	4,00	3,00	4,00	5,00	5,00	1,00
	42	5,00	4,00	4,00	5,00	4,00	5,00	3,00	5,00	3,00	2,00
	43	4,00	,00	5,00	5,00	2,00	3,00	3,00	5,00	3,00	3,00
	44	5,00	3,00	1,00	5,00	5,00	5,00	3,00	5,00	5,00	5,00
	45	5,00	5,00	4,00	5,00	5,00	5,00	4,00	4,00	3,00	5,00
	46	4,00	4,00	4,00	4,00	4,00	5,00	3,00	3,00	3,00	2,00
	47	5,00	,00	5,00	5,00	5,00	,00	4,00	5,00	3,00	4,00
	48	4,00	3,00	4,00	5,00	4,00	2,00	5,00	3,00	2,00	4,00
	49	1,00	5,00	5,00	1,00	5,00	3,00	1,00	5,00	5,00	5,00
	50	4,00	5,00	5,00	5,00	5,00	4,00	4,00	4,00	1,00	4,00
	51	4,00	2,00	1,00	3,00	4,00	4,00	2,00	5,00	4,00	1,00
	52	5,00	5,00	1,00	5,00	5,00	5,00	1,00	5,00	5,00	1,00
	53	4,00	3,00	1,00	5,00	4,00	3,00	3,00	4,00	3,00	4,00
	54	2,00	3,00	1,00	1,00	3,00	2,00	2,00	5,00	4,00	,00
	55	5,00	4,00	5,00	5,00	4,00	4,00	4,00	5,00	4,00	4,00
	56	4,00	4,00	5,00	5,00	3,00	1,00	2,00	5,00	2,00	4,00
	57	3,00	4,00	1,00	3,00	4,00	4,00	5,00	5,00	4,00	5,00
	58	5,00	3,00	1,00	5,00	5,00	5,00	4,00	5,00	5,00	4,00
	59	3,00	4,00	4,00	3,00	4,00	4,00	3,00	4,00	4,00	3,00
	60	2,00	3,00	1,00	4,00	3,00	1,00	2,00	5,00	2,00	4,00
Total	N	60	60	60	60	60	60	60	60	60	60

Metacognition Case Summaries				
		Item31	Item32	Global Score
	1	5,00	5,00	125,00
	2	4,00	5,00	117,00
	3	4,00	4,00	128,00
	4	1,00	5,00	119,00
	5	5,00	5,00	136,00
	6	4,00	4,00	117,00
	7	5,00	5,00	129,00
	8	4,00	4,00	123,00

9	5,00	5,00	119,00
10	3,00	3,00	96,00
11	5,00	5,00	127,00
12	4,00	5,00	118,00
13	5,00	5,00	101,00
14	4,00	4,00	115,00
15	4,00	5,00	100,00
16	3,00	2,00	115,00
17	4,00	4,00	114,00
18	4,00	4,00	111,00
19	5,00	5,00	134,00
20	4,00	5,00	121,00
21	5,00	5,00	132,00
22	2,00	5,00	119,00
23	4,00	5,00	115,00
24	5,00	5,00	135,00
25	5,00	5,00	107,00
26	5,00	5,00	115,00
27	2,00	4,00	102,00
28	5,00	5,00	139,00
29	3,00	4,00	100,00
30	4,00	3,00	118,00
31	5,00	5,00	116,00
32	5,00	5,00	137,00
33	2,00	5,00	84,00
34	4,00	5,00	121,00
35	5,00	5,00	133,00
36	2,00	3,00	101,00
37	3,00	5,00	118,00
38	3,00	3,00	106,00
39	4,00	4,00	99,00
40	3,00	4,00	111,00
41	4,00	5,00	117,00
42	5,00	5,00	122,00

	43	3,00	5,00	97,00
	44	5,00	5,00	134,00
	45	4,00	5,00	137,00
	46	4,00	4,00	115,00
	47	5,00	5,00	133,00
	48	3,00	5,00	109,00
	49	5,00	5,00	128,00
	50	5,00	5,00	119,00
	51	3,00	3,00	111,00
	52	5,00	5,00	110,00
	53	4,00	3,00	105,00
	54	4,00	4,00	98,00
	55	5,00	5,00	113,00
	56	5,00	5,00	121,00
	57	5,00	5,00	115,00
	58	5,00	5,00	130,00
	59	3,00	4,00	108,00
	60	3,00	5,00	95,00
Total	N	60	60	60

APPENDIX E METACOGNITIVE KNOWLEDGE CASE SUMMARIES

MK Case Summaries		
		MK
	1	33,00
	2	38,00
	3	35,00
	4	39,00
	5	40,00
	6	31,00
	7	37,00
	8	40,00
	9	32,00
	10	27,00
	11	37,00
	12	34,00
	13	32,00
	14	35,00
	15	26,00
	16	36,00
	17	38,00
	18	30,00
	19	40,00
	20	34,00
	21	40,00
	22	37,00
	23	31,00
	24	40,00
	25	31,00
	26	37,00
	27	28,00
	28	39,00
	29	26,00
	30	34,00

	31	36,00
	32	36,00
	33	28,00
	34	35,00
	35	36,00
	36	30,00
	37	37,00
	38	31,00
	39	28,00
	40	29,00
	41	32,00
	42	33,00
	43	26,00
	44	39,00
	45	34,00
	46	33,00
	47	38,00
	48	31,00
	49	42,00
	50	25,00
	51	36,00
	52	26,00
	53	30,00
	54	33,00
	55	31,00
	56	36,00
	57	31,00
	58	39,00
	59	29,00
	60	27,00
Total	N	60

APPENDIX F DECLARATIVE KNOWLEDGE CASE SUMMARIES

DK Case Summaries		
		DK
	1	24,00
	2	28,00
	3	26,00
	4	29,00
	5	31,00
	6	22,00
	7	27,00
	8	32,00
	9	22,00
	10	21,00
	11	29,00
	12	24,00
	13	23,00
	14	25,00
	15	21,00
	16	28,00
	17	28,00
	18	23,00
	19	32,00
	20	24,00
	21	31,00
	22	27,00
	23	21,00
	24	30,00
	25	22,00
	26	28,00
	27	20,00
	28	29,00
	29	18,00
	30	25,00

	31	26,00
	32	26,00
	33	19,00
	34	26,00
	35	26,00
	36	21,00
	37	29,00
	38	22,00
	39	20,00
	40	20,00
	41	24,00
	42	23,00
	43	19,00
	44	29,00
	45	26,00
	46	23,00
	47	28,00
	48	24,00
	49	32,00
	50	17,00
	51	27,00
	52	22,00
	53	22,00
	54	23,00
	55	24,00
	56	27,00
	57	22,00
	58	29,00
	59	21,00
	60	21,00
Total	N	60

APPENDIX G CONDITIONAL KNOWLEDGE CASE SUMMARIES

CK Case Summaries		
		Ck
	1	9,00
	2	10,00
	3	9,00
	4	10,00
	5	9,00
	6	9,00
	7	10,00
	8	8,00
	9	10,00
	10	6,00
	11	8,00
	12	10,00
	13	9,00
	14	10,00
	15	5,00
	16	8,00
	17	10,00
	18	7,00
	19	8,00
	20	10,00
	21	9,00
	22	10,00
	23	10,00
	24	10,00
	25	9,00
	26	9,00
	27	8,00
	28	10,00
	29	8,00
	30	9,00

	31	10,00
	32	10,00
	33	9,00
	34	9,00
	35	10,00
	36	9,00
	37	8,00
	38	9,00
	39	8,00
	40	9,00
	41	8,00
	42	10,00
	43	7,00
	44	10,00
	45	8,00
	46	10,00
	47	10,00
	48	7,00
	49	10,00
	50	8,00
	51	9,00
	52	10,00
	53	8,00
	54	10,00
	55	7,00
	56	9,00
	57	9,00
	58	10,00
	59	8,00
	60	6,00
Total	N	60

APPENDIX H METACOGNITIVE REGULATION CASE SUMMARIES

MR Case Summaries		
		MR
	1	92,00
	2	79,00
	3	93,00
	4	80,00
	5	96,00
	6	86,00
	7	92,00
	8	83,00
	9	87,00
	10	69,00
	11	90,00
	12	84,00
	13	69,00
	14	80,00
	15	74,00
	16	79,00
	17	76,00
	18	81,00
	19	94,00
	20	87,00
	21	92,00
	22	82,00
	23	84,00
	24	95,00
	25	76,00
	26	78,00
	27	74,00
	28	100,00
	29	74,00
	30	84,00

	31	80,00
	32	101,00
	33	56,00
	34	86,00
	35	97,00
	36	71,00
	37	81,00
	38	75,00
	39	71,00
	40	82,00
	41	85,00
	42	89,00
	43	71,00
	44	95,00
	45	103,00
	46	82,00
	47	95,00
	48	78,00
	49	86,00
	50	94,00
	51	75,00
	52	78,00
	53	75,00
	54	65,00
	55	82,00
	56	85,00
	57	84,00
	58	91,00
	59	79,00
	60	68,00
Total	N	60

APPENDIX I PLANNIG CASE SUMMARIES

P Case Summaries		
		P
	1	14,00
	2	10,00
	3	9,00
	4	12,00
	5	12,00
	6	10,00
	7	11,00
	8	11,00
	9	8,00
	10	9,00
	11	10,00
	12	10,00
	13	8,00
	14	9,00
	15	7,00
	16	11,00
	17	9,00
	18	10,00
	19	15,00
	20	9,00
	21	13,00
	22	10,00
	23	9,00
	24	14,00
	25	9,00
	26	9,00
	27	8,00
	28	13,00
	29	8,00
	30	10,00

	31	7,00
	32	7,00
	33	5,00
	34	9,00
	35	10,00
	36	9,00
	37	11,00
	38	9,00
	39	10,00
	40	8,00
	41	10,00
	42	9,00
	43	9,00
	44	11,00
	45	11,00
	46	10,00
	47	14,00
	48	10,00
	49	7,00
	50	12,00
	51	10,00
	52	5,00
	53	10,00
	54	6,00
	55	9,00
	56	10,00
	57	12,00
	58	11,00
	59	9,00
	60	7,00
Total	N	60

APPENDIX J INFORMATION MANAGEMENT STRATEGIES CASE SUMMARIES

IMS Case Summaries		
		IMS
	1	29,00
	2	27,00
	3	36,00
	4	29,00
	5	35,00
	6	31,00
	7	30,00
	8	24,00
	9	35,00
	10	24,00
	11	33,00
	12	30,00
	13	23,00
	14	30,00
	15	23,00
	16	26,00
	17	24,00
	18	29,00
	19	33,00
	20	32,00
	21	32,00
	22	31,00
	23	27,00
	24	31,00
	25	25,00
	26	27,00
	27	29,00
	28	35,00
	29	26,00
	30	31,00

	31	31,00
	32	36,00
	33	22,00
	34	30,00
	35	32,00
	36	21,00
	37	28,00
	38	27,00
	39	22,00
	40	29,00
	41	31,00
	42	34,00
	43	31,00
	44	34,00
	45	37,00
	46	31,00
	47	31,00
	48	29,00
	49	29,00
	50	29,00
	51	29,00
	52	34,00
	53	27,00
	54	22,00
	55	32,00
	56	28,00
	57	24,00
	58	32,00
	59	30,00
	60	20,00
Total	N	60

APPENDIX K COMPREHENSION MONITORING CASE SUMMARIES

CM Case Summaries		
		CM
	1	17,00
	2	16,00
	3	21,00
	4	18,00
	5	21,00
	6	15,00
	7	20,00
	8	21,00
	9	18,00
	10	15,00
	11	20,00
	12	15,00
	13	14,00
	14	17,00
	15	19,00
	16	17,00
	17	19,00
	18	18,00
	19	24,00
	20	15,00
	21	18,00
	22	20,00
	23	19,00
	24	18,00
	25	17,00
	26	17,00
	27	18,00
	28	23,00
	29	20,00
	30	18,00

	31	17,00
	32	24,00
	33	11,00
	34	20,00
	35	22,00
	36	18,00
	37	19,00
	38	15,00
	39	15,00
	40	17,00
	41	16,00
	42	17,00
	43	10,00
	44	19,00
	45	22,00
	46	15,00
	47	19,00
	48	13,00
	49	23,00
	50	23,00
	51	13,00
	52	13,00
	53	15,00
	54	14,00
	55	14,00
	56	18,00
	57	20,00
	58	18,00
	59	19,00
	60	16,00
Total	N	60

APPENDIX L DEBUGGING STRATEGIES CASE SUMMARIES

DS Case Summaries		
		DS
	1	19,00
	2	17,00
	3	16,00
	4	13,00
	5	18,00
	6	15,00
	7	17,00
	8	14,00
	9	18,00
	10	12,00
	11	17,00
	12	19,00
	13	16,00
	14	15,00
	15	16,00
	16	14,00
	17	14,00
	18	15,00
	19	13,00
	20	18,00
	21	17,00
	22	12,00
	23	16,00
	24	18,00
	25	17,00
	26	17,00
	27	13,00
	28	20,00
	29	11,00
	30	15,00

	31	19,00
	32	19,00
	33	10,00
	34	19,00
	35	18,00
	36	11,00
	37	13,00
	38	15,00
	39	15,00
	40	17,00
	41	18,00
	42	18,00
	43	13,00
	44	20,00
	45	19,00
	46	17,00
	47	20,00
	48	17,00
	49	20,00
	50	19,00
	51	14,00
	52	17,00
	53	15,00
	54	13,00
	55	19,00
	56	18,00
	57	18,00
	58	20,00
	59	15,00
	60	15,00
Total	N	60

APPENDIX M EVALUATION CASE SUMMARIES

E Case Summaries		
		E
	1	13,00
	2	9,00
	3	11,00
	4	8,00
	5	10,00
	6	15,00
	7	14,00
	8	13,00
	9	8,00
	10	9,00
	11	10,00
	12	10,00
	13	8,00
	14	9,00
	15	9,00
	16	11,00
	17	10,00
	18	9,00
	19	9,00
	20	13,00
	21	12,00
	22	9,00
	23	13,00
	24	14,00
	25	8,00
	26	8,00
	27	6,00
	28	9,00
	29	9,00
	30	10,00

	31	6,00
	32	15,00
	33	8,00
	34	8,00
	35	15,00
	36	12,00
	37	10,00
	38	9,00
	39	9,00
	40	11,00
	41	10,00
	42	11,00
	43	8,00
	44	11,00
	45	14,00
	46	9,00
	47	11,00
	48	9,00
	49	7,00
	50	11,00
	51	9,00
	52	9,00
	53	8,00
	54	10,00
	55	8,00
	56	11,00
	57	10,00
	58	10,00
	59	6,00
	60	10,00
Total	N	60

APPENDIX N FOSSILIZATION CASE SUMMARIES

Fossilization Case Summaries				
		Number of words	Number of mistakes	Rate of mistakes
	1	717=478+178+61	28=14+14+0	3,91
	2	795=548+146+101	69=55+09+05	8,68
	3	500=328+127+45	29=24+05+00	5,80
	4	801=562+147+92	16=13+02+01	2,00
	5	552=360+127+65	21=12+05+04	3,80
	6	582=422+99+61	37=28+03+06	6,36
	7	623=408+151+64	39=32+06+01	6,26
	8	582=426+104+52	41=34+06+01	7,04
	9	631=406+129+96	45=32+07+06	7,13
	10	556=337+117+102	14=13+01+00	2,52
	11	590=368+154+68	43=25+16+02	7,29
	12	641=389+137+115	19=12+04+03	2,96
	13	612=392+157+63	20=17+03+00	3,27
	14	710=491+146+73	49=37+10+02	6,90
	15	884=631+164+89	37=23+10+04	4,19
	16	666=316+215+135	41=19+14+08	6,16
	17	699=365+192+142	33=16+08+09	4,72
	18	483=289+131+63	35=22+11+02	7,25
	19	720=426+193+101	22=10+11+01	3,06
	20	538=333+117+88	30=21+06+03	5,58
	21	597=404+123+70	55=35+16+04	9,21
	22	868=557+222+89	82=61+15+06	9,45
	23	545=346+145+54	32=18+12+02	5,87
	24	803=478+205+120	35=20+13+02	4,36
	25	709=477+156+76	41=33+06+02	5,78
	26	627=458+150+19	56=42+14+00	8,93
	27	469=264+118+87	20=11+04+05	4,26
	28	537=371+132+34	33=25+08+00	6,15
	29	417=273+122+22	20=11+05+04	4,80

	30	703=470+203+30	36=23+12+01	5,12
	31	550=336+166+48	29=16+11+02	5,27
	32	845=653+0+192	15=12+00+03	1,78
	33	412=367+0+45	34=32+00+02	8,25
	34	728=665+0+63	12=12+00+00	1,65
	35	450=398+0+52	26=22+00+04	5,78
	36	810=517+215+78	72=52+18+2	8,89
	37	457=303+119+35	58=39+18+1	12,69
	38	629=357+189+83	110=66+35+9	17,49
	39	384=214+129+41	62=40+18+4	16,15
	40	597=329+187+81	72=40+28+4	12,06
	41	621=383+168+70	40=19+18+3	6,44
	42	674=415+200+59	59=38+20+1	8,75
	43	595=396+149+50	19=12+4+3	3,19
	44	652=394+180+78	56=43+10+3	8,59
	45	600=412+144+44	66=48+13+5	11,00
	46	685=350+175+160	75=47+16+12	10,95
	47	670=367+208+95	94=57+26+11	14,03
	48	500=305+153+42	66=38+26+02	13,20
	49	537=295+201+41	45=29+15+01	8,38
	50	461=273+139+49	82=56+21+05	17,79
	51	481=262+186+33	19=9+10+0	3,95
	52	510=311+152+47	35=18+14+3	6,86
	53	695=500+146+49	125=99+22+4	17,99
	54	510=304+153+53	43=26+13+4	8,43
	55	520=310+148+62	55=32+19+4	10,58
	56	609=415+162+32	63=49+13+01	10,34
	57	512=329+150+33	53=36+14+3	10,35
	58	580=451+104+25	46=36+9+1	7,93
	59	500=276+175+49	35=28+7+0	7,00
	60	497=302+169+26	77=47+29+1	15,49
Total	N	60	60	60

RÉSUMÉ

Cette étude a examiné la relation entre la métacognition et fossilisation au niveau morphosyntaxique de l'acquisition de l'anglais comme langue seconde chez les étudiants de deuxième année d'anglais.

La collecte des données comportait trois sources: (1) L'échelle des Orientations Motivationnelles de L'apprentissage des langues - Motivation Intrinsèque, Motivation Extrinsèque, et Amotivation (LLOS-IEA), une adaptation d'un questionnaire élaboré par Noels, Clement & Pelletier (2001). Cette échelle a été utilisée pour isoler les étudiants motivés puisque nous ne pouvons pas parler de la fossilisation, sans que les étudiants soient motivés pour apprendre une deuxième langue, (2) l'adaptation de l'instrument d'auto-rapport de 52 Point de Schraw et Dennison (1994); L'inventaire de La Conscience Metacognitive (MAI) qui a été utilisé pour évaluer la conscience de la connaissance de la cognition et de la régulation de la cognition des étudiants, les deux principales composantes de la métacognition, et (3) trois différentes compositions écrites de chaque étudiant participant à cette étude qui ont servi à évaluer leurs erreurs morphosyntaxiques, un miroir qui reflète leur fossilisation.

Les sujets de cette étude ont été choisis aléatoirement parmi toute la population d'étudiants inscrits en deuxième année d'anglais (système LMD) à l'Université Mentouri de Constantine.

Les résultats de cette étude indiquent qu'il n'y a absolument aucune relation entre la métacognition d'ordre général et la fossilisation des étudiants.

ملخص

هذه الدراسة بحثت في العلاقة بين ما وراء المعرفة (معرفة المعرفة) و التحجر على مستوى تركيب الكلمة و الجملة عند اكتساب الانجليزية كلغة ثانية لدى طلاب السنة الثانية انجليزية.

جمع المعطيات تضمن ثلاثة عناصر:

(1) مقياس توجهات تعلم اللغة (تحفيز داخلي، تحفيز خارجي، لا تحفيز) و هو تكييف لاستبيان طوره نوالز، كليمنت و بيليتيه (2001). استعمل هذا المقياس لعزل الطلاب المتحجرين بما أننا لا نستطيع التحدث عن التحجر دون كون الطلاب متحجرين لتعلم لغة ثانية.

(2) تكييف لأداة التقرير الذاتي المتكونة من 52 بنداً و التي طورها كل من شراو و دانيسون (1994) باسم استبيان الوعي المعرفي. هذه الأداة استعملت لتقييم مدى وعي الطلاب بمعرفة المعرفة و تنظيم المعرفة و هما عنصرا ما وراء المعرفة الأساسيان.

(3) ثلاثة أعمال مكتوبة مختلفة لكل طالب ساهم في هذه الدراسة. تهدف هذه الأعمال إلى تقييم الأخطاء النحوية التي تعد مرآة تعكس التحجر لدى الطلبة. الأشخاص موضوع هذه الدراسة تم انتقاؤهم بطريقة عشوائية ضمن مجموع الطلبة المسجلين في السنة الثانية انجليزية (فرع ل م د) في جامعة منتوري بقسنطينة.

نتائج هذه الدراسة تشير إلى انه لا توجد إطلاقاً أية علاقة بين ما وراء المعرفة المستقل عن أي مجال و التحجر.