Cognitive and metacognitive strategy use in first and second language reading comprehension

Chinedu Januarius Osuji

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Department of Language and Linguistics

University of Essex, UK.

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Dedication

This thesis is dedicated to my father, Mr. Christopher Sunday Arihiakawa Osuji (Headmaster), and my sons, Chimechetalam and Chinemerem.

Abstract

This thesis explored cognitive and metacognitive strategy use in first and second language reading comprehension (RC) among Igbo native speakers who are English as Second Language (ESL) learners in Nigeria. The RC of ESL readers in Nigeria has not previously been investigated. The three studies presented in this thesis explored cognitive and metacognitive strategy use in RC performance in Igbo (study 1), the effect of L2 language proficiency and vocabulary size on the use of cognitive and metacognitive strategies in ESL reading (study 2), and the effect of cognitive and metacognitive strategy use on ESL RC (study 3), respectively.

To explore cognitive and metacognitive strategy use on first language RC performance (study 1), participants did RC tasks in Igbo and completed a reading comprehension strategies (RCSs) questionnaire. Participants reported a medium usage level for ten out of the fourteen reading strategies shortlisted for the investigation. Regression analysis suggests that their RC strategy use explained a significant variance (28.6%) in the Igbo reading scores of the students. No significant difference was recorded in the participants' reported use of cognitive and metacognitive strategies during the reading task.

In study 2, in addition to doing RC tasks in English and completing an RCSs questionnaire, participants sat English language proficiency and vocabulary size tests. High vocabulary size was significantly related to high use of cognitive reading strategies, while low vocabulary size was related to low use of cognitive reading strategies. L2 language proficiency had no effect on RCS use, and reading comprehension strategy use had no effect on RC performance.

In study 3, participants did another set of reading tasks and completed a RCSs questionnaire. Cognitive and metacognitive strategy use jointly had a significant

positive effect on RC performance, but only metacognitive strategy use uniquely contributed significantly to RC performance. The usage levels for cognitive and metacognitive strategies distinguished high performers from low performers in the RC test, but the cognitive strategy of translation was hardly used by this group of ESL readers.

The study finally drew some general conclusions by comparing results from the various studies. This study is an attempt to create awareness among teachers and students in Nigerian schools, on the effect of reading strategies on reading comprehension performance. The findings in the study may therefore contribute in changing how teachers in Nigeria teach reading, and how readers undertake the processing of written text, since it makes it clear that reading strategies, particularly metacognitive strategies substantially facilitate RC. From a theoretical point of view, this study examines the role of cognitive and metacognitive strategy use within the compensatory model of L2 reading, and assesses how they relate to knowledge sources like vocabulary knowledge in the model.

Declaration

The report in this thesis is based on research carried out in the Department of Language and Linguistics, University of Essex, United Kingdom. No part of this thesis has been submitted for any other degree or qualification, and it is all my work, unless referenced to the contrary in the text.

Acknowledgements

The reaction of my 87 years old father, sometime in September 2013, when I broke to him the news of my scholarship to study for a PhD in the UK, remains very fresh in my mind. My old father received the news with mixed feelings. At first, he was extremely happy that at last I was going to study for my PhD, and wished that he would be alive to see me actualize his dream of having a son that holds a PhD degree. But soon after, my father, out of worry, began to cry because he felt I would no longer be able to take care of him while I was in school (which never was the case). It was quite an emotional moment. I am therefore extremely grateful to everybody who directly or indirectly, has through his or her actions or inactions made my old father's dream of having a son with a PhD degree come true in his lifetime. The subsequent lines are therefore dedicated to appreciating the support and encouragement provided to me by those wonderful individuals and bodies, which has culminated in the acquisition of this degree.

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Chapter 1

1. Introduction

Second language (L2) learning is said to be faster for learners who are able to regulate their learning through the use of strategies (Anderson, 2005). In theory, learners employ various strategies to cope with cognitive challenges. In reading, these strategies could be cognitive or metacognitive in nature.

The use of cognitive and metacognitive strategies to cope with the challenge of comprehending written texts in the first and second language has generated interest among researchers. Many studies conducted in Europe and America have indicated that cognitive and metacognitive strategy use contributes to increased performance in reading comprehension (RC) (e.g. Block, 1986, 1992; Nergis, 2013; Phakiti, 2003b). Studies have also indicated that the use of these strategies and its effect on RC performance depend on factors like the nature of the reading task and the reader's reading or linguistic proficiency level. For example, studies have indicated that texts that are challenging to readers evoke the use of more varied strategies than texts that readers find easy to understand (Denton et al., 2015; Trabasso et al., 1995), although Lee (2015) found no effect of text difficulty on strategy use. Others claim that high proficiency readers employ the use of varied cognitive and metacognitive strategies and use them more effectively during reading (Phakiti, 2003; Sheorey & Mokhtari, 2001), although some studies too found no such effect (e.g. Brantmeier, 2000; Sarig, 1987; Yamashita, 2002). Studies have also indicated that varying cultural and literacy backgrounds could affect the use of cognitive and metacognitive strategies (Adamson, 1990; Oxford, 1990; Parry, 1996; Rahimi & Katal, 2012).

A review of several studies that investigated the cognitive processes influencing RC in the L1 indicates that most were conducted in America and Europe,

and recently some in Asia. In addition, the effect of reading strategies on reading comprehension was not measured in many of these studies, probably because think-aloud protocols and retrospective interviews were used to elicit data. Studies that measured the contribution of cognitive and metacognitive processing to RC mostly used adolescent readers of American, European, or Asian descent. No study so far has investigated the cognitive and metacognitive processes of adult L1 readers of indigenous African languages. Similarly, in L2 RC studies, most of the investigations on the cognitive processes influencing L2 RC involved mainly English L2 readers of either European or Asian descent. Such studies were often in the context of English as a foreign language (EFL). To the best of my knowledge, there is hardly any study that investigated the cognitive and metacognitive processes influencing RC in English as a second language (ESL) in an African context, where English is a lingua franca.

Reading processes in the L2, which involves interaction between top-down and bottom-up processes, 'consist of clusters of cognitive and metacognitive strategies in interaction with one another' (Macaro, 2006: 330). The L2 reading processes therefore aim to make L2 text comprehensible, with the aid of cognitive and metacognitive strategies as constituents of the processes. However, while studies have indicated that the use of these cognitive strategies by readers during L2 reading processes tend to depend on certain factors (some have earlier been mentioned), one factor that could influence cognitive and metacognitive processing in L2 RC, which has received little or no attention is L2 vocabulary knowledge. How readers' vocabulary knowledge in the L2 could influence cognitive and metacognitive processing during L2 RC is yet to be explored. Although researchers in L2 RC studies have investigated the influence of L2 proficiency on cognitive and metacognitive processes in the L2, their findings are conflicting, and L2 proficiency are often

vaguely conceptualized with no effort made to specifically measure the construct in most studies as would be shown in the brief literature in section 3.4. The four major competences associated with L2 proficiency are 'grammatical competence, sociolinguistic competence, discourse competence, and strategic competence' (Ghafournia and Afghari, 2013: 21). Given that sociolinguistic and discourse competences are very difficult to measure within the scope of the current study, decision was made to operationalize L2 proficiency as just grammatical competence. Therefore the L2 grammatical knowledge of the participants in the current study was measured with the grammar section of the Oxford Placement Test (Allan, 2004) to determine their L2 proficiency.

So, it is probably plausible to argue that a thorough examination of the cognitive processes underlying reading in the first or second language has not yet been conducted given that research in cognitive and metacognitive processes, in its current state, tends to have excluded a significant proportion of L1 and L2 readers in indigenous languages and communities outside Europe, Asia, and America. Moreover, the virtual absence of research on how L2 vocabulary knowledge could influence cognitive and metacognitive processes during L2 text processing, and the conflicting research findings on the influence of L2 proficiency on cognitive and metacognitive processing in L2 reading process, all point to the fact that the cognitive processes underlying reading comprehension in the L2 have not been thoroughly examined.

This thesis aims to start filling the research gaps mentioned above by examining cognitive and metacognitive strategy use in the L1 and ESL reading comprehension of adult native speakers of Igbo, an indigenous language in Nigeria. The participants were high school (secondary school) graduates enrolled in the National Certificate of

Education (NCE) programme at a Federal College of Education, and graduate programmes at a Federal University of Technology, located in the northeastern part of Nigeria. The NCE programme was designed to produce teachers that will teach at primary and junior secondary school levels in Nigeria. Qualification into NCE programmes, like graduate programmes in Nigeria, is based on the candidates' performance at either the General Certificate of Education (GCE), West African Examination council (WAEC), or National Examination Council (NECO) tests, and Joint Admissions and Matriculation Board (JAMB) universities, polytechnics and colleges of education matriculation examinations. The participants' L1 literacy levels were diverse, with 12% of the participants rating their L1 literacy low, 16% fairly low, 36% fairly high, 24% high, and 12% very high. However, the study did not examine how the participants' L1 literacy could have impacted their L2 strategy use, evidence of which has been reported in some previous studies (e.g. Upton and Lee-Thompson, 2001; van Gelderen et al., 2007). Studies have indicated that L1 literacy has a prominent role in L2 literacy.

Although the current study was not designed to test relationship between L1 and L2 literacy, it probably would have been interesting to examine the role L1 literacy of this group of readers with diverse levels of L1 literacy could have played in their L2 strategy use. One approach to doing this would be to compare the participants' reported L1 literacy levels with their L2 reading performance. A significant positive correlation would indicate that L1 literacy levels could have played a role in the L2 strategy use of the participants. However, if the result is to the contrary, it could be interpreted to suggest otherwise.

Nonetheless, studies reported in this thesis only examined how the use of a cluster of cognitive and metacognitive strategies identified by Phakiti (2003) as

cognitive and metacognitive strategies L2 readers use during reading comprehension tasks could relate to the reading comprehension performance of this group of readers. Macaro (2006: 327) observes that 'for a strategy to be effective in promoting learning or improved performance, it must be combined with other strategies either simultaneously or in sequence' thereby creating what is called strategy cluster. The effect of strategy clustering on performance during reading tasks has been recorded in previous studies (e.g. Graham, 1997). Using factor analysis Phakiti (2003) identified a cluster of cognitive and metacognitive strategies L2 readers use during reading tasks to aid performance. Chapters 2 and 4 will therefore report studies, which examined the extent to which the use of these cognitive, and metacognitive strategies by Igbo L1 speakers relates to RC performance in Igbo and English. Chapter 3 will report a study examining the role of ESL vocabulary knowledge and language proficiency in cognitive and metacognitive strategy use during ESL reading by native speakers of Igbo. The concluding chapter will summarise the research results of the studies reported in the previous chapters and will draw general conclusions from them.

The remainder of the current chapter will first define relevant terms and will then provide a broad overview of the literature on L1 and L2 reading strategy research.

1.1. Definitions of reading comprehension strategy (RCS)

Learner strategies have been distinguished into 'learning strategies' and 'use strategies'. 'Learning strategies' are used for language learning or acquisition, and 'use strategies' are employed by learners to enhance performance (Cohen, 1998; Phakiti, 2003). RCSs are categorized as use strategies, and have mostly been defined with emphasis on their conscious and deliberate nature. According to O'Malley and Chamot (1990) (cited in McNeil, 2010: 885), 'reading comprehension strategies are

referred to as the conscious actions readers use to repair breakdowns in comprehension (cognitive strategies) or the deliberate actions readers use to monitor and oversee those attempts at repair (metacognitive strategies)'. Cohen (1986: 133) and Duffy et al. (1986: 239) also stress the conscious and deliberate nature of RCSs.

It is obvious that all the definitions for RCSs emphasize the conscious mental processes involved in RCS use. In these definitions, there was no mention of the automated non-conscious processing (reading skill) that readers do during reading process. Therefore, most researchers distinguish *reading strategy* from *reading skill*. These terms have sometimes been used interchangeably in the reading comprehension literature, and therefore they deserve some discussion. The terms *skill* and *strategy* have varying historical uses in psychology and education (Afflerbach et al., 2008). For example, while *skill* has been used in the fields of Psychology and Education for over a century, the use of the term *strategy* became prominent starting from the 1970s with the advent of information processing models used to describe the various cognitive processes that individuals adopt to attain set goals like the goal of comprehending texts (Afflerbach et al., 2008; Manoli & Papadopoulou, 2012). *Skill* could be seen as referring to a learning outcome or behaviour that is a product of regular practice. Therefore, the automated act of decoding and comprehending written texts, which readers exhibit with speed, efficiency, and fluency after constant practice and interaction with written texts, is considered *reading skill*. By contrast, conscious and purposeful use of a mental process is a *reading strategy*. In the opinion of Urquhart & Weir (1998), *reading skill* constitutes cognitive abilities, which readers possess and are able to deploy when interacting with written texts. It however operates without the reader's deliberate control or conscious awareness, which distinguishes it from *reading strategy*.

The next section looks at some of the ways reading strategies have been categorised in the reading literature.

1.2. Classifications of RCSs

The classification of RCSs is problematic to some extent (O'Malley and Chamot, 1990). There is a preponderance of classifications available for the construct. However, the various classifications fall into either of the two broad groups, one relating to bottom-up processing and the other to top-down processing. Some of the available RCS classifications include those proposed by Block (1986), Carrell (1989), O'Malley et al. (1985), Pressley and Afflerbach (1995), Sarig (1987), etc. In this section, I will briefly examine some of these taxonomies with the aim to highlight their dimensions without necessarily going into detailed discussion on them beginning with Pressley and Afflerbach (1995) classification.

Pressley and Afflerbach's classification is based on the 150 conscious activities they identified as used by readers. According to Upton and Lee-Thompson (2001, p. 474), 'their rubric is by far the most comprehensive one that has been developed to describe the process of L1 reading comprehension'.

Pressley and Afflerbach (1995) grouped RCSs into three types, referring to them as 'activities': Type A, identifying strategies; Type B, monitoring strategies; and Type C, evaluating strategies. Identifying strategies (Type A) enable the reader to construct the meaning of the text before, during and even after reading a text. These are strategies that readers use to get a general understanding of the meaning of a text. These strategies may involve explicitly looking for key words or information in a text or deciding on pieces of information that are or are not important in a given text. Monitoring strategies (Type B) on the other hand help the reader to regulate

comprehension and the learning process. They are metacognitive processes, which can also be employed by the reader during and after the reading activity. They include the observation of text characteristics, reading behaviours or specific actions taken by the reader in order to respond to certain textual demands. Evaluation strategies (Type C) involve readers making some evaluation of the reading process to approve or disapprove of it.

The classification of RCSs proposed by O'Malley et al. (1985) is based on Brown and Palincsar (1982) classification. Brown and Palincsar categorized strategies into metacognitive and cognitive. O'Malley et al. (1985) added 'social mediation' as a third dimension of the classification. The O'Malley et al. classification consists of 23 strategies; 7 of them are metacognitive, 14 cognitive, and 2 social mediation strategies. Because it is unclear how their 'social mediation' strategy qualifies as a RCS, the decision was made not to discuss it here.

The metacognitive strategies referred to as higher order executive skills involve planning, monitoring or evaluating the learning or comprehension process (Brown et al., 1983). Cognitive strategies on the other hand 'operate directly on incoming information, manipulating it in ways that enhance learning' (O'Malley and Chamot, 1990: 44).

In the classification of RCSs proposed by Block (1986), RCSs consist of two groups, 'general comprehension strategies' and 'local linguistic strategies'. The 'general comprehension strategies' (top-down processing) involve comprehension gathering and monitoring. This category includes strategies such as anticipation of context, recognition of text structure, and integration of information. The 'local linguistic strategies' (bottom-up processing) according to Block represent the reader's attempt to construct meaning from text based on specific linguistic cues from the text.

This category includes strategies such as paraphrasing, rereading, and questioning the meaning of a sentence or clause or unknown word.

Sarig (1987) proposed a four-category classification of RCS. Category 1 referred to as 'technical-aid moves' is a strategy in which readers employ technical aids such as skimming, scanning, and skipping to facilitate the processing of texts. Category 2, 'clarification and simplification moves' is a strategy in which readers attempt to bring clarity to texts by simplifying utterances in them. It includes strategies such as syntactic simplification, words meanings decoding, and using synonyms. Category three called 'coherence-detecting moves' is a strategy that requires readers to use textual or extra-textual cues to establish text coherence. It includes use of background knowledge, identification of key information in a text, and use of textual schemata. Category four called 'monitoring moves' refers to the monitoring of reading by readers involving some degree of conscious planning, correction of mistakes, continuous self-evaluation during the reading process, etc.

A RCS classification was also proposed by Carrell (1989: 126). It is based on Gough (1972) bottom-up and top-down processes in reading. Carrell broadly classified RCSs into two, 'local strategies' (bottom-up) and 'global strategies' (top-down). 'Local strategies' according to Carrell refer to 'those having to do with sound-letter, word meaning, sentence syntax, and text details' (Carrell, 1989: 126), while 'global strategies' consists of background knowledge, textual organization, and text gist.

This review of some of the classifications reveals that researchers often conceptualize the same strategies differently. For example, strategies classified as bottom-up and top-down strategies could, by their description, also be referred to as cognitive strategies: bottom-up strategies involve scanning and using context cues to

construct meaning from texts, while top-down strategies involve skimming and activating background knowledge to facilitate comprehension, and these tasks are associated with cognitive strategies in Phakiti's (2003) classification. Similarly, most of the tasks associated with global and problem-solving strategies according to Mokhtari and Reichard (2002: 259) are associated with cognitive strategies in Phakiti's conceptualization of cognitive strategies, although, they are conceived as metacognitive strategies by Mokhtari and Reichard (2002).

For most researchers, however, metacognitive strategies involve planning, monitoring of comprehension and evaluation of strategy use (Chou, 2013; Oxford, 2011; Phakiti, 2003, 2006;). It is believed that cognitive and metacognitive strategies are the two fundamental strategies that readers use for reading (Chou, 2013). These two strategies, which arguably constitute an amalgamation of most strategies associated with reading comprehension, are the focus of the current study. The next section explains the construct of cognitive strategy, while the subsequent section explains that of metacognitive strategy.

1.3. Cognitive strategy (CS)

The relationship that exists between cognitive and metacognitive strategies makes defining them as separate constructs difficult. Veenman et al. (2006) observe that metacognition is 'contingent on cognition', which invariably suggests that metacognitive strategies (MSs) are also contingent on cognitive strategies (CSs). Metacognition 'is a higher-order agent overlooking and governing the cognitive system, while simultaneously being part of it' (Veenman et al., 2006: 5). In the same vein it could be argued that MSs are also higher-order executive agents overlooking and governing the use of CSs.

CSs have been defined as 'deliberate actions readers take when comprehension problems develop' (Sheorey and Mokhtari, 2001: 431). They are invoked for the purpose of making 'cognitive progress' (Flavell, 1979: 909). A cognitive strategy could be to underline some sections of a text, reread portions of or an entire text to increase understanding, or reduce reading speed when comprehension is threatened.

In addition to describing CSs as actions or activities that tend to apply in the physical realm, they have also been described in relation to the mental processes that underlie them. Oxford (2011: 44) prefers to refer to CSs as 'cognitive processing'. They operate at three different stages, 'the declarative, associative, and procedural knowledge stages'. The declarative stage, said to be 'conscious, effortful, halting, and nonhabitual' (Chou, 2013: 176), is a platform that allows learners to employ strategies to aid their ability to notice and cope with new information. At the associative stage, strategies are used by learners to practice newly acquired information on a learning task, and at the procedural stage, strategies used for processing new information at the associative stage become automatized, beyond the conscious control of the learner, and can now be deployed with less effort to the point of being an unconscious habitual behaviour (Chou, 2013; Oxford, 2011).

Bimmel et al. (2001: 511) identified three main groups of strategies used by readers. Group 1 strategies involve the 'use of linguistic and non-linguistic prior knowledge'; they are the strategies involving predicting, deducing or inferencing, and elaborating. Group 2 strategies involve the 'use of text elements with a high information value'; they involve 'skimming, looking for key fragments, making notes, questioning, and summarizing' (ibid). Group 3 strategies involve the 'use of structure-marking elements in the text'; they are strategies such as connecting words or phrases,

constitute the third main group of strategies. Although this conceptualization is not exhaustive, the strategies identified by Bimmel and his colleagues constitute cognitive strategies with the exception of 'questioning', which seems more of a metacognitive strategy than a cognitive strategy according to Phakiti (2003). It is however important to note that Bimmel et al.'s (2001) classification was of all the strategic activities readers engage in, not of CSs in particular.

Phakiti's (2003a, 2003b) conceptualization of CSs relates to Bimmel et al.'s (2001) classification. Like Oxford (2011), Phakiti (2003b: 651) sees CSs as 'directly related to the target language and world knowledge of the learners, which allow them to construct meaning from text and to perform a given task'. Inspired by the works of Alderson (2000), Baker and Brown (1984), O'Malley & Chamot (1990), Oxford (1990) and Purpura (1999), Phakiti (2003b: 651) conceived CSs to include 'making predictions, translating, summarizing, linking with prior knowledge or experience, applying grammar rules, and guessing meaning from text'.

1.4. Metacognitive strategy (MS)

MSs have generally been conceptualized as consisting of planning, monitoring and evaluating the learning or reading process. However, when it comes to identifying activities that constitute MSs in reading, researchers' opinions vary. For example, Sheorey & Mokhtari (2001: 431) conceptualized MSs as 'advanced planning and comprehension monitoring techniques'. This conceptualization does not deviate entirely from the general conceptualization of MSs. However, some of the ten activities identified in their conceptualization as constituting MSs are considered CSs by other researchers. For example, activities like using text features, (MET6), context clues (MET7), typographical aids (e.g. italics) (MET8), and predicting or guessing

text meaning (MET9), (which fall within inferencing), are classified as CSs in Phakiti (2003a, 2003b).

Phakiti (2003a, 2003b) conceptualized MSs as involving planning, monitoring and evaluating of the learning process or in tackling a given cognitive task. In Phakiti's model, planning, described as the previewing and overviewing of the organization of a task consists of advanced preparation, problem identification, goal setting or selective attention, self-management, and goal prioritization. Monitoring and evaluating, described as 'checking, verifying, or correcting reading performance against standards while or after completing reading', involve double-checking, performance evaluation, strategy monitoring and evaluation, and problem monitoring and evaluation (p.699).

Oxford's (2011) conceptualization of MSs bears some similarities with Phakiti's (2003a, 2003b) conceprualization. In Oxford's model, metacognitive strategies involve focusing, planning, obtaining information, organizing them, coordinating, monitoring and evaluating the construction of L2 knowledge based on the cognitive process. However, obtaining information, which was identified as a metacognitive activity by Oxford (2011), never featured in Phakiti's (2003a, 2003b) or Sheorey and Mokhtari's (2001) conceptualizations of MSs.

In this thesis, the operationalization of cognitive and metacognitive strategies follows the conceptualization of the constructs in Phakiti (2003b, 2008). However cognitive and metacognitive strategies will be examined as 'state strategies' rather than 'trait strategies'. This means that the study will investigate the participants' strategic regulation of cognitive and metacognitive strategy use during reading tests, as against examining the participants' general awareness of strategic knowledge. This

is due to the fact that the construct of 'trait strategies' for cognitive and metacognitive strategy, presumed to be a stable trait, was found to be unstable in Phakiti (2008).

Section 1.5 will review studies that concurrently investigated cognitive and metacognitive strategy use during L1 and L2 reading, while in section 1.6, the review of studies that investigated cognitive and metacognitive strategy use only in L2 reading will be presented.

1.5. Cognitive and metacognitive strategy use during L1 and L2 reading

Many reading strategy studies that concurrently investigated L1 and L2 reading have been conducted to test the *Linguistic Threshold Hypothesis* (LTH) and the *Linguistic Interdependence Hypothesis* (LIH). The LTH posits that there may be a threshold of linguistic competence that detracts from the effect of bilingualism on cognitive ability (Cummins, 1976). This therefore suggests that 'in order to read in a second language, a level of second language linguistic ability must be achieved' (Bernhadt & Kamil, 1995). The LIH, on the other hand, suggests that L1 and L2 reading share the same underlying dimension (Cummins, 1979). According to the LIH, once learners are competent in their L1 reading, they possess the ability to transfer such reading competence to their L2 reading (Coady, 1979; Koda, 2005). By contrast, according to the LTH, such transfer of strategic competence is only possible when one's L2 proficiency has also reached a certain threshold (Cziko, 1980; Devine, 1987). Brisbois (1995: 577) claims that 'language skills do transfer, allowing language students, particularly upper level students, who have reached the necessary language threshold, to capitalize upon their L1 skills in order to make sense of the L2'.

Several studies have compared the L1 and L2 reading processes of the same participants (e.g., Sarig, 1987; Schoonen et al., 1998; Stevenson et al., 2007; Upton and Lee-Thompson, 2001; van Gelderen et al., 2007; Young and Oxford, 1997). Some of these studies found a positive relationship between L1 and L2 reading processes (e.g., Sarig, 1987; Upton and Lee-Thompson, 2001; van Gelderen et al., 2007), thereby suggesting support for the LIH, while others found no such relationship (e.g., Schoonen et al., 1998; Stevenson et al., 2007; Young & Oxford, 1997), indicating support for the LTH. In a study involving eight female Israeli teenagers, Sarig (1987) investigated the high-level processing skills of the participants when they read in their L1 Hebrew and L2 English. The result revealed that the readers used, in a very similar way, their high-level processing skills, operationalized as identifying main ideas and synthesizing the overall message, when they read in both languages.

This subject was approached differently by Koda (1990) who studied the effect of L1 reading strategies in L2 reading processing by examining L1 orthographic influence on L2 reading comprehension processes. 62 proficient L1 readers of a morphographic (Japanese) or phonographic (Arabic and Spanish) language, and control group of 21 native speakers of English participated in the study. Participants read two passages in English in an experimental or control condition. Sanskrit symbols were used to substitute names for the fish and cocktails in the two passages read by participants in the experimental condition. Pronounceable English nonsense words were substituted for the Sanskrit symbols in the two passages when read in the control condition. The study concludes that there is 'L1 orthographic influence on cognitive strategies used in L2 reading' (p. 404), based on the fact that reading speed among readers of L1 phonographic languages (Arabic, English, and Spanish) decreased significantly when they read texts with Sanskrit symbols in the

experimental condition, which was not the case with readers of L1 morphographic language (Japanese). Koda therefore argued that cognitive transfer occurs during L2 reading.

Upton and Lee-Thompson's (2001) study differed slightly from the two previous studies in the sense that participants in this study read only in the L2 but were encouraged to speak in the L1 during think-aloud protocols and retrospective interviews. The study investigated how L2 readers use L1 cognitive processes, and how such L1 cognitive processes help with L2 reading comprehension. Participants were 10 native speakers of Chinese and 10 of Japanese at three different proficiency levels of English studying in a university in the US. The study was particularly interested in mental translation (Kern, 1994), or switching to L1 to aid comprehension in the L2 as a common strategy among L2 readers. The results indicated that the participants, particularly at the intermediate and advanced levels of proficiency in English, relied highly on the L1 to aid comprehension in L2 reading. A substantial proportion of the cognitive ('type A strategies', which aimed at identifying and learning text content) and metacognitive strategies ('type B strategies', which monitored cognitive processes) that the readers in the study employed, particularly the intermediate and advanced ESL readers, were verbalized in the L1. The researchers concluded that L1 is active during L2 reading, but reliance on L1 declines as L2 proficiency increases. This categorization of RCSs was based on Pressley and Afflerbach (1995) classification on which the study was based. It is however doubtful if verbalizing thought in L1 during a think-aloud session could indicate that the L1 was active during L2 reading. This finding could also be attributed to the learners' not being fluent in the L2 and, consequently, preferring to speak in the L1.

van Gelderen et al. (2007) adopted a longitudinal design to investigate the relationship between RC development in L1 and L2 among Dutch L1 learners of EFL. 389 secondary-school students from grades 8 through 10 participated in the study. Data was collected three times over a period of three years. In the study, Dutch was considered L1 to both native and nonnative speakers because it was the dominant language and all the participants were fluent in it. Participants read six L1 and seven L2 texts. Comprehension for all the texts was measured via multiple-choice questions. The study found a strong relation, measured via structural equation modeling, between L1 and L2 RC at the early phase of L2 reading, which strengthened as the readers advanced in class. This finding was interpreted as congruent with the LIH or the transfer hypothesis since it suggested that reading in the L1 and L2 are similar in this case even as the students progress academically. Metacognitive knowledge was also substantially related to RC performance of all grade levels in L1 and L2 reading, which was considered a further indication of the transfer hypothesis.

However, in related studies by Stevenson et al., (2007), Tercanlioglu (2004), and Young and Oxford (1997), no relationship was found between L1 and L2 reading processes. Young and Oxford reported that when reading texts, the participants employed higher-level processing strategies to read L1 (English) texts, while they used lower-level processing strategies to read L2 (Spanish) texts. Similar results were found in Tercanlioglu (2004) and Stevenson et al. (2007).

Tercanlioglu (2004) investigated the use of reading strategies in L1 and ESL contexts. The participants were 17 postgraduate non-native-English-speaking international students from different countries and English speaking British students, all enrolled in a school of Education in the UK. Reading comprehension was measured with three English texts. Data on reading comprehension strategies was

elicited via audiotaped interviews. The results show that cognitive strategies were used more frequently. However, while the L1 readers reported higher frequency usage for metacognitive strategies, the L2 readers reported higher frequency usage for support strategies. Interestingly, the study found no difference in the RC performance of the two groups that could be attributed to differences in strategy use.

Stevenson et al. (2007) is a study with similar aims. It compared the L1 (Dutch) and L2 (English) reading strategies of 22 Dutch high school students studying English in an EFL context, using think-aloud protocols. Reading strategy use was examined under three dimensions: a) 'Orientation of processing' (i.e., whether strategies are directed towards content or language), b) 'Type of processing' (i.e. whether strategies involve regulating the reading process, processing the meaning of the text, or rereading the text), otherwise called cognitive and metacognitive processing, and c) 'linguistic Domain of Processing' (i.e. whether strategies are directed towards text elements at levels below, at, or above the clause) (Stevenson et al., 2007: 116). Participants individually read four argumentative texts, two Dutch, two English, concurrently verbalizing their thoughts. Results indicated that in respect of 'Orientation of Processing', participants used more language-oriented strategies than content oriented strategies when reading in EFL than in Dutch. The researchers attributed this finding to the high use of the L1-translation strategy by the participants when they read the English texts. In terms of the 'Type of processing dimension', readers in the study used a higher proportion of cognitive and metacognitive strategies while reading in EFL than in the L1. To explain this finding, the researchers assumed that the readers had more frequent challenges with understanding the language of the EFL than the L1 text. In terms of 'Domain of processing', the study found that readers used higher proportion of above-clause strategies in EFL than in Dutch. This study

did not examine, however, the effect of the use of these strategies on RC in the two languages. The inability of the participants in these studies to employ similar RCSs to read L1 and L2 texts could be a consequence of their proficiency levels in the L2. It is possible that their L2 proficiency levels were below the threshold mark, and therefore could not facilitate the transfer of L1 RCSs to L2 reading; this interpretation of the findings is in line with the LTH.

Further support for the LTH was provided in Schoonen et al. (1998), which explored the contributions of vocabulary knowledge and metacognitive knowledge to L1 and foreign language (FL) reading comprehension of 685 grades 6, 8 and 10 Dutch L1 students enrolled in 1st, 3rd, and 5th year EFL instruction classes, respectively. Participants' reading comprehension in Dutch and English was measured with multiple-choice testing materials developed by the Dutch National Institute for Educational Measurement and the International Educational Assessment (IEA) Reading Literacy Study (Elley, 1992). Vocabulary knowledge in Dutch was measured with a multiple-choice test, while English vocabulary knowledge was measured with a translation test. The two tests were developed by De Glopper et al. (1997). A questionnaire developed by the authors was used to measure metacognitive knowledge in all the 3 grades, irrespective of the language. The study found a substantial impact of metacognitive knowledge on L1 RC at grades 8 and 10, while little impact was found at grade 6. However, findings suggested that metacognitive knowledge contributes to EFL RC especially at grade 10, where the importance of metacognitive knowledge to EFL RC increased, while the importance of vocabulary knowledge decreased. Whereas the influence of vocabulary knowledge on L1 and EFL RC differed, no difference was found between the influence of metacognitive knowledge on L1 and EFL RC at grade 10. Therefore at grade 10, the variance in L1

and EFL RC is not attributable to vocabulary knowledge, rather it is related to metacognitive knowledge. This finding was interpreted as congruent with the LTH since it indicated that advanced readers transfer their metacognitive knowledge while performing reading tasks in the L2.

Unfortunately, the review above indicates that adolescents who often were beginner EFL readers, but with well developed text processing ability in L1 reading were used to conduct most of the studies. These studies therefore tended to focus on participants whose dominant language is their L1, and as a result provided no information on how reading processing could progress in contexts where readers' dominant language is the L2, and reading proficiency was developed first in the L2. To address the question about how cognitive and metacognitive processes operate in L1 and L2 reading for readers with poorly developed L1 text processing ability, the current study investigates the effect of cognitive and metacognitive strategy use on RC performance of adult readers when processing texts in a native local language in which many have very limited literacy.

Another general point about the studies reviewed here is that they were mostly conducted in EFL contexts, and not in ESL contexts, where English, not the L1 is the dominant language. What many researchers seem not to note is the possibility that L1 reading in EFL contexts, could diverge from L1 reading in ESL contexts. The same may hold for L2 reading too. So, it is probably logical to assume that L1 reading skills, believed to be transferable under the LIH, can only be transferred where it exists, which is most probably in EFL contexts where L1 reading is most likely to be well developed. However, in an ESL context like Nigeria, where many have little or no proficiency reading in their L1, it could be that no such transfer occurs, given that in most cases reading starts with the L2 not L1, and proceeds in the L2 all through the

educational life of the child. Therefore, reading proficiency is hardly attained in the L1 by most natives. In this case, if transfers do occur, it may likely be the L2 skill transferring to the L1, and not the other way round.

1.6. Cognitive and metacognitive strategy use in L2 reading research

Whereas most studies (e.g. those in 1.5) involving L1 reading strategy use are not interested in how strategies used in L1 reading relate to L1 RC, several studies that investigated reading strategy use in exclusively L2 reading context reported how the use of reading strategies relates to RC in the L2. In fact, the effect of cognitive and metacognitive strategy use on L2 RC has specifically been reported in many studies (e.g. Phakiti, 2003a, 2003b, 2006, 2008). L2 readers who make effective use of cognitive and metacognitive strategies during cognitively demanding reading conditions have generally been considered good or successful readers.

Although few studies like Guo & Roehrig (2011) found no significant effect for cognitive and metacognitive strategy use in L2 RC, many L2 studies have indicated that cognitive and metacognitive strategy use has a significant effect on reading performance (e.g. Nergis, 2013; Phakiti, 2003a, 2003b; Sheorey & Mokhtari, 2001; Yau, 2009). For example, Sheorey & Mokhtari (2001) examined the differences in the reported use of cognitive and metacognitive strategies among native and non-native English-speaking college students using the *Survey of Reading Strategies* (SORS) questionnaire. Participants were students of two universities in the US enrolled in ESL composition courses. In addition to filling in the strategy questionnaire, participants reported their overall TOEFL score, and self-rated their reading ability in English. The results indicated that the L1 and ESL readers were

only significantly different in their reported use of support reading strategies. Otherwise they showed no significant difference in their reported use of cognitive and metacognitive strategies. The study also found an effect of reading ability on reading strategy use: L1 and ESL readers with high reading ability reported higher usage levels for cognitive and metacognitive strategies than L1 and ESL lower-reading-ability readers, respectively. Finally, while L1 readers with high reading ability consider support reading strategies as relatively more valuable than L1 readers with low reading ability, ESL readers in the study, irrespective of their reading ability, attributed high value to support reading strategies.

The validity of Sheorey and Mokhtari's (2001) findings can be brought into question because this study did not measure the direct effect of cognitive and metacognitive strategy use on RC. Many subsequent studies, however, examined the effect of strategy use on L2 RC. Phakiti (2003a) investigated how cognitive and metacognitive strategy use relates to EFL reading achievement test performance using a strategy questionnaire and retrospective interviews. 384 Thai students enrolled in a university in Thailand participated in the study in which data was collected during the participants' final examination in an English course in which reading comprehension skills were taught. Participants read a total of eight passages with gap-filling cloze questions. All participants answered the strategy questionnaire, while four highly successful and four unsuccessful participants participated in the retrospective interviews. Results indicated that cognitive and metacognitive strategy use was significantly positively related with participants' performance at the reading test. The study also suggested that metacognitive strategy use distinguished highly successful readers from moderately successful ones, and moderately successful readers from unsuccessful ones. Highly successful readers reported significantly more use of

metacognitive strategies than the moderately successful readers, while the moderately successful readers reported significantly more use of metacognitive strategies than the unsuccessful readers.

In another study, Guo and Roehrig (2011) examined the roles of metacognitive awareness of reading strategies, syntactic awareness in English, and English vocabulary knowledge in the English RC of 278 Chinese undergraduate students enrolled as English education majors at three universities in China. Reading comprehension was measured with two tests, the TOEFL Reading Comprehension Subset (TOEFL-RBC) and the Gray Silent Reading Tests (3rd edition) (Wiederholt & Blalock, 2000). L2 vocabulary knowledge (breadth and depth) was measured with two tests, Vocabulary Levels Test (Nation, 1990) and Depth of Vocabulary Knowledge Measure (DVK) (Qian & Schedl, 2004), while L2 syntactic awareness was also measured with two tests, the Sentence Combination Subset of the Test of Adolescent and Adult Language (4th edition) (Hammill et al., 2007) and the Syntactic Awareness Questionnaire (Layton et al., 1998). Metacognitive awareness too was measured with two instruments, *Metacognitive Reading Strategies Questionnaire* (MRSQ) (Taraban et al., 2004) and *Metacognitive Reading Awareness Inventory* (MRAI) (Miholic, 1994). The results indicated that although L2 language knowledge and metacognitive awareness of reading strategies both correlated highly with RC in the study, only L2 language knowledge explained significant variance in the RC performance of the readers in the structural model predicting L2 reading. The authors concluded that the Chinese subjects in the study could not transfer their awareness of L1 reading strategies into reading in English because their proficiency levels in English did not meet the 'threshold' that could enable such transfer.

Guo and Roehrig's (2011) study was one of the few that found no significant effect of strategy use on RC, which the authors claimed was due to the low L2 proficiency of the readers. In L2 reading research, proficient L2 readers have often been associated with higher reported use of cognitive and metacognitive strategies, as shown in Nergis (2013). Nergis (2013) investigated whether depth of vocabulary knowledge, syntactic awareness or metacognitive awareness could better predict academic reading comprehension among 45 undergraduate students of a university in Turkey enrolled in an English language teaching programme. Reading comprehension was measured with TOEFL-RBC 2000, DVK with measures originally developed by Read (1998), and syntactic awareness with a *Sentence Combination Subset* of the Test of Adolescent and Adult Language (TOAL-4) (Hammill et al., 2007). The metacognitive reading strategies awareness was measured with a Likert scale questionnaire developed by Taraban et al. (2004). The study found that metacognitive reading strategies awareness was the strongest predictor of academic RC well above DVK and syntactic awareness (see van Gelderen et al., 2004 for a similar result). The finding was explained as supporting the claim that highly proficient L2 learners rely more on their metacognitive awareness skills when tackling tasks in the L2, which previous studies (e.g. Phakiti 2003a, 2003b; Sheorey & Mokhtari, 2001) have also indicated. Therefore it is probable that participants' level of L2 proficiency was responsible for why Guo & Roehrig (2011) found no effect for RC performance. Findings in Yau (2009) study also point to this conclusion.

Yau (2009) investigated the knowledge and application of strategic reading in the Taiwanese EFL context. Participants were 144 Taiwanese Grade 11 students. Participants answered multiple-choice comprehension questions on six passages in two separate sessions: two written in contemporary Chinese, two in classic Chinese,

and the other two in contemporary English. Participants' knowledge and application of reading strategies was measured via two reading strategy questionnaires, one for reading L1 Chinese and the other for reading L2 English. Qualitative data was elicited with a combination of semi-structured interviews and think-aloud protocols with two higher and two lower performing EFL readers. Results from the quantitative data indicated a substantial link between perceived use of first and second language reading strategies. The study found high correlation between metacognitive strategy use in L1 and L2, as well as for cognitive and support strategies respectively. No statistically significant difference was found between L1 and L2 reading strategy use. Readers reported more frequent use of cognitive and metacognitive strategies during L1 reading than during L2 reading, whereas more frequent use of support strategies was reported for L2 reading. L2 RC performance in general correlated positively with self-reported use of reading strategies. However, while reported cognitive and support strategy use were significantly correlated with RC performance in the L2, the study found no significant correlation between reported metacognitive strategy use and RC performance in the L2, although the two correlated positively. The strategic processing of English texts, for this group of participants, was found to be similar with strategic processing of texts written in classical Chinese. The similarity in processing strategies used to read English and Chinese texts was interpreted to support the reading universals hypothesis (Goodman, 1970). On the other hand, the fact that this group of readers reported using more cognitive and metacognitive strategies in L1 than in L2 reading, as well as the non significant correlation between their metacognitive strategy use and L2 RC, could also be seen as supporting the claims that transfer of L1 skills is contingent on L2 proficiency. Also is the fact that the use of metacognitive strategies during L2 reading has been associated with highly

skilled or proficient L2 readers. The grade level of the participants in this study suggests low levels of proficiency as EFL readers, which could explain why metacognitive strategy use did not correlate significantly with reading performance in the study.

1.7. Strategy instruction research in L2 reading

Probably the greatest indication of the benefits of strategy use for RC, particularly of cognitive and metacognitive strategies, has come from research on the effect of strategy instruction on the use of reading strategies in L2 reading. Motivated by L2 RC research findings suggesting a positive effect for strategy use developed through instruction, researchers began to encourage strategy instruction in schools. In fact, a number of L2 researchers have studied the benefits of cognitive and metacognitive instruction on RC performance of L2 learners (Akkakoson, 2013; Dabarera, Renandya, Zhang, 2014; Lubliner and Smetana, 2005; Salataci and Akyel, 2002) with some interesting results.

Salataci and Akyel (2002) investigated the effect of strategy instruction in improving the use of RSs in L1 and L2 reading, and how the use of the RSs learnt through instruction affects the RC of Turkish EFL students in L1 and L2 RC performance. Eight Turkish students enrolled in an intermediate course in English in a Turkish university were the participants. Participants received 4 weeks instruction on reading strategy use. They read two versions of the reading components of the Preliminary English Test (PET), one version before the strategy instruction and another after the instruction. Data was collected using think-aloud protocols, observations, semi-structured interviews and a background questionnaire. The students' L1 and L2 reading strategies improved and their RC scores on the PET

increased after the RS instruction. However, this study was silent on the mediating effect of language proficiency, which has been found to play a role in strategy use.

In a quasi-experimental study involving two groups of Thai university students, Akkakoson (2013) investigated the relationship between strategy instructions, learning of L2 RS use and English reading achievement. Employing a pre-test/post-test design, the experimental group was taught how to read general English texts using a strategies-based approach for 16 weeks, while the control group was also taught how to read general English in the same period using a traditional method. Participants were asked to weekly document, as out-of-class assignments, account of how they used the strategies taught to read English texts selected by the participants on their own, and their reflections on the strategies used while reading the texts. Data from these entries were used for the analyses. The study found that while the RC scores of the control group did not improve during the course of the study, the RC scores of the experimental group showed a significant improvement after the strategy instruction. The study also found that the explicit strategy instruction given to the experimental group resulted in the readers' 'greater metacognitive awareness of the need to be strategic and monitor comprehension' (p. 442) leading to improved reading achievement.

Dabarera, Renandya, and Zhang (2014) also found in their study with Singaporean students that metacognitive strategy awareness and use was improved through instruction, which in turn led to increase in RC scores of the ESL students. The study found a positive correlation between metacognitive awareness and use and increase in reading scores of the Singaporean students.

Metacognitive strategy instruction has also been shown to be beneficial even in the acquisition of vocabulary. Lubliner and Smetana (2005) investigated the

effectiveness of a metacognitive strategy instruction program tagged Comprehensive Vocabulary Development (CVD), in increasing the reading comprehension and vocabulary acquisition of fifth-grade students in a suburban low performing title 1 school in California. The study found that metacognitive instruction led to a significant gain in vocabulary and RC for a group of low performing school children. Studies reviewed so far point to the fact that the use of cognitive and metacognitive strategies relates to performance in RC.

Some of the studies reviewed in this chapter have indicated that the use of these strategies could be contingent on some factors. One factor prominent in the review is language proficiency. Although some of the studies reviewed provide support for the role of proficiency in cognitive and metacognitive strategy use in L2 reading performance, some studies found no support for such effect (e.g. Brantmeier, 2000; Sarig, 1987; Yamashita, 2002). Yamashita (2002) concluded that difference in language of the reading task, or the reader's ability in those languages, does not affect the use of metacognitive strategies. However, to some researchers, particularly those whose studies were guided by the LTH, proficiency is salient in readers' strategic abilities (Bernhardt, 2000). Hence, for studies that found no relationship between cognitive and metacognitive strategy use and L2 reading performance, the L2 proficiency level of the participants tends to be blamed often (e.g. Guo & Roehrig, 2011; Sarig, 1987; Yau, 2009). Unfortunately, L2 proficiency levels were never explicitly measured in many of these. The current study therefore addresses this issue by measuring participants' L2 proficiency levels via a standardized proficiency test.

1.8. Strategy elicitation and assessment

In the field of reading strategy research, various methods have been adopted to elicit readers' strategy use. They include the use of survey tools (written questionnaires), think-aloud protocols or verbal reports, diaries or dialogue journals, observation etc. (Gao, 2004). Among these various tools, questionnaire emerges as one of the most widely used in strategy research (Gao, 2004). The popularity of questionnaire stems from the idea that they are 'cost-effective and allow both researchers and participants to gain a rapid understanding of the participants' strategy use' (Oxford and Burry-Stock, 1995, cited in Gao, 2004: 4). Questionnaire data are easy to analyze, and they provide for the use of large sample size in research, which often constitutes a basic condition for running many statistical analyses.

Notwithstanding its advantages as data-elicitation tool in strategy research, the use of questionnaires to elicit data has recently come under criticisms. Some of these criticisms relate to the diverse strategy inventories provided in questionnaires that makes it difficult to find a strategy inventory that can precisely capture learners' strategy use (Hsiao and Oxford, 2002). Critics of questionnaire (e.g. Gu, Wen and Wu, 1995) also argue that sometimes the wordings of items in questionnaires create ambiguity, which makes them susceptible to different interpretation that could bias or alter findings in studies. Even where the wording of the items is clearly unambiguous, critics have also alluded to the possibility of social desirability bias in the responses provided by participants on questionnaire items. Also, the fact that questionnaires are not able to capture the multidimensional nature of the strategies that readers use has made critics to question their validity.

In recent times therefore, elicitation of data in strategy research has tended to be in favour of the other data elicitation tools, particularly the concurrent verbal protocol (think-aloud) or retrospective verbal protocol. However, while retrospective verbal protocol is also limited by the fact that it is 'difficult to determine whether data gathered in this way truly reflect what participants were thinking during task completion or new thoughts that occur to them while completing the protocol' (Sanz et al., 2009: 34). The concurrent verbal protocol, which is thought to have the advantage of providing real time view into mental processes (Sanz et al., 2009), is also plagued with reactivity and nonveridicality concerns (Bowles, 2010; Ellis, 2001; Jourdenais, 2001). Reactivity refers to situation in which verbalization affects the outcome of a cognitive process (Sanz et al., 2009), by acting as an additional task to the participants in the process, thereby altering the cognitive process resulting in the provision of an inaccurate representation (nonveridicality) of the cognitive process (Ellis, 2001; Jourdenais, 2001). Within the nonveridicality concern, Sanz et al. (2009: 34) observed that 'participants who are thinking aloud while completing a task may provide an incomplete representation of their cognitive processes; however, lack of verbalization of processes cannot be interpreted as absence of process'. This suggests that think-aloud may not be appropriate for data collection in all situations, particularly in cases like the current study, where participants, during the piloting of the study, were completely unable to concurrently or retrospectively verbalize their thought processes.

The act of thinking aloud while doing reading tasks was very novel to the participants. As a consequence, they found it almost impossible to concurrently verbalize their thought processes. Even the retrospective verbal protocol, which the researcher opted to use as an alternative to the concurrent verbal protocol when the

participants could not concurrently verbalize their thought, was also plagued with the production of intangible protocols that mostly did not yield data required for any meaningful analysis. The researcher was therefore left with no option but to ditch these methods out of concern that employing any of them to elicit data during the main study could indicate that the veridicality of data obtained in this circumstance would obviously be threatened from the onset, as the pilot study results revealed. However, because the study was designed to assess the relationship between reading strategy use and performance in reading comprehension tasks in an induced testing situation, it could not support the use of diaries or observation as data elicitation tools. It was therefore decided that questionnaire remains the most viable tool for data collection in this circumstance.

1.9. Overview of the thesis

This thesis aims to examine the extent to which the use of a set of cognitive and metacognitive strategies relates to RC in L1 and L2 reading, as well as whether L2 proficiency and vocabulary size could relate to the use of cognitive and metacognitive processes during L2 reading. Research conducted mostly in EFL contexts has suggested that cognitive and metacognitive strategy use tends to correlate positively and significantly with RC performance in L1 and L2. However, while some researchers argue that readers use these strategies in the same way across L1 and L2, others claim that varied proficiency levels entail varied usage levels for cognitive and metacognitive strategies. Moreover, how the knowledge of vocabularies could affect the use of cognitive and metacognitive strategies in L2 text processing, particularly in ESL contexts where English is a lingua franca has not yet been explored. This thesis therefore investigated, with groups of Igbo native speakers who are ESL readers in

Nigeria, the effects of cognitive and metacognitive strategy use on L1 and L2 RC, and the role of L2 language proficiency and vocabulary size in cognitive and metacognitive reading strategy use. The structure of the thesis is therefore as follows.

CHAPTER 2 investigates the effect of cognitive and metacognitive strategy use in the RC of Igbo native speakers when they process texts written in Igbo under an induced testing condition. Previous L1 and L2 reading studies conducted mostly in EFL reading contexts have suggested that whether the reading texts are in the L1 or L2, the reader's ability in those languages does not affect the use of metacognitive strategies (Davis & Bistodeau, 1993; Yamashita, 2002). But, whether or not in the ESL context in Nigeria, where English is a lingua franca and reading in the L1 is not popular, the use of cognitive and metacognitive strategies could be affected by reader's ability in Igbo, or the fact that the reading task is in Igbo, needs to be explored. It is therefore being hypothesized that these Igbo L1 readers, who may not be considered adept readers in their first language, will use cognitive and metacognitive strategies to a positive and significant effect on their L1 RC performance. In previous studies (e.g. Phakiti 2003a, 2003b; Sheorey & Mokhtari, 2001), quality and quantity of use were found to distinguish high achievers from low achievers in RC tasks. It is therefore hypothesized that Igbo readers who perform well in the reading test will use more cognitive and metacognitive strategies than those that performed poorly in the test. The data from this study will further be analyzed in CHAPTER 5 in comparison with data from the studies reported in CHAPTER 3 and CHAPTER 4 to draw a coherent conclusion on the effect of cognitive and metacognitive strategy use on text processing in L1 and L2 in an ESL context.

In CHAPTER 3 the role of L2 proficiency and vocabulary size in cognitive and metacognitive strategy use is investigated. As indicated in the review, there is yet

no consensus as to whether or not L2 proficiency relates to cognitive and metacognitive strategy use during L2 text processing. Some researchers (e.g. Bernhardt, 2000; Ghafournia & Afghari, 2013; Zhang & Wu, 2009) claim that L2 proficiency plays a role in cognitive and metacognitive strategy use, while others claim that no such relationship exists (e.g. Brantmeier, 2000; Rahimi et al., 2009; Yamashita, 2002). In the current study, it is hypothesized that L2 proficiency will have a positive and significant relationship with cognitive and metacognitive strategy use in L2 RC of the Igbo native speaker. This position runs contrary with the position held by researchers (e.g. Rahimi et al. 2009; Stevenson et al., 2007; Yamashita, 2002) that proficiency plays no role in the use of cognitive and metacognitive strategies.

The contribution of vocabulary knowledge to cognitive and metacognitive strategy use in L2 text processing constitutes part of the investigation in this chapter. There is hardly any study that has explored this relationship. However, this possible relationship is indicated by the fact that the most widely investigated reading strategy, inferencing strategy, is a cognitive strategy that has been found to relate with vocabulary knowledge (e.g. Oakhill et al., 2015). Given this relationship, a relationship between vocabulary knowledge and cognitive and metacognitive strategy use in L2 text processing also seems possible. It is therefore hypothesized that vocabulary knowledge will have a positive and significant relationship with cognitive and metacognitive strategy use in L2 text processing.

CHAPTER 4 reports on a study, which examines the effect of cognitive and metacognitive strategy use in L2 text processing of the Igbo native speakers. The study will be guided by the same hypotheses stated for the study on L1 reading reported in CHAPTER 2. Further analysis will be conducted in CHAPTER 5 to establish if cognitive and metacognitive strategy use differed between two L2 text-

processing conditions, i.e. the study on the role of vocabulary and proficiency in cognitive and metacognitive strategy use during L2 text processing (Chapter 3) and the study on the effect of cognitive and metacognitive strategy use on L2 text processing (Chapter 4). The aim is to test whether the L2 reader's cognitive and metacognitive strategy use varied in relation to performance at the reading tasks situations. If cognitive and metacognitive strategy use is found to vary in relation to performance between two different L2 reading tasks situations, we hope to interpret it as support for the claim that these variables are vital in RC. It will also be considered an indication that the social desirability concern about the use of questionnaire to elicit data in the study may not be warranted, since data elicited would have been found to be a near perfect reflection of the L2 readers processing strategies during the reading tasks. CHAPTER 5 also examines some limitations of the study, the implications of the study for teachers, and some possible focus for future research.

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Chapter 2

2. Cognitive and metacognitive strategy use during reading by native speakers of Igbo

Abstract

According to most studies on reading comprehension, reading strategies may improve reading comprehension, leading researchers to advocate reading strategy instruction. Igbo is one of the three major indigenous languages in which reading is taught in Nigerian schools. However, the limited awareness among Igbo language teachers of the significance of strategy use in reading has allowed reading to be continuously taught indirectly through the traditional method of discussing the structure of prescribed texts. As a way to raise awareness on reading strategies, this study attempted to identify from a cluster of cognitive and metacognitive strategy items the cognitive and metacognitive strategies that Igbo readers in the study reported to have used to process Igbo text. The contribution of the use of those strategies to the reading comprehension performance of the readers was investigated, and the cluster of strategies (cognitive or metacognitive) that readers reported using more frequently to process Igbo texts was determined. Twenty-five Igbo students in a Federal College of Education in Nigeria participated in the study. The participants did reading comprehension tasks in Igbo, and completed a reading strategies questionnaire after reading each passage. In their questionnaire answers, participants reported a medium usage level for ten out of the fourteen reading strategies shortlisted for the investigation. Regression analysis suggests that their reading comprehension strategy

use had a significant positive effect on the students' reading scores, explaining 28.6% of the variance. However, there was no significant difference in the participants' reported use of cognitive and metacognitive strategies during the reading task.

2.1. Introduction

The belief that the reading comprehension strategies (RCSs) employed during reading comprehension, whether in the first language (L1) or the second (L2), affect reading comprehension has gained traction among reading researchers. Numerous studies on the effect of RCSs on reading comprehension (e.g. Block, 1992; Schoonen et al., 1998; Sheorey & Mokhtari, 2001) suggest that the strategies readers employ during reading account for a large portion of the variance in reading comprehension scores. Moreover, high proficiency readers typically use an array of RCSs when they engage in reading, which tends to set them apart from low proficiency readers (Phakiti, 2003; Yau, 2009).

The degree to which RCSs are used effectively during reading has also been claimed to affect reading comprehension (Baker & Beall, 2009; Baker & Brown, 1984). In particular, studies suggest that skilled readers are often those who regulate their use of cognitive strategies (acts employed to manipulate the material to be learned or the act of applying specific techniques to a learning task), and metacognitive strategies (acts employed to oversee, direct and regulate the learning process) during reading (see Nergis, 2013; Rahimi & Katal, 2012; Sheorey & Mokhtari, 2001). Pedagogical studies indicating strategy instruction helps to significantly improve readers' performance in reading comprehension tasks (e.g. Akkakoson, 2013; Dabarera, Renandya, & Zhang, 2014; Lubliner & Smetana, 2005;

Salataci & Akyel, 2002) also suggest that cognitive and metacognitive strategy use is beneficial to reading comprehension.

Reading in Igbo tends to be unpopular and unattractive to many Igbo native speakers, as experience with literacy among this group does not often commence in the L1. This seemingly 'subtractive bilingual' reading situation (where L1 reading competence is diminishing in favour of L2 reading competence) (Cummins, 1976) is attributable to the unique sociolinguistic environment in which Nigerian indigenous languages struggle to survive due to the overbearing influence of English on the life of natives as a Language of Wider Communication (LWC) (lingua franca) (see Adedimeji, 2004). Moreover, the traditional indirect method of teaching reading by discussing the structure of prescribed texts persists in classrooms. Although studies conducted outside the sociocultural context of Igbo have indicated that cognitive and metacognitive strategy use could have a significant positive effect on RC, nothing is known about the cognitive and metacognitive processes that readers use to process texts in Igbo, and the extent to which their use, as in previous studies, could relate to performance in comprehending Igbo texts by Igbo natives who are not particularly adept readers in Igbo. In fact, it would be interesting to examine if metacognitive processing would be a significant contributor to performance in reading comprehension in Igbo as has been reported in some previous L1 studies with 'additive bilingual' readers (competent L1 readers who are also gaining competence in L2 reading) (Cummins, 1976) in EFL contexts (e.g. Tercanlioglu, 2004; Young & Oxford, 1997). It has been suggested that different language backgrounds and varying experiences with literacy could significantly influence reader's use of strategies while trying to construct meaning from written texts (Parry, 1996). In line with this understanding it is therefore being assumed that since people from different cultures

adopt different strategies when tackling learning tasks, identifying and analyzing strategies used by people within a cultural setting could potentially provide more insight into the cognitive processes that underlie text processing, and may also improve teaching in that culture (Oxford, 1990; Rahimi & Katal, 2012).

2.2. Cognitive and metacognitive strategies in reading comprehension

Within the framework of language learning, cognitive and metacognitive strategies are considered essential learning tools. Cognitive strategies 'aid the learner in putting together, consolidating, elaborating, and transforming knowledge of the language and culture' (Oxford, 2011: 46), while metacognitive strategies enable the learner to 'focus, plan, obtain resources, organize, coordinate, and evaluate the construction of L2 knowledge' (Oxford, 2011: 44).

In the context of reading comprehension, cognitive strategies are conceived as reading strategies that 'relate to the target language and world knowledge of the learners, which allow them to construct meaning from text and to perform the given task' (Phakiti, 2003, 2008), while metacognitive strategies are seen to 'relate to self-management or self-regulation in a given reading activity' (Phakiti, 2003: 651). They have metaphorically been referred to as 'construction workers' and 'construction managers' respectively (Oxford, 2011). In Phakiti's studies, cognitive strategies consisted of 'making predictions, translating, summarizing, linking with prior knowledge or experience, applying grammar rules and guessing meaning from context' (Phakiti, 2003: 651), while metacognitive strategies consist of planning and monitoring strategies. Planning strategies involve previewing or overviewing of a task

to decide on a course of action, while monitoring strategies involve actions like checking, monitoring and evaluating the reader's thinking and reading performance.

Cognitive and metacognitive strategy use in L1 text processing has been investigated in relation to L2 text processing by many researchers (e.g. Koda, 1990; Sarig, 1987; Schoonen et al., 1998; Sheorey & Mokhtari, 2001; Stevenson et al., 2007; Tercanlioglu, 2004; Upton & Lee-Thompson, 2001; van Gelderen et al., 2007; Young & Oxford, 1997). Many of these studies tested the *Linguistic Interdependence Hypothesis* (LIH) (Cummins, 1979), which suggests a relationship of the L1 to the learning of L2 based on the principle of Common Underlying Proficiency (CUP). Since the underpinning principle of this hypothesis suggests the transferability or otherwise of L1 linguistic skill to L2, and the role of language specific knowledge and processing skills in the process, reading researchers have often explored L1 reading processes in relation with L2 reading process to establish the veracity of the claim of a relationship between L1 and L2 reading ability. Many of these studies (e.g. Bernhardt & Kamil, 1995; Brisbois, 1995; Fecteau, 1999; Lee & Schallert, 1997) have indicated a positive and significant relationship between L1 and L2 reading ability.

The relationship between L1 and L2 reading ability has also been tested in studies that focused on cognitive and metacognitive reading comprehension strategies. Some of such studies (e.g. Schoonen et al., 1998; Tercanlioglu, 2004; van Gelderen et al., 2007) have provided evidence for the effect of cognitive and metacognitive strategy use in L1 and L2 text processing.

For example, Sarig (1987), Stevenson et al.'s (2007), Young and Oxford (1997) study compared L1 and L2 Cognitive and metacognitive processes. Sarig (1987) suggested that readers in the study used, in a very similar way, their high-level processing skills, operationalized as identifying of main ideas and synthesizing of

overall message, when they read in both languages. Whereas Young and Oxford (1997) reported that when reading texts, the participants employed higher-level processing strategies (metacognitive strategies) to read L1 (English) texts, while they used lower-level processing strategies (cognitive strategies) to read L2 (Spanish) texts. However, in Stevenson et al.'s (2007) study, readers reported using a higher proportion of cognitive and metacognitive strategies while reading in L2 than in the L1. In order to also compare cognitive processes in L1 and L2 text processing, Koda (1990) examined L1 orthographic influence on L2 text processing. The researcher concluded that there is 'L1 orthographic influence on cognitive strategies used in L2 reading' (p. 404), based on the fact that reading speed among readers of L1 phonographic languages (Arabic, English, and Spanish) decreased significantly when they read texts with Sanskrit symbols in the experimental condition, which was not the case with readers of L1 morphographic language (Japanese). One feature of studies that compared cognitive and metacognitive processes in L1 and L2 is that they are often silent on the effect of these processes on reading comprehension performance. This is particularly because reading comprehension is often not measured in such studies.

On the other hand, other studies tested the effect of cognitive and metacognitive processes in L1 and L2 text processing. Such studies are often the ones that report the effect of L1 and L2 cognitive processing on reading comprehension performance. Some of these studies (e.g. Schoonen et al., 1998; van Gelderen et al., 2007) involved adolescents. Schoonen et al. (1998) found a substantial impact of metacognitive knowledge on L1 reading comprehension at grades 8 and 10, while little impact was found at grade 6. However in L2 reading, the study found that metacognitive knowledge contributes to RC in the L2 especially at grade 10.

Therefore variance in L1 and L2 reading comprehension at grade 10 was attributed to metacognitive knowledge. Similarly van Gelderen et al. (2007) found metacognitive knowledge to be substantially related to reading comprehension performance of all grade levels in L1 and L2 reading.

It is however important to observe that while the Dutch L1 readers in these studies tended to have consistently used cognitive and metacognitive processing in similar manner during L1 and L2 processing, a somewhat different trend was found with readers in other studies conducted in different contexts. For example, earlier it was noted that Young & Oxford (1997) reported that when reading texts, the participants employed higher-level processing strategies (metacognitive strategies) to read L1 (English) texts, while they used lower-level processing strategies (cognitive strategies) to read L2 (Spanish) texts. Similarly, in a study by Tercanlioglu (2004) in which the use of reading strategies in L1 and ESL contexts was investigated among postgraduate non-native-English-speaking international students from different countries and English speaking British students. The researcher found that there was a clear preference for cognitive strategies followed by metacognitive and then support strategies by the ESL and L1 readers. However, while the L1 readers reported higher frequency usage for metacognitive strategies, the L2 readers reported higher frequency usage for support strategies. Interestingly, the study found no difference in the reading comprehension performance of the two groups that could be attributed to the variation in their reading strategies as L1 or ESL reader.

Therefore, while Dutch readers in Schoonen et al. (1998) and van Gelderen et al. (2007) reported the use of more cognitive and metacognitive strategies in processing L1 texts, readers in Young & Oxford (1997) reported higher frequency usage for metacognitive strategies in L1 and cognitive strategies for L2 text

processing. On the other hand, readers in Stevenson et al. (2007) reported higher frequency of cognitive and metacognitive strategy use in L2 than in L1 text processing, whereas readers in Tercanlioglu (2004) study reported using more metacognitive strategies for L1, and support strategies for L2 text processing.

Meanwhile, the finding in Tercanlioglu's study, which indicates that irrespective of the divergence in strategy use in the two languages, reading comprehension was not affected, is curious. This is because the finding tends to be in contrast with the position in literature, particularly L2 reading literature where several studies have tended to indicate that metacognitive strategies are good predictors of reading comprehension. It is as a result of the perceived significant impact of these strategies on reading comprehension performance that a number of L2 reading researchers have explored the potential benefits of cognitive and metacognitive strategy instruction for improved reading comprehension performance in L1 and L2 (e.g. Salataci & Akyel, 2002), in the acquisition of L2 vocabulary (e.g. Lubliner & Smetana, 2005), and in L2 reading comprehension (e.g. Akkakoson, 2013; Dabarera, Renandya, & Zhang, 2014). All these studies did not only find that strategy instruction improved readers use of cognitive and metacognitive strategies in L1 and L2, their use were also found to significantly improve readers' performance in reading comprehension tasks or in the acquisition of L2 vocabulary.

The current study examines cognitive and metacognitive strategy use by native speakers of Igbo during reading and their role in reading comprehension. The reading strategies of adult L1 readers with late and limited L1 literacy experiences (as the group in the current study) in an ESL context needs to be understood for the benefit of teaching L1 in ESL contexts where there is strong dominance of English (Oxford, 1990; Rahimi & Katal, 2012). Parry (1996) has suggested that different

language backgrounds and varying experiences with literacy could significantly influence reader's use of strategies while trying to construct meaning from written texts. The studies reviewed (Schoonen et al., 1998; Stevenson et al., 2007; Tercanlioglu, 2004; van Gelderen et al., 2007; Young & Oxford, 1997) have also indicated that different contexts of reading could potentially affect the way cognitive and metacognitive strategies are used in text processing. Given that studies with adolescents (Schoonen et al., 1998; van Gelderen et al., 2007) have indicated that even among beginner readers, students at higher-grade levels reported more frequent use of cognitive and metacognitive strategies, which had significant effect on their reading comprehension performance. It is therefore hypothesized that in the current study this group of Igbo L1 readers, who are not adept readers in their native language, will report the use of more metacognitive strategies to process Igbo texts. As previous studies (e.g. Baker & Beall, 2009; Baker & Brown, 1984; van Gelderen et al., 2007) have indicated, it is also hypothesized that metacognitive strategy use will have significant positive effect on the reading comprehension performance of these readers well above the effect of cognitive strategy use. Hence the study reported here addressed these research questions:

1: Which are the cognitive and metacognitive strategies used during Igbo reading tasks by native speakers of Igbo enrolled in a teacher-training programme in Nigeria?

2: What is the relative effect of cognitive and metacognitive strategy use on these participants' reading comprehension?

3: Which cluster of strategies (cognitive or metacognitive) did readers report using most frequently while processing Igbo texts?

2.3. Method

2.3.1. Participants

The study was carried out in a Federal College of Education in Nigeria. The participants in the study consist of 25 students, 4 males and 21 females, enrolled in the College to be trained as teachers. Their ages spanned from 19 to 35 years. They had been studying in the College for a period of one to three years. Participants were informed of the study through their class teachers, who also helped to distribute the consent forms to the students. The students completed the consent form a week before the study, and only those that indicated willingness to participate in the study were invited to participate. The choice of teacher trainees for the study was considered adequate because there was no reason to assume that previous instruction could bias their responses given that reading strategy instruction is not in their curriculum.

A language learning and use self-report questionnaire with a five-point Likert scale was administered (see appendix A). The purpose was to ascertain participants' background on L1 use to ensure that they could rightly be classified as Igbo L1 speakers. This questionnaire was also administered to establish that the participants do not suffer from any impairment, which could affect the outcome of the study as well as to measure their reading ability in Igbo. Self-report proficiency scales have been shown by researchers to correlate very highly with objective measures of language ability (see Maclntyre et al., 1997; Kroll et al., 2002, etc.), and have been used in many studies (e.g. Dewaele et al., 2008; Colzato et al., 2008; Rai et al., 2011). 52% of the participants reported speaking Igbo exclusively at home. 37% reported speaking a combination of Igbo and English, while 7% reported speaking Igbo,

English and Hausa at home. Only one participant reported speaking only English at home.

While all the participants reported to have started learning reading in English before the age of eight, only 30% of the participants stated this for Igbo. 62% of the participants reported that they started learning to read in Igbo when they were already between the ages of 10 and 20 years. Two participants did not answer when they started learning to read in Igbo.

Regarding their Igbo reading ability, operationalized as the fluent decoding of Igbo orthographic representations, 12% reported having low, 16% fairly low, 36% fairly high, 24% high and 12% very high reading ability in Igbo. Comprehension ability in Igbo, operationalized as the ability to form coherent metal representation of Igbo written or spoken texts, was also reported to be low for 8%, fairly low for 20%, fairly high for 20%, high for 40% and very high for 12% of the participants. However, none of the participants reported being dyslexic nor did they report having any hearing or visual impairment. All the participants voluntarily agreed to participate in the study, and ₦1,000. A top-up voucher for Global System for Mobile communication (GSM) was given to each participant as a token of appreciation for his or her participation.

2.3.2. Measures

2.3.2.1. Reading Comprehension measures

The reading comprehension was measured with three passages, each followed by five multiple-choice questions. Participants read all the three passages, and answered all the multiple-choice questions accompanying them. Passages from past West African

Examination Council (WAEC) tests, and the Joint Admissions and Matriculation Board (JAMB) tests were adopted with some minor modifications. WAEC and JAMB set qualifying standardized tests for students in Nigeria. The WAEC sets and administers the Ordinary Levels (OL) tests that qualify students to seek admission into any tertiary institution in Nigeria and all over the world, while the JAMB sets and administers Nigerian university entrance examinations.

Additional multiple-choice questions were created for two of the original Igbo comprehension passages to ensure that participants read texts with an equal number of questions, each with three distractors (see appendix B). Recent developments in the evaluation of reading comprehension require reading comprehension to be evaluated with questions that would be sensitive to the mental representations that readers form as they try to construct meaning from a text (see Magliano et al., 2007), local, global, and inferential questions. Local questions were designed to test readers' general ability to locate explicit information in the text, either at the sentential or contextual levels. Global questions tested readers' ability to maintain coherence in order to grasp meaning at the level of sentence, paragraph, or even the complete text. Inferential questions tested readers' ability to go beyond the text to use information from the text and previous knowledge to provide explanations, draw analogies, or predict meaning (Pascual & Goikoetxea, 2014). A total of five questions were created for each of the three dimensions.

The word count for each of the RC passages in the study is 307 words for passage 1, 336 words for passage 2, and 213 words for passage 3.

It has to be acknowledged that since different techniques for testing reading might permit the evaluation of different composites of the reading construct, there is no one best format for testing reading (Alderson, 2000). Multiple-choice tests were

used instead of other test formats (e.g., cloze, gap-fill, free-recall, and text summarization tests) because of the popularity of the multiple-choice test format in the examination system of Nigeria. Moreover, the procedure for analyzing multiple-choice tests items is well established (Wesche & Paribakht, 1996), it provides for scorer reliability (Alptekin & Ercetin, 2011) and therefore makes their use even more attractive. In fact, notwithstanding the controversy on the validity of the multiple-choice test for assessing reading comprehension (see Rupp, Ferne, & Choi, 2006), it is believed that such tests have the benefit of limiting the possible answers to comprehension questions and, consequently, leading to easy data analysis. The availability of 'statistical support for the analysis of multiple-choice tests, and straightforward interpretation of test analysis result' (Phakiti, 2003b: 659) constitutes an attraction for the choice of the multiple-choice format of testing in the current study.

2.3.2.2. Reading strategy use measures

Cognitive and metacognitive strategy use was assessed with a RCSs questionnaire. Researchers like Oxford (1996) and Purpura (1999) support the use of strategy questionnaires in the investigation of cognitive and metacognitive strategy use. Apart from being cost effective, strategy questionnaires are believed to provide for participants and researchers a quick understanding of the strategies used by participants (Oxford & Burry-Stock, 1995). In a recent study by Phakiti (2003), only a strategy questionnaire was used due to ethical concerns about asking participants to report on their strategy use while taking the test, need to statistical compare learners' reading strategies across groups, the challenge of tape-recording participants, the desire to assess the overall degree of strategy use not the number of times readers

used a particular strategy. This was the strategy questionnaire adapted for the current study. The decision to adapt Phakiti's questionnaire was based on the fact that it was designed to measure specific cognitive and metacognitive strategies associated with reading comprehension in a testing context. Since the participants in the current study were required to read texts in a testing condition, it was assumed that the questionnaire was adequate for our study.

Phakiti's (2003) questionnaire uses a 5-point Likert scale; it requires participants to assess whether a strategy is used 1 (never), 2 (sometimes), 3(often), 4 (usually) and 5 (always). Phakiti's (2003) questionnaire contains 35 items testing cognitive and metacognitive strategy use in reading. It was established by means of exploratory factor analysis (EFA) that the items in the questionnaire clustered in two factors, one of them related mainly to cognitive strategies, and the other mainly related to metacognitive strategies. Based on this dichotomy, five strategy items in the 35-item questionnaire (e.g. 'I translated the reading text and tasks into English to enhance my understanding', 'I read the text and questions several times to better understand them') were shortlisted as items relating to cognitive strategy use, while ten items (e.g. 'I was aware of what and how I was doing in the test', 'I checked my answers as I progressed in the test', 'I corrected mistakes immediately when found') were also shortlisted as relating to metacognitive strategy use in the study. In all, a total of 15 items were shortlisted from the 35 items. These 15 items constituted the strategy questionnaire used to conduct the current study. However, only 14 items were used in the analysis. Item 33 ('I determined how to solve the test') was excluded and hence did not appear in our strategy questionnaire because it did not seem to be understandable to most participants. The procedure adopted to reach this decision is

presented in the next section. Apart from changing the word ‘Thai’ to ‘Igbo’ in item 2, no other change was made to the items.

2.4. Data collection procedure

Data for the study was collected in two sessions over a period of two days. On day one, participants individually completed the Participant’s Information Sheet and Consent Form, and answered the language learning and use questionnaire. At the end of the session in day one, a copy of the strategy questionnaire to be used on the second day of data collection was presented to participants together in groups of 5. They were asked to go through it and report any item that was not comprehensible to them. Over 90% of them identified one particular item, ‘I determined how to solve the test’, as generally incomprehensible. The item was therefore excluded from the questionnaire that was used on the second day of data collection.

On day two of data collection, participants took the reading comprehension test in Igbo, after which they answered the strategy questionnaire on the passages. The reading comprehension test consisted of three passages, each followed by five multiple-choice questions. Participants had to answer the strategy questionnaire immediately after reading every passage and answering its multiple-choice questions. In other words, participants answered the strategy questionnaire three times during the data collection session to ensure that the questionnaire responses provided captured the true strategic behaviour exhibited by the participant while reading a particular passage. Participants were given the option of answering the English or Igbo versions of the questionnaire. All opted to answer the English version. Participants took between one hour and one hour and 15 minutes to fill in the test and questionnaire sheets.

2.5. Data analysis procedure

Data collected via the reading comprehension tests were converted into percentages of correct answers per participant. The questionnaire data, which were elicited with Likert scales, were analyzed based on the ordinal ratings in the Likert scales. However, because the participants answered the strategy questionnaire three times for the reading comprehension tests, the average ratings of the items in the questionnaire were used for the analysis. Data elicited from all the 25 participants were used for the analysis. All analyses were done with version 19 of the Statistical Programme for Social Sciences (SPSS) (2010). To answer the first research question, a cut-off point of .80 for equal intervals between the 5 levels in the Likert scale was set (see Akkakoson, 2013 for a similar procedure). To answer to the second research question, multiple regression analysis and one-way repeated measures ANOVA were used.

2.6. Results

Research question 1 aims at determining the RCSs reported used substantially by readers during the Igbo reading comprehension task. The mean rating of all the strategy items by the participants was used for the analysis. Tables 1 and 2 present the descriptive statistics of the students' responses to the questionnaire items used for the analysis. The statistics provided in Table 1 and 2 are based on the reported average rating for each item on the questionnaire's 5-point Likert scale. Despite the controversy on the appropriateness of analyzing Likert scale data like interval data in this manner (see Jamieson, 2004; Kuzon et al., 1996), this approach was adopted not only because of its popularity in research, but also because it has been argued that ordinal scales are reduced to interval data when they consist of sums across many

items (Carifio & Perla, 2008; Norman, 2010). Table 1 provides descriptive statistics for the ratings of the cognitive strategy questionnaire items and Table 2 for those of the metacognitive strategy items.

Table 1: Mean, standard deviation, skewness and kurtosis for cognitive strategy questionnaire items used in reading comprehension.

Cognitive item	*Mean*	*SD*	*Skewness*	*Kurtosis*
1. I translated the reading text and tasks into English to enhance my understanding.	2.16	1.375	1.048	.009
2. I tried to understand the text and questions regardless of my vocabulary knowledge.	3.00	1.291	.253	-1.257
3. I tried to find topics and main ideas of the passage without reading it in detail.	2.24	1.128	.619	-.164
4. I read the text and questions several times to better understand them.	2.96	1.060	.313	-.698
5. I used my prior knowledge to help understand the text.	2.64	.952	.192	-1.010

Table 2: Mean, standard deviation, skewness and kurtosis for metacognitive strategy questionnaire items used in reading comprehension.

Metacognitive item	*Mean*	*SD*	*Skewness*	*Kurtosis*
6. I was aware of what and how I was doing in the test.	3.20	1.258	-.273	-.780
7. I checked my answers as I progress in the test.	3.08	1.320	.078	-1.035
8. I corrected mistakes immediately when found.	2.60	1.472	.426	-1.164
9. I determined what the test questions require me to do.	2.68	1.215	.223	-.683
10. I was aware of the need to plan a course of action.	2.44	1.193	.634	-.125
11. I tried to understand the questions adequately before attempting to answer.	3.36	1.186	-.451	-.540
12. I was aware of selected strategies to help me complete the test questions before solving them.	2.71	1.367	.133	-1.375
13. I checked my accuracy as I progressed through the test.	2.96	.955	.088	-.371

14. I identified relevant information in the text to help me understand the text and answer the questions.	3.13	.992	.023	-.130

Therefore to determine the specific cognitive and metacognitive strategy items reportedly used substantially by the participants during the Igbo reading task, a cut-off point of .80 was set for equal intervals between the 5 levels in the Likert scale, following Akkakoson (2013). This enabled the researcher to determine the items that were highly scored by the students in both the cognitive strategies and metacognitive strategies investigated. It was therefore decided that:

1. a mean score of 1.00 – 1.80 would indicate that the students never use a particular strategy (the lowest level).
2. a mean score of 1.81 – 2.60 would indicate that the students sometimes use a particular strategy (the low usage level).
3. a mean score of 2.61 – 3.40 would indicate that the students often use a particular strategy (the medium-usage level).
4. a mean score of 3.41 – 4.20 would indicate that the students usually use a particular strategy (the high-usage level).
5. a mean score of 4.21 – 5.00 would indicate that the students use a particular strategy always whenever they read (the highest level).

Questionnaire items whose scores fall within levels 1 and 2 were not reported because they were deemed to be of low usage, and therefore are of no significance in the strategy repertoire of these readers during the reading task. Details of the analyses are presented in Table 3. The results in Table 3 indicate that 10 out of the 14 strategy items received a medium level of usage during the reading comprehension tests. The

distribution of cognitive and metacognitive strategy use items presented in Table 3 shows that this group of Igbo readers reported substantial use of cognitive strategy items 2 (I tried to understand the text and questions regardless of my vocabulary knowledge), 4 (I read the text and questions several times to better understand them), and 5 (I used my prior knowledge to help understand the text), and metacognitive strategy items 6 (I was aware of what and how I was doing in the test), 7 (I checked my answers as I progressed in the test), 9 (I determined what the test questions require me to do), 11 (I tried to understand the questions adequately before attempting to answer), 12 (I was aware of selected strategies to help me complete the test questions before solving them), 13 (I checked my accuracy as I progressed through the test), and 14 (I identified relevant information in the text to help me understand the text and answer the questions) during the Igbo reading comprehension task. In response to the first research question, these strategy items could therefore be described as the cognitive and metacognitive strategies that these readers used when they read in Igbo. Strategy items 1 (I translated the reading text and tasks into English to enhance my understanding), 3 (I tried to find topics and main ideas of the passage without reading it in detail), 8 (I corrected mistakes immediately when found), and 10 (I was aware of the need to plan a course of action) do not appear in Table 3 because they received low ratings from participants.

Table 3: Distribution of highly scored cognitive and metacognitive strategy items

Cognitive item	*Rating*	*Metacognitive item*	*Rating*
2	Medium usage	6	Medium usage
4	Medium usage	7	Medium usage
5	Medium usage	9	Medium usage
		11	Medium usage

	12	Medium usage
	13	Medium usage
	14	Medium usage

Questionnaire results also indicate that no strategy item was reported for high level of use. Therefore, in 81% of the time, medium usage level was reported for the cognitive and metacognitive strategies used during the reading task.

Research question 2 examines the relative contributions of reported cognitive and metacognitive strategy use to Igbo reading comprehension scores. To answer this research question, multiple regression analyses were conducted to see if cognitive and metacognitive strategies could account for a substantial amount of variance in Igbo reading comprehension scores. In the regression model, the Igbo reading comprehension score was the outcome variable, while participants' average ratings for the use of cognitive strategy and metacognitive strategy items during the reading comprehension tasks were the predictor variables (see Table 4 for the descriptive statistics of the reading scores, cognitive strategy and metacognitive strategy use).

Table 4: Mean, standard deviation, skewness and kurtosis for the reading comprehension scores, cognitive and metacognitive strategies used during reading comprehension

Variable	*Mean*	*SD*	*Skewness*	*Kurtosis*
Reading comprehension	55.36	27.720	-.073	-1.340
Cognitive strategy	2.600	.58878	.320	-.308
Metacognitive strategy	2.888	.73729	.513	.217

Before conducting the multiple regression analyses, tests were conducted to examine whether the assumptions of multiple regression analysis were met. The test for the assumption of collinearity indicated that multicollinearity was not a concern (CS, Tolerance = .959; MS, Tolerance = .959). The assumption of independent errors was also met (Durbin-Watson = 2.212). The histogram of the standardized residuals indicated that the data contained approximately normally distributed errors, as also indicated by the normal P-P plot of standardized residuals, which showed points located very close to the regression line. The scatterplot of the standardized residuals also indicated that the assumption of homoscedasticity and linearity were met in the data. Therefore, multiple regression analysis was conducted with the reported average ratings for cognitive strategy and metacognitive strategy use as predictor variables and reading comprehension scores as the dependent variable.

All predictors were entered in the multiple regression analysis simultaneously (forced entry). Results indicate that cognitive and metacognitive strategy use explains a significant amount of variance in the reading comprehension scores of the Igbo L1 readers (F (2, 22) = 4.42, p = .024, R^2 = .286, $R^2_{Adjusted}$ = .22). 28.6% of the variance associated with Igbo reading scores was jointly explained by the reported cognitive and metacognitive strategy use, with metacognitive strategy use explaining 24.1% of the variance.

Results further indicate that the reported cognitive strategy use did not significantly predict RC performance (β = -.22, t (24) = -1.19, p = .25), whereas metacognitive strategy use did (β = .54, t (24) = 2.91, p = .008). In particular, according to the multiple regression analysis, one unit increase in metacognitive strategy use was associated with .54 unit increase in RC scores in Igbo. We might therefore conclude that for this group of Igbo native speakers, the use of

metacognitive strategies but not the cognitive strategies contributed significantly to improving their reading comprehension performance in Igbo.

To gain a better insight into the effect of cognitive and metacognitive strategy use on reading comprehension in Igbo, the effect of aggregation over participants (i.e. analyzing data of distinct groups of participants as a single group), was controlled for in the ANOVA analysis conducted to compare cognitive and metacognitive strategy use between high and low performers on the reading comprehension task. According to Phakiti (2003b: 672) aggregation over participants has 'a potential to alter the findings …' in a study. Two groups of high and low performers on the reading comprehension task were created using median split (see Table 4 for the descriptive statistics of the reading comprehension scores). The participants that scored above 53% were grouped as high performers (HPs), whereas those with scores of 53% and below were grouped as low performers (LPs). Therefore, the HPs group in Igbo consists of 12 students, while the LPs group consists of 13 students. Table 5 presents the descriptive statistics of cognitive and metacognitive strategies used by high and low performers in Igbo reading tasks. The Table indicates that data in all conditions are normally distributed except for the low performers' cognitive strategy use (LPCSU) data, which are not normally distributed. Mauchly's test indicated that the assumption of sphericity has been met (X^2 (2) = 2.81, $p > .05$).

Table 5: Mean, standard deviation, and Kolmogorov-Smirnov (K-S) test of normality for cognitive and metacognitive strategy use by high and low performers in Igbo reading tasks.

Variable	*Mean*	*SD*	*K-S*	*Sig.*
HPCSU	2.60	.52570	.193	.200*

LPCSU	2.48	.53570	.253	.033
HPMSU	3.22	.76376	.227	.087
LPMSU	2.54	.59154	.135	.200*

a. Lilliefors significance correction
*. This is a lower bound of the true significance
Note: HPCSU = High Performers' Cognitive Strategy Use; LPCSU = Low Performers' Cognitive Use; HPMSU = High Performers' Metacognitive Strategy Use; LPMSU = Low Performers' Metacognitive Strategy Use.

One-way repeated-measures ANOVA was chosen to conduct pairwise comparisons of means for the groups' reported cognitive and metacognitive strategy use in reading comprehension using the least significant difference (LSD) procedure. Fisher's LSD procedure has been found to perfectly protect against inflated type 1 error rates when not more than 3 means are compared (see Hayter, 1986 & Seaman et al., 1991 for analytical and empirical explanations, respectively). On the average, they have also been found to be at least 8% more powerful than most commonly used post hoc tests like Tukey's HSD test (Seaman et al., 1991). Although the LPCSU data are not normally distributed, an ANOVA was conducted, as it is robust to the violation of this assumption (see Field, 2013: 444-5 for a detailed discussion). Table 6 presents the results of the pairwise comparisons in the one-way repeated-measures ANOVA performed on cognitive and metacognitive strategies reported by high and low performers in the reading tasks. The ANOVA result for cognitive and metacognitive strategy use reported by high and low performers on the Igbo reading tasks indicates that in general, there was a significant main effect for reported metacognitive strategy use between high and low performers on Igbo reading tasks, (f (5, 55) = 4.519, $p <$ .009).

Table 6: Results of pairwise comparisons on cognitive and metacognitive strategies used by high and low performers during the reading tasks.

Var. Contrasts	*df*	*f*	*Sig.*	*Effect size*
HPCSU vs LPCSU	1	.328	.578	0.17
HPMSU vs LPCSU	1	7.514	.019	0.64
HPMSU vs LPMSU	1	11.650	.006	0.72
HPMSU vs HPCSU	1	5.880	.034	0.96
LPMSU vs LPCSU	1	.086	.775	0.11

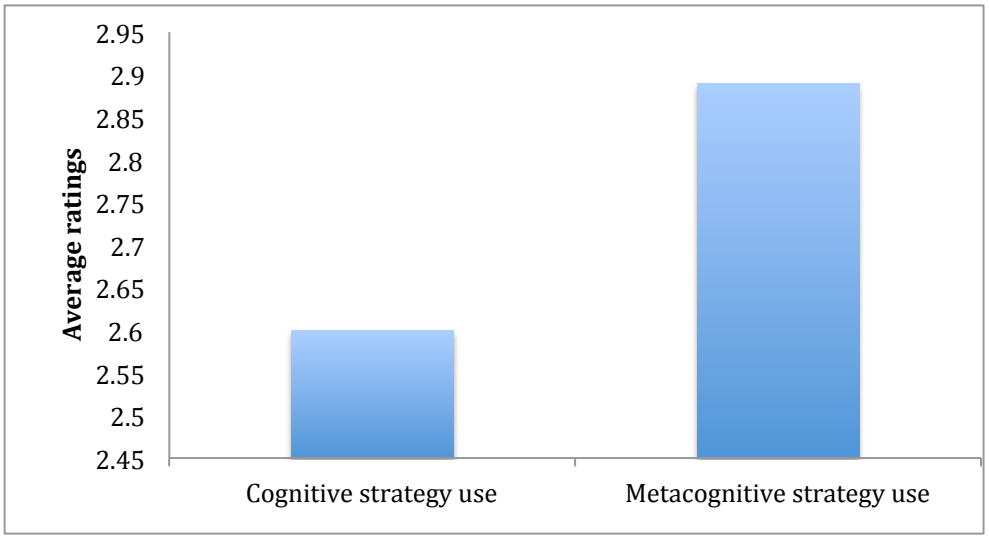
Note: HPCSU = High Performers' Cognitive Strategy Use; LPCSU = Low Performers' Cognitive Use; HPMSU = High Performers' Metacognitive Strategy Use; LPMSU = Low Performers' Metacognitive Strategy Use.

While the two groups did not differ significantly in their reported use of cognitive strategies, they exhibited significant difference in respect of their reported metacognitive strategy use.

Research question 3 investigates the cluster of cognitive or metacognitive strategies reported used most frequently by readers while processing Igbo texts. To reach decision, the first step was to plot a chart with the data for the reported use of cognitive and metacognitive strategy use to enable a visual comparison. Figure 1 is a chart showing reported cognitive and metacognitive strategy use by the Igbo readers. The chart seems to indicate that Igbo readers' reported frequency of use for metacognitive strategies appears to be higher than their reported frequency of use for cognitive strategies during the reading test in Igbo. Suggesting that readers in the study used the two clusters of strategies differently. However, this visual difference needed to be tested to ascertain whether it is statistically significant. A paired sample *t*-test was then used to statistically compare reported cognitive strategy use with metacognitive strategy use to determine if the observed visual difference in the reported use of these variables is statistically significant to warrant drawing the

conclusion that readers reported more frequent use of metacognitive strategies than cognitive strategies.

Fig. 1: Reported average use of cognitive and metacognitive strategies



The result of the paired sample *t*-test, which compared the reported use of cognitive strategies with reported metacognitive strategy use, indicated that the reported use of metacognitive strategies ($M = 2.89$, $SD = .589$) was not significantly higher than the reported use of cognitive strategies ($M = 2.60$, $SD = .737$), $t\ (24) = -1.71$, $p > .05$, by the Igbo readers in the study.

2.7. Discussion

The fact that literacy does not commence in the L1 for many Igbo native speakers, to some extent, makes reading in Igbo special for many Igbo children. For example, the participants in this study reported that their literacy experience with Igbo commenced between the ages of 10 and 20 years, which is well beyond the normal age for basic literacy in English in Nigeria, and around the world. Nonetheless, this experience with L1 literacy is often truncated shortly after since subsequent learning in schools for

these readers has to proceed in English. As a result, many Igbo L1 children are hardly proficient readers in Igbo, which tends to set them apart from L1 readers in EFL contexts, who often tend to possess well-developed reading proficiency in their L1 before commencing literacy training in English. This study therefore investigated the cognitive and metacognitive strategies used in Igbo reading by this group of readers to ascertain how they contribute to reading comprehension in Igbo.

The first research question for the study seeks to identify the cognitive and metacognitive strategies used substantially during the Igbo reading tasks by this group of native speakers of Igbo. In respect of research question 1, the study found that this group of readers reported using substantially three cognitive strategy items, and seven metacognitive strategy items during the reading task. However, the frequency of use for these strategy items was 'often' (medium-usage level). Nonetheless, their reading strategies, at the rate they reported to have used them, appear to have had positive impact on their reading comprehension. So, even when the reported use of 10 out of the 14 strategies for the reading tasks was at a medium-usage level, they appear to have contributed to better reading comprehension. However, the study also indicates that some strategy items were barely used by the readers. The result of the analysis presented in Table 3 indicates that out of the five cognitive and nine metacognitive strategy items listed in the questionnaire, cognitive item 1 ('I translated the reading text and tasks into English to enhance my understanding') was considered not used during the Igbo reading tasks. But further examination of the data in Table 1 reveals that to some extent there is a degree of disposition among the participants to use the cognitive strategy of translating from Igbo to English to facilitate their comprehension in Igbo. Although the participants did not report using this strategy substantially, it may sound strange that Igbo readers translate Igbo into English to make meaning in

Igbo. Albeit low, the mean ratings that the questionnaire item on translating from Igbo to English has received (M = 2.16) somehow suggest that some participants sometimes used this strategy. This result seems to indicate that some of these Igbo readers are more adept in L2 reading than in L1 reading, which is not strange given the place of English in communal and personal lives of Nigerians. In fact, as a direct consequence of its role as a Language of Wider Communication (LWC) in Nigeria, English has become the vehicle of thought among the various linguistic groups in Nigeria, particularly the Igbo native speakers. Due to the deep rooted nature of English in Nigeria, some argue for the existence of Nigerian English, a variety of English considered to be among one of the world Englishes (Ajani, 2007; Bamgbose, 1982; Odumuh, 1987; Ogu, 1992). So, the knowledge that some Igbo L1 readers may sometimes translate Igbo into English to enhance comprehension in Igbo could also be interpreted as indicating a unique text processing strategy which has not been reported among L1 readers in previous studies conducted in EFL contexts (e.g. Tercanlioglu, 2004; Upton & Lee-Thompson, 2001), where reading in the L1 often precedes literacy in the L2. For example, Upton & Lee-Thompson (2001) in their study, which used think aloud protocol to elicit data, concluded that L1 facilitated the readers' use of cognitive and metacognitive strategies because a substantial proportion of the strategies used by the readers were verbalized in the L1. It is most probable that readers in Upton & Lee-Thompson's study verbalized their strategies in their L1 because the L1 is where they have substantial proficiency being in an EFL context. In the case of the Igbo readers in the current study, the verbalization of substantial proportion of reading strategies used to process Igbo texts in a think aloud situation would most probably be in English. So, it could be argued that English is active in the mind of these readers even as they try to construct meaning from Igbo

texts, which to some extent tends to make processing texts in the L1 special for some Igbo readers in the ESL context of Nigeria. This phenomenon calls for further investigation using a more direct measure of strategic behaviour during text processing.

The other strategy items that the participants rarely reported used were strategy item 3 ('I tried to find topics and main ideas of the passage without reading it in detail') and item 8 ('I corrected mistakes immediately when found') during the reading tasks. Item 3 refers to the skill of scanning and skimming, and item 8 deals with double-checking during the reading process.

The second research question sought to investigate the relative effect of cognitive and metacognitive strategy use on the participants' performance in the reading task. A popular conception is that the contribution of strategy use to reading comprehension depends on the extent to which the reader is able to use strategies effectively. It is not enough to know what strategies to use; what is of great importance is being able to use them appropriately (Anderson, 1991) because '…strategies may contribute to successful comprehension or detract from it' (Cohen, 1986: 133). Therefore, it could be assumed that despite using few strategies, and at a medium-usage level, the results obtained suggest that the strategies were put to some effective use during the reading task, resulting in better achievement in reading comprehension.

However, the availability of background knowledge on the texts could also have facilitated the participants' level of reading comprehension (see Alptekin, 2006; Lee, 2007; Burgoyne, Whiteley, & Hutchinson, 2013 for the effect of background knowledge in comprehension), given that the text topics consist of information drawn from the participants' cultural milieu. Using background knowledge to aid

comprehension is considered as cognitive strategy, which could have significantly facilitated the participants' ability to form a coherent mental representation of the textual information during the reading tasks as suggested by their reported use of strategy item 5 (I used my prior knowledge to help understand the text).

Reading strategy research indicates that skilled readers use reading comprehension strategies (RCSs) differently from unskilled readers. In the current study we went further to also investigate the RCSs used by students with high and low scores in the Igbo reading tasks. The result of the repeated-measures ANOVA used for the analysis indicates that the cognitive strategies and metacognitive strategies used differed significantly between students with high and low scores in the reading tasks. Students that scored high in the reading tasks used significantly more metacognitive strategies than cognitive strategies, whereas those with low scores did not differ significantly in their cognitive and metacognitive strategy use. The result tends to suggest that the performance of the HPs on the reading task relates to high metacognitive strategy use.

This finding together with the finding that metacognitive strategy use significantly predicted reading comprehension agrees with studies, which suggest that metacognitive strategy use, facilitates reading comprehension (e.g., Schoonen et al., 1998; Tercanlioglu, 2004; van Gelderen, 2007; Young and Oxford, 1997) for L1, and (Brown, 1978; Nergis, 2013; Phakiti, 2003; Stevenson et al., 2007; Zhang & Wu, 2009) for L2. The result of the regression analysis indicates that metacognitive strategy use contributed to the reading comprehension of the students during the reading tasks, accounting for a substantial amount of the variance (i.e. 24.1%) in the reading scores. This finding provides support to the view that readers who make effective use of metacognitive strategies during cognitively demanding reading

conditions are likely to be successful readers (O'Malley et al., 1985). A close examination of the standardized regression coefficients discloses that metacognitive strategies used during the reading tasks made significant contribution to the variance in the reading comprehension scores of the students thus lending empirical support to the findings in earlier studies that metacognitive strategy use is a good predictor of reading comprehension (Guo & Roehrig, 2011; Nergis, 2013; Phakiti, 2003a, 2003b; Shoerey and Mokhtari, 2001). In the current study, 24.1% of the total variance in the Igbo reading comprehension scores was explained by metacognitive strategy use. This indicates that a significant reason for the good performance of the students in the reading tasks is attributable to the students' use of metacognitive strategies. For scholars like (Akkakoson, 2013; Dabarera, Renandya, Zhang, 2014; Lubliner and Smetana, 2005; Salataci and Akyel, 2002;), who through their studies have advocated in favour of strategy instruction, this finding could constitute an additional reference. The finding therefore further demonstrates the unique effect that metacognitive strategies could have on reading comprehension when they are efficiently put to use.

The third research question sought to determine the cluster of strategies (cognitive or metacognitive) that readers reported using most frequently while processing Igbo texts. The study established that the reported level of use for cognitive and metacognitive strategies did not differ significantly during the reading task. The result suggests that the Igbo readers generally used cognitive and metacognitive strategies almost in similar manner while processing Igbo texts. Using cognitive and metacognitive strategies to process L1 texts in this manner tends to suggest that this group of L1 readers processed L1 texts differently from readers in some previous L1 studies conducted in the context of EFL. For example, Stevenson et al. (2007) reported that cognitive and metacognitive strategies were not significantly

used in L1 text processing by readers in the study. However, Young & Oxford (1997) and Tercanlioglu (2004) reported that only metacognitive strategies were used substantially to process L1 text by readers in their study. It is clear that results from the studies mentioned indicate difference in the strategic behaviour of the readers in those studies and the Igbo readers in the current study. Given these results therefore, it is probably plausible to assume that reading in L1 for the Igbo native speaker in Nigerian ESL context could diverge from other L1 reading situations in EFL contexts. More research is therefore needed to ascertain how L1 reading differ in EFL and ESL contexts where English is a lingua franca.

2.8. Conclusion

It is often not clear to teachers why some students exhibit very low rates of comprehension. The absence of this knowledge leaves such students at the mercy of fate, given that teachers are unable to provide the right form of help to such students. For the same reason also designers of reading programmes for schools may fail to articulate adaptive reading programmes that could help students in this situation. The result is that teachers are confronted daily with the 'maddening experience of having a student who appears to understand every sentence and yet cannot answer the simplest question about a passage as a whole' (Eskey, 1973: 177).

What this study was particularly designed to accomplish was to create awareness of the significant function of RCSs in reading comprehension, be it in the L1 or the L2, particularly for students and language teachers in Nigeria where the traditional method of teaching reading still persists in classrooms. The study was however limited by the fact that a questionnaire rather than more direct methods of strategy identification during reading was used to elicit data for the study, which

raises concern that social desirability or knowledge from other sources could have affected the questionnaire responses provided by the participants. Another limitation is sample size, and the fact that the taxonomy of cognitive and metacognitive strategies investigated in the study does not constitute a comprehensive representation of the possible reading strategies that readers may employ during reading tasks. Nonetheless, the study has hinted on the possibility that L1 reading in different bilingual contexts could diverge. It also demonstrated that poor RCS use has some consequence on the performance of students in the task of constructing meaning from texts in one of Nigerian's native languages. Therefore, since reading strategies are teachable constructs, providing such instruction to students constitutes a viable way of facilitating the students' rate of comprehension even during L1 text processing. The potential of RCSs in the improvement of students' performance in reading comprehension needs to be exploited. It is virtually an untapped resource in the educational system of Nigeria.

2.9. References

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Appendix A: Biodata data questionnaire

About the Questionnaire

This questionnaire is designed to elicit some background information about the students participating in this study. Please be assured that all information provided will be treated as confidential. I sincerely appreciate your decision to be a participant in this study.

Please note that there are no right and wrong answers to the questions in the questionnaire, so feel free to provide the answers that you deem right.

Questionnaire

Please take a little time and respond to all the questions in this questionnaire. You are free to seek clarification where you are in doubt. Tick as appropriate please. You are also free to tick as many answers as you think appropriate in each question.

1. Which is your native language?

Igbo□ Hausa □ Yoruba □ English □ None □

2.Which other languages do you also speak?

Hausa □ Yoruba □ English □

Others_____(Pls. name the languages)

3. At which age did you start learning English? _____

4. Please rate your *Reading Ability* in English *Language* using the scale below:

No ability (0) ☐ Low (1) ☐ Fairly low (2) ☐ Fairly high (3) ☐ High (4) ☐ V. High (5) ☐

5. Can you read in your native language? **Yes ☐ No ☐**

6. At which age did you start learning to read in your native language? _____

7. Please rate your *Reading Ability* in your *Native Language* using the scale below:

No ability (0) ☐ Low (1) ☐ Fairly low (2) ☐ Fairly high (3) ☐ High (4) ☐ V. High (5) ☐

8. Which language(s) do you speak at home? _____(**Pls. name the languages**)

9. In which of these other languages can you read?

Hausa ☐ Yoruba ☐ English ☐ Others ---------- (Pls. name the languages)

10. Please rate your *comprehension Ability* in your *Native Language* using the scale below:

No ability (0) ☐ Low (1) ☐ Fairly low (2) ☐ Fairly high (3) ☐ High (4) ☐ V. High (5) ☐

11. Please rate your *comprehension Ability* in English *Language* using the scale below:

No ability (0) ☐ Low (1) ☐ Fairly low (2) ☐ Fairly high (3) ☐ High (4) ☐ V. High (5) ☐

Participant Information

What is your Registration Number? _____

What is your subject combination? _____

What is your class level? _____

How old are you? _____

Do you have any hearing problem? **Yes** □ **No** □ If YES please say the nature of the hearing problem_____

_____

Do you have problem with your vision? **Yes** □ **No** □ If YES please say the nature of the vision problem you have _____

_____

Do you have problem with reading texts? **Yes** □ **No** □ If YES please say the nature of the problem _____

_____

Please indicate your gender **Male** □ **Female** □

Please give your phone number. _____

Thank you for volunteering to participate in my study.

Appendix B: Igbo RC passages

Jiri nwayọọ guọ ederede a ma zaa ajụjụ so ya.

EDEREDE I

Agha ripiara ihe niile Ezeudo rutara n'ọru bekee kemgbe ọgụ afọ na iri. Ọ na-elezi anya ịla ezumike nka mgbe agha dobiri. Ndị nwere ohere kwakọrọ ihe ha gbawa ọsọ ndụ site Oduma gbagawa Udenta mana ndị o ribidoro zọwara naani isi onwe ha. Maazị Ezeudo ejighi nta, o jighi imo lọta. Mana ndị obodo ya kelere Ọlisa bi n'igwe niihi na o ji ndụ ya lọta n'obodo ha. Na nghọta ha, onye ji ndụ ji ihe niile. Ezeudo hụrụ ọnọdụ ya dika ọ dị ndụ ọnwụ ka mma. Ọ jiri eze were kpere ekwere nke na onye hụrụ ya ga-amata na nwoke na-apị ụkwa na ọrụ na-eme.

Ihe Maazị Ezeudo gabigara tupu agha a akwụsị abụghị ihe e ji ọnụ nkiti ako. E wezụga enyemaka ndị ọchịchị site n'ibunye ndị mmadụ ihe oriri dị iche iche n'efu, oke ọsịsị kara ịdaru ala. Nwaamadị a bụ onye nwere ako na uche ma burukwa onye hụrụ ndị obodo ya n'anya. Ọ bụ eziokwu na aku na uba ya efuchaala mana amamiihe ya efughi. Agha a nọrọ naani ọgụ afọ na iri were kwụsị mana onye lere Maazị Ezeudo anya n'ahụ pụrụ ịgụta ọkpụkpụ ya ọnụ. Ọ teghị aka, ihe a nụrụ bụ na agha ebeela.

Ozigbo agha kwụsịrị ndị Amokwe họputara ya ka ọ burụ eze na-achị obodo ha niihi na eze ha nwụrụ anwụ mgbe a na-alụ agha. Ndị ọchịchị wuru ya ụlọ nwere agba ma bunyekwa ya ugboala bụ ichaka nke ọ ji akpaghari. Onodụ a mere ọ jiri chefuo ajọ ihe niile ọ gabigara mgbe a na-alụ agha. Ọ jiri amamiihe ya na itu egwu Chukwu were chia ndị obodo ya otutu afọ tupu o bulara chi ya ụkpa. Mmemme olili na okwukwa ozụ ya bụ ọpụrụ iche n'obodo Amokwe. Ọha obodo niile zuru oke ụbọchị ahụ. Ihe oriri na nke ọñụñụ bụ atụrụ taba.

Zaa ajụjụ ndị a:

1. N'ederede a, oke ọsịsị kara ịdaru ala na-egosi na Maazị Ezeudo…

   A . kara inwụ onwụ
   B. ịta oke ahụhụ
   C. iso luọ ọgụ
   D. igbu osisi

2. Ọgụ afọ na iri pụtara gịnị?

   A. iri abụọ na iri
   B. ọgụ iri
   C. iri ọgụ ato
   D. iri ato

3. kedu aha obodo Maazị Ezeudo?

   A. Udenta
   B. Amokwe
   C. Oduma
   D. Osisioma

4. Otu n'ime ihe ndị a ka ndị ọchịchị emeghị n'ederede a

   A. iwuru eze obodo ulọ
   B. ibute ihe oriri mgbe agha
   C. ikwụsị agha

D. ịzụtara eze obodo ụgbọala

5. Ihe oriri bụ atụrụ taba dịka ọ dị n'ederede a gosiri na ihe oriri…

A. atụrụ juputara
B. ezughị oke
C. dị otutụ
D. bụ nke atụrụ ga-ataba

Ederede II

Naịjirịa bụ obodo ọma nke Chukwu goziri nke na mmiri ara ehi na mmanụañụ na-asọputa ebe dum n'ikem n'ikem. E nwere agbụrụ ato mejuputara ya dịka; Hausa, Igbo na Yoruba. Nke ọ bụla n'ime ha ato nwegbadoro obodo nta dị iche iche mebere ya. Malite n'afọ 1960 ruo 2011, Naịjirịa bụ obodo a mara ama dị ka ndị e jiri udo na ịdị n'otu mara. Mana ugbu a, tigbuo zogbuo meziri obodo a echeta ebewe. Onọdụ a mere onye ọ bụla taa kpuchie onụ. Nke mere na nne amaghịzị nwa nke nwa ji ama nne ya. Onye ọ bụla na-eze mmadụ ibe ya ka onye bụ ọrịa ekpenta.

Na Hausa, ndị Boko Haram na-ahịọtụ. N'ala Igbo, ndị ntọrị ekweghị mmadụ ñụọ mmiri tọgbọ iko. Na Yoruba, ndị ohi were onọdụ ebe ahụ. A ga-ekwu ole ghara ibe ya. Mpaghara obodo ọ bụla nwere ihe mmekpa ahụ ndị niile bi n'obodo ahụ ji ata ikekere eze. Ka o sila dị, ihe abụọ ma ọ bụ karịa dị njọ ga-enweriri nke ka ibe ya jokarịa njọ. Book Haram karisiri jọọ njọ n'ime nsogbu ndị a chere Naịjirịa aka mgba. Book Haram amaghị ọgaranya nke o ji ama okenye, ọ maghị nwoke ma ọ bụ nwaanyị, nwata ma ọ bụ okenye. Ọ na-eji ogbu n'igwe akụpịasị ndụ mmadụ na akụ na ụba pịapịa ka ebe a na-alụ agha.

Onụọgụ akụ na ụba na ndụ mmadụ Boko Haram mebiri bụ agụgịde agba awara. A na-ekwu nke emere unyịa, a na-anụ ebe ọ na-akpọtụ ozigbo ozigbo ahụ, a nọrọ na ya na-enwetakwa ozi ebe a siri na ha ga-aga wakpuo n'oge adighị anya. Ọ dị mkpa ka ndị ọchịchị obodo na ndị Mba Ụwa mara otu ha ga-esi mee ka ajọ onọdụ a kwụsị tupu ihe mmadụ aghoo ihe onye ọzọ. E mee ngwa ngwa emeghara ọdachị. Ọ dighị mma mmadụ nkịtị Chukwu kere ibụ ọgbata uhie n'ebe mmadụ ibe ya nọ. Udo ka mma. Udo na-ebute ọganiihu, ogologo ndụ, ahụ ike na ezigbo mmekọrịta n'etiti mmadụ na ibe ya.

Zaa ajụjụ ndị a:

1. Dịka o siri dịrị n'ederede a, '…ekweghị mmadụ ñụọ mmiri tọgbọ iko' pụtara gịnị?

A. ekweghị mmadụ ñụọ mmiri
B. ekweghị mmadụ zụọ ike
C. ekweghị mmadụ togbo iko
D. ekweghị mmadụ ahụ ndị ntọrị

2. Kedu mpaghara obodo ihe mmekpa ahụ ha karịsị jọọ njọ?

A. Hausa
B. Igbo
C. Yoruba
D. Naịjirịa

3. Otu n'ime ihe ndị a esoghị na nsogbu chere Naịjirịa aka mgba

A. Boko Haram
B. ntọrị
C. ohi
D. iri ngarị

4. Agụgide agba awara dịka ọ dị n'ederede a bụ

A. ijeri
B. nde
C. adighị ọgụgụ
D. puku

5. N'uche gị dịka nwaamala Igbo, kedu aha a ga-enye ederede a?

A. Naịjirịa na tigbuo zogbuo
B. Boko Haram na Naịjirịa
C. Ọnọdụ Naịjirịa taa
D. Naịjirịa ụnyịa na taa

EDEREDE III

Ndị enyi abụọ, Ikenna na Ugwu kpebiri na ha ga-ele ule e ji aba mahadum. Ugwu hoọrọ uloakwụkwọ dị n'Alaocha dika ebe ọ ga-ele ule mana Ikenna hoọrọ uloakwụkwọ dị n'imeobodo. Mgbe ọbụla, Ugwu nọ na-agụ akwụkwọ ya maka ule ha na-abịa nso; Ikenna nọ na-egbu oge. O jighị akwụkwọ ya kpọrọ ihe.

Mgbe oge e ji ele ule ruru, Ikenna gara ebe ahụ o tinyere ule, kwụọ nnukwu ugwọ ruru puku Naira iri na ise maka okwe ule a ga-ewetara ya. Ka ụbọchị ahụ ruru, ha gara ebe ule ha dị iche iche. Ugwu lere ule ya dika ọ kwesịrị ma Ikenna ruru ebe nke ya, eke etie ya. Ihe ọ turu anya ya abughị ihe ọ hụrụ. Ndị na-ele ha ule kpachisịrị ebe niile. Okwe ule agbaghị dika o si chee. Nke a mere na ọ chịtaghị aja n'ule ahụ.

Mgbe rizoltụ pụtara, Ugwu gafere n'ule ahụ ebe Ikenna kụrụ afọ n'ala. Ihe a turu Ugwu n'anya nke mere ka ọ jụọ Ikenna ihe butere ọdida ya. Ikenna zara ya si: "Nnaa, agara m ebe m chere na ma ga-enwete enyemaka ule mana ebe niile kpachịrị akpachi, amakwaghị m ihe m dere. Nke a mere …." O kwuchaghị, Ugwu a jụọ ya: "Kedu ka ị ga-esi rie ebe ị na-arụghị ọrụ?"

6. Mmadụ abụọ a kpọrọ aha n'ederede a bụ

A. agbataobi
B. umunne
C. ẹnyi
D. ọgọ.

7. Ihe a kọrọ maka ya bụ etu mmadụ abụọ a siri

A. banye mahadum
B. gụọ akwụkwọ
C. mee mpụ
D. lee ule.

8. Ihe mere Ikenna jiri daa ule ya bụ na

A. ọ gụghị akwụkwọ ya
B. ọ kwughị ugwọ a sị ya kwụọ
C. ọ gaghị ule ahụ n'oge
D. o deghị ihe ọbụla.

9. N'ederede a, "ọ chịtaghị aja n'ule ahụ" pụtara Ikenna

A. edeghị ule ahụ
B. agụghị akwụkwọ maka ule ahụ
C. akwadoghị onwe ya nke ọma maka ule ahụ
D. edetaghị ihe n'ule ahụ.

10. Puku Naịra iri na ise pụtara

A. ₦150.00
B. ₦150,000.00

C. ₦1,500.00
D. ₦15,000.00

Chapter 3

3. Exploring the reading comprehension strategies of ESL learners: the role of second language vocabulary size and proficiency

Abstract

The role of vocabulary knowledge in reading comprehension strategy (RCS) use during reading in the second language has only been examined in one EFL study in which reading strategy use was measured as trait strategy use rather than state strategy use. This study investigated how second-language (L2) vocabulary size and proficiency affect the use of state RCSs in an English as a Second Language (ESL) setting. Twenty-seven Igbo ESL students, from a teacher training college in Nigeria participated in the study. The participants took the grammar section of the Oxford Placement Test (OPT) (Allan, 2004), and the Vocabulary Size Test (Nation & Beglar, 2007). On a later day, they read three passages with multiple-choice questions, and answered a reading comprehension strategies questionnaire after reading each passage. Results indicate that although vocabulary size and L2 proficiency do not predict RCS use, high vocabulary size was significantly related to high use of cognitive reading strategies and low vocabulary size to low use of cognitive strategies. Finally, RCS use was not significantly related to reading comprehension, nor did L2 proficiency relate to RCS use. The findings on the relationship between vocabulary size and use of cognitive strategies was interpreted to support the claim that cognitive strategies (CSs) are knowledge based, and they rely heavily on the

linguistic competence of the reader (Phakiti, 2003). The pedagogical implications of the study are discussed.

3.1. Introduction

Several studies indicate that RCS use is vital for reading comprehension (e.g., Chen et al., 2009; Guo & Roehrig, 2011; Nergis, 2013; Sheorey and Mokhtari, 2001). Researchers have, consequently, investigated the determinants of RCS use. L2 proficiency has consistently been found to predict RCS use, explaining between .30 and .78 of the variance in strategy use (Anderson, 2005).

Although studies exploring the relationship between L2 proficiency and RCS provide valuable information on the relationship between RCS use and L2 proficiency (e.g., Ghafournia & Afghari, 2013; Phakiti, 2003b; Rahimi et al., 2009; Sarig, 1987; Zhang & Wu, 2009), it is still unclear what role vocabulary knowledge plays in RCS use, given its role in L2 reading proficiency (see Brisbois, 1995; Kim & Cho, 2015; Milton, 2013; Zhang, 2012). It has been suggested that RCS use could be a function of vocabulary and encyclopedic knowledge (Anderson, 1991). In fact, research suggests vocabulary knowledge affects the number and type of lexical inferencing strategies used by L2 readers during L2 reading comprehension (see Calvo, 2005; Nassaji, 2004;).

It has also been claimed that the ability to use background knowledge (a cognitive strategy) during reading depends on vocabulary knowledge. For researchers like Fisher and Frey (2009), vocabulary knowledge is an indicator of learners' background knowledge. It is also associated with the use of certain problem-solving strategies in cases of a breakdown in constructing meaning from text (Cromley & Azevedo, 2007).

However, apart from studies that specifically explored the unique contributions of vocabulary knowledge to the use of strategies of lexical inferencing and background knowledge use, studies that investigated the possible contributions of vocabulary knowledge to RCS use in general have not been conducted. The purpose of this study therefore is to determine the effect of L2 vocabulary size and proficiency on RCS use. The next section explains the construct of RCSs, while the subsequent section provides explanation on how cognitive and metacognitive strategies relate to reading comprehension.

3.1.1. Reading comprehension strategies (RCSs)

Most researchers have distinguished learner strategies into two types, 'learning strategies' and 'use strategies' (but see Bialystok, 1990). 'Learning strategies' are used for language learning or acquisition, and 'use strategies' are employed by learners to enhance performance (Phakiti, 2003). RCSs constitute use strategies. They have been defined as 'the conscious actions readers use to repair breakdowns in comprehension (cognitive strategies) or the deliberate actions readers use to monitor and oversee those attempts at repair (metacognitive strategies) (McNeil, 2011: 885, citing O'Malley and Chamot, 1990).

Defining reading strategies as conscious and deliberate behaviour derives from the constructivist self-control theory of information processing, proposed by Gagné et al. (1993). Within this theoretical understanding of human information processing, reading strategies are conceived as 'deliberate, goal-directed attempts to control and modify the reader's effort to decode text, understand words, and construct meaning of text' (Afflerbach et al., 2008: 368). Since strategies are conscious and deliberate behaviours, strategic readers are able to examine their strategy use, monitor its

effectiveness, and revise set goals and means if required (Afflerbach et al., 2008). The flexibility and adaptability that is involved in strategy use is one factor that distinguishes RSs from reading skills. Another is the 'element of choice involved in their selection', which Cohen (1986: 239) argues also distinguishes them from other processes. The reader's ability to examine strategy use, monitor its effectiveness, and revise set goals during the reading process is a kind of metacognitive processing.

In the current study the operationalization of RCSs follows Phakiti's (2003) categorization of cognitive and metacognitive strategies. Cognitive strategies (CSs) 'relate to the target language and world knowledge of the learners, which allow them to construct meaning from text, and to perform the given task', while metacognitive strategies (MSs) 'relate to self-management or self-regulation in a given reading activity' (Phakiti, 2003: 651). In Phakiti's categorization, which was inspired by the strategy taxonomy proposed by O'Malley & Chamot (1990), CSs consist of 'making predictions, translating, summarizing, linking with prior knowledge or experience, applying grammar rules and guessing meaning from context', while MSs consist of planning and monitoring strategies. Planning strategies involve previewing or overviewing a task to decide on a course of action. Monitoring strategies involve actions like checking, monitoring and evaluating one's thinking and reading performance.

3.1.2. Cognitive and metacognitive strategies in L2 reading comprehension

The effect of cognitive and metacognitive strategy use on L2 reading comprehension has been explored in several studies. Most of those studies (e.g. Guo & Roehrig, 2011; Nergis, 2013; Phakiti, 2003a, 2003b; Shoerey and Mokhtari, 2001; Yau, 2009;)

found an effect for cognitive and metacognitive strategy use on L2 reading comprehension. For example, Yau (2009) found a significant positive effect for cognitive strategies on reading comprehension in the L2, while metacognitive strategy use was positively but not significantly correlated with reading comprehension performance in the L2. Guo and Roehrig (2011) also found an effect for cognitive and metacognitive strategy use on reading comprehension using structural equation modeling (SEM). However, while the structural path from L2 language (vocabulary and syntactic knowledge) to L2 reading comprehension was significant, the path from metacognitive strategies to L2 reading comprehension was not significant although they were highly correlated. The researcher attributed the non significant relationship between metacognitive strategy use and reading comprehension to the effect of the linguistic variables (vocabulary and syntactic knowledge) that were jointly investigated in the study. By contrast, Nergis (2013) found that metacognitive reading strategy was the strongest predictor of academic reading comprehension.

Evidence from studies on strategy instruction also provides support for the effect of cognitive and metacognitive strategy on reading comprehension. Salataci and Akyel (2002) investigated the effect of strategy instruction and use on the L1 and L2 RCS and reading comprehension of Turkish EFL students. Results suggested that following RS instruction the students' L1 and L2 RCS use improved and their reading comprehension scores increased. However, this study was silent on the mediating effect of language proficiency levels, which has been found to play a role in strategy use.

Akkakoson (2013) investigated the relationship between strategy instruction, learning of L2 RCS use and English reading achievement through a quasi-experiment with Thai university students. While the reading comprehension scores of the control

group did not improve during the course of the study, the reading comprehension scores of the experimental group showed a significant improvement. The study also found that the explicit strategy instruction given to the experimental group resulted in the readers' 'greater metacognitive awareness of the need to be strategic and monitor comprehension' (Akkakoson 2013: 442).

In Dabarera, Renandya, and Zhang (2014) Singaporean students' metacognitive strategy awareness and use improved through instruction, which in turn led to an increase in the reading comprehension scores of the ESL students. The study found a positive correlation between metacognitive awareness and use and increase in reading scores of the Singaporean students.

Finally, Lubliner and Smetana (2005) investigated the effectiveness of a metacognitive strategy instruction program, Comprehensive Vocabulary Development, in increasing reading comprehension and vocabulary acquisition. The study found that metacognitive instruction led to a significant gain in vocabulary and reading comprehension for the low-performing school children.

Studies reviewed so far provide some evidence of the effect of RCS use in predicting reading performance, which appears to be of unique importance to reading strategies researchers. However, how RCS use is affected by factors like vocabulary knowledge and proficiency, particularly when the effect of vocabulary knowledge is partialled out in a regression model is not well understood. Therefore the role of proficiency in relation to the use of RCSs is the focus of the subsequent discussion.

3.1.3. L2 proficiency and reading comprehension strategy use

In the field of reading strategy research, several studies have demonstrated that strategic competence could be a function of L2 proficiency. Even in situations that

high-proficiency and low-proficiency L2 readers have been found to use the same types of reading strategies (see Anderson, 1991; Yang, 2002; Zhang et al., 2008) high proficiency readers have been found to use a higher variety of strategies and to use strategies more effectively (Pressley & Afflerbach, 1995). Therefore strategic competence, as an attribute, has consistently been associated with reading proficiency. Consequently, poor and good readers are not only distinguished by the levels of linguistic competence they possess, but also through the varying levels of strategic competence exhibited during reading. Reading proficiency therefore emerges as a convergence of linguistic and strategic competence. These two levels of competence are essential components of communicative language ability (Bachman, 1990). Hence in the extended compensatory model of L2 reading, it is posited that strategic knowledge and L2 language knowledge constitute essential sources of knowledge in L2 reading (McNeil, 2012).

In RCS research, the quality and quantity of use of certain RCSs is associated with levels of reading ability and success. For example, Phakiti (2003b) found that highly successful L2 readers use significantly more cognitive and metacognitive strategies in reading than low unsuccessful L2 readers. Phakiti (2003b: 670) also claims that 'less successful learners choose less effective strategies and use them less effectively than more successful learners'. According to Baker and Brown (1984) cited in Yau (2009: 218) 'while reading, good readers employ not only more CSs, but also high-level strategies'. High-level strategies indicate MSs, which studies have shown are more regularly and efficiently employed by good readers (see Rasekh & Ranjbary, 2003; Zhang et al., 2008; Zhang & Wu, 2009). Studies (e.g., Nergis, 2013; Sheorey and Mokhtari, 2001) posit that the ability to regulate the use of cognitive and metacognitive strategies is a hallmark of skilled readers.

Several studies provide evidence of how RCS use relates to L2 proficiency (e.g. Block, 1986; Ghafournia & Afghari, 2013; Phakiti, 2003b; Rahimi et al., 2009; Sarig, 1987; Zhang & Wu, 2009). Block (1986) found that even within a group of poor readers that failed a college reading proficiency test, the ESL learners who were 'integrators' ('subjects who […] were generally aware of text structure, and monitored their understanding consistently and effectively' (p. 482)) performed better in reading comprehension and were found to use RCSs differently from 'non-integrators' (subjects who 'seemed to rely much more on their personal experiences to help them develop a version of the text' (p. 482)). The fact that these participants exhibited variation in the use of RCSs is notable because it provides evidence of how readers with different proficiency levels, as indicated by the participants' scores on standardized reading tests and their first semester grade point average, could diverge in their use of reading strategies. It suggests that divergence in reading proficiency will almost certainly be partly a function of strategy use.

Several studies (e.g. Ghafournia & Afghari, 2013; O'Malley & Chamot, 1990; Phakiti, 2003b; Zhang & Wu, 2009) suggest that L2 proficiency has a significant effect on RCS use. In most of these studies, proficiency was vaguely measured using participants' performance on the reading comprehension tasks provided for the studies. Measuring proficiency in this way could be problematic because performance in a reading comprehension task may not be a true reflection of L2 proficiency. Studies (e.g. Ulijn & Strother, 1990; Zhang, 2012) have suggested that performance at a reading comprehension task is not related to L2 grammatical knowledge, which is an aspect of L2 proficiency. It may therefore be logical to assess L2 proficiency with a distinct measure of L2 proficiency, and then compare the readers' use of reading strategies during the reading task with their performance in the proficiency test to

determine how the two relate. The current study addresses this concern by incorporating explicit measure of L2 proficiency in the study design.

Some studies found no evidence of any differences in the strategy use of successful and unsuccessful L2 readers (e.g., Rahimi et al., 2009; Sarig, 1987). For example Rahimi et al. (2009) suggested that L2 proficiency played no significant role in the use of RCSs operationalized as contextual strategies (strategies used to identify the syntactic structure for textual cohesions during the construction of meaning from texts), and intratextual strategies (strategies that primarily use lexical constituents of a text to enable meaning construction) (Chavez, 1994) in their study. However, Sarig's finding has been criticized for the level of L2 proficiency of the participants in the study, which has been described as low. The point is that within the framework of the 'threshold hypothesis' it is suggested that the transfer or application of strategic competence is a function of the attainment of a certain level of L2 proficiency (Alderson, 1984), which studies have shown to be the case. For example, while Guo and Roehrig (2011) found that metacognitive awareness was not as important as other predictors (L2 syntax and vocabulary) in predicting reading comprehension for less advanced EAP learners, Nergis (2013) found that the strongest predictor of academic reading comprehension for her advanced ELT students was metacognitive reading strategies.

Given the discussion above, it may be plausible to argue that the relationship between L2 proficiency and the use of RCSs is not yet well established. This assertion is predicated on the fact that L2 proficiency was not explicitly measured in most of the previous studies. The conflicting findings in those studies further corroborate this position, hence justifying the current investigation. Similarly, not much is known about the role of vocabulary knowledge in the use of RCSs in ESL reading

comprehension, given the virtual absence of studies that investigated this relationship particularly in ESL context. Vocabulary knowledge and strategic knowledge constitute knowledge sources within the framework of the compensatory model of L2 reading (Bernhardt, 2005; McNeil, 2012), which ESL readers draw on to enable meaning construction in the L2. Therefore, examining how these two knowledge sources relate during text processing in the L2 could significantly contribute to our understanding of ESL reading within the proposed compensatory model of L2 reading. At this juncture, a review of the contribution of vocabulary to RCS use is examined.

3.1.4. Vocabulary size in reading comprehension strategy use

The role of vocabulary in L2 reading comprehension is well established, but its role in the use of RCSs is not. Some researchers have reported that increase in a reader's vocabulary size leads to an increase in the frequency of RCSs used (Brisbois, 1995; Nassaji, 2004). For example, Brisbois (1995: 578) claims that 'as L2 vocabulary knowledge gradually increases, and readers gain in automaticity, various reading strategies and skills can be used more and more', while Nassaji (2004) claims that vocabulary knowledge increases the lexical inferencing strategies that readers employ. Others argue that the ability to use background knowledge or to predict meaning during the reading process is also affected by the readers' vocabulary knowledge (Koda, 1989; Strother & Ulijn, 1987).

However, how vocabulary knowledge relates to RCS (cognitive and metacognitive) use in general during ESL reading, to the best of my knowledge, has not yet been investigated. Previous studies have tended to focus specifically on the role of vocabulary knowledge on the strategy of lexical inferencing, but not on the

role that the knowledge of vocabulary could play in the reader's ability to use other cognitive and metacognitive strategies during L2 text processing. These studies have suggested that readers' ability to infer the meaning of words is related to their vocabulary knowledge (Calvo, 2005; Nassaji, 2004). For example, Nassaji (2004) investigated how L2 learners' depth of vocabulary knowledge relates to the degree and type of the lexical inferencing strategies that they use in reading comprehension. It was found that participants with strong depth of vocabulary knowledge use certain types of lexical inferencing strategies more frequently and more effectively than those with weak depth of vocabulary knowledge. Depth of vocabulary knowledge was also found to contribute significantly to successful inferencing.

Therefore, the relationship between vocabulary knowledge and the use of lexical inferencing strategies, considered to be cognitive strategies (Phakiti, 2003b), tends to suggest that there is a gap in literature on the role of vocabulary knowledge in the use of other CSs, during reading comprehension. CSs, which according to Phakiti (2003b: 651) include 'translating, summarizing, applying grammar rules, guessing meaning from context' are reading processes that require a certain degree of vocabulary knowledge. For example, Chou (2013: 187) reported that unfamiliar vocabulary in the text read by the participants in his study 'resulted in a higher frequency of certain CS uses'. However, due to a virtual absence of studies that explored the effect of vocabulary knowledge on the use of cognitive and metacognitive strategies in ESL and EFL reading strategy literature, not much is known about how L2 vocabulary knowledge could predict the use of reading strategies.

To the best of my knowledge, Al-Nujaidi (2003) is the only study investigating the relationship between vocabulary sizes and reading strategy use in the

context of EFL reading comprehension. It examined, among other things, the relationship between vocabulary knowledge and RCS use of first year EFL learners in Saudi Arabia. The researcher reported that participants with larger vocabulary size reported using reading strategies more frequently than their counterparts with low vocabulary size. The high and middle vocabulary proficiency groups in the study 'showed more frequent use of all types of reading strategies than the low vocabulary proficiency group' (Al-Nujaidi, 2003: 119). Al-Nujaidi (2003: 147) concluded that 'extensive vocabulary knowledge seems to trigger successful use of appropriate reading strategies'. However, this study tended to have measured the readers' 'trait' reading strategies, and not their 'state' reading strategies. This suggestion is predicated on the fact that participants were asked to report on their reading strategies by responding to a reading strategies survey questionnaires before attempting the reading comprehension tasks. It is therefore doubtful how the strategies reported by the participants before embarking on the reading tasks could be deemed objective measure of the actual strategies employed by the readers during the reading task.

The current study aims to see whether Al-Nujaidi's (2003) conclusion can be generalized to a population of ESL speakers, namely Igbo native speakers of English even when readers' 'state' reading strategies are measured. In order to ensure an effective assessment of the relationship between vocabulary size, L2 proficiency, and the use of RCSs, the current study investigates how these variables relate to the use of a specific cluster of cognitive and metacognitive strategies during a reading comprehension task. The cognitive and metacognitive strategies investigated are associated with reading comprehension during EFL text processing in test taking condition. The aim is to as much as possible establish specific clusters of state cognitive or metacognitive strategies that are related to ESL readers' vocabulary size

and L2 proficiency as they process texts in the L2. The research questions that guided the study are as follows:

3.2. Research questions

1. Which are the RCSs used by teacher training students who are native speakers of Igbo, during L2 reading tasks?
2. What is the relative effect of cognitive and metacognitive strategy use on reading comprehension for the Igbo ESL speakers?
3. Which is the relative effect of L2 vocabulary size, and L2 proficiency levels on the cognitive and metacognitive strategies used by teacher training students, who are native speakers of Igbo, during L2 reading?

3.3. Method

3.3.1. Participants

The study was carried out in a College of Education in Nigeria. The participants in the study consist of 27 students from the College, 4 males and 23 females, who were enrolled in either art or science related courses. Their average age was 26.5 years (*SD* = 3.896), and they had been studying in the College for a period of one to three years (*M* = 1.96, *SD* = .854).

To elicit information on their English language use and acquisition, a language learning, use and acquisition self-report questionnaire with a five-point Likert scale was administered (see Appendix A). The aim was to ensure that the participants qualify to be classified as ESL speakers. The questionnaire was also intended to identify participants that could be afflicted with any form of impairment (e.g.

dyslexia, visual or hearing problems), which could negatively affect their performance on the tasks. 14 of the participants reported speaking Igbo language exclusively at home, 10, reported speaking a combination of Igbo and English, while 2 reported speaking Igbo, English and Hausa at home. Only one participant reported speaking only English at home.

All the participants reported to have started learning reading in English before the age of eight, whereas only 9 of the participants reported that they started learning reading in Igbo by the age of eight. In fact, 18 reported to be within the ages of 15 and 20 years the time they started learning to read in Igbo. Two participants failed to indicate the age at which they started learning to read in Igbo. None of the participants reported being dyslexic, nor did any report having any hearing or visual impairment.

All the participants voluntarily agreed to participate in the study. They were given ₦1,000 worth of global system for mobile communication (GSM) top-up for their participation.

3.4. Procedures

The researcher embarked on this investigation after obtaining ethical approval from the University of Essex. Data for the study was then collected in two sessions over a period of two days. On day one, participants used 10 minutes to complete the Participant's Information Sheet and Consent Form. Then, they used an average of 5 minutes to respond to the background information questionnaire, after which they completed the Vocabulary Size Test (VST), and the grammar section of the Oxford Placement Test (OPT). For the VST, participants were told that they could use as much time as necessary to ponder over the items while completing the task, as

recommended by Nation and Beglar (2007). Therefore no time limit was set for the task. However, they completed the VST in an average time of about 45 minutes. 30 minutes were allowed for the OPT, which is the average recommended time for completing the grammar part of the test. At the end of the test taking session on day one, norming of the strategy questionnaire to be used on the second day of data collection was conducted with the participants in groups of between 6 and 7. They were asked to go through it, without any time restriction, and report any item that was not comprehensible to them. 90% of them identified one particular item, 'I determined how to solve the test' as incomprehensible. The item was therefore excluded from the questionnaire that was used on the second day of data collection. Each session of the norming exercise lasted an average of 15 minutes.

On day two of the data collection, participants took the reading comprehension test, and answered the strategy questionnaire on the passages. The reading comprehension test consists of three passages. Accompanying each passage are five multiple-choice questions. Participants read and answered the comprehension questions for each of the three passages, one after the other. Each participant was also required to answer the strategy questionnaire immediately after reading and answering questions on each passage. In other words, the participants answered the strategy questionnaire three times during the data collection session. Each participant was allowed 35 minutes to read each passage, answer the questions, and respond to the strategy questionnaire. The entire session lasted 1 hour and 45 minutes. Participants were required to answer the strategy questionnaire for each passage read to ensure that the response provided on the passages captured the true strategic behaviour exhibited by the participant while reading a particular passage. Each of the tasks and the questionnaire used for the study are briefly described below.

3.4.1.1. Reading comprehension tests

The reading comprehension ability of the participants was tested with three passages adapted from past West African Examination Council (WAEC) tests, and the Joint Admissions and Matriculation Board (JAMB) tests. The WAEC and JAMB set qualifying standardized tests for students in the entire West Africa. The WAEC sets and administers the Ordinary Levels (OL) tests that qualify students to seek admission into any tertiary institution in Nigeria and all over the world, while the JAMB sets and administers entrance tests into the tertiary institutions in Nigeria, also based on the OL syllabus. Because these tests are standardized tests, the researcher did not pilot them for reliability and validity. The Flesch reading ease test for the three passages yielded 59.1%, 53.4%, and 65.3% readability scores for passage one, two, and three respectively, while the Flesch-Kincaid grade levels estimate for all the passages is 11.7, 12.1, and 9.6 for passages one, two, and three respectively. These values indicate that the texts used for the study were within the range recommended for this category of readers.

The only modification to the texts was providing titles where the original English passages had no titles. This was done to facilitate the evaluation of their use of a reading strategy like 'using titles of texts to help comprehend text', which was listed in the strategy questionnaire participants had to fill in. Accompanying each text are five multiple-choice questions, each with four distractors. Participants read all three texts, and answered all fifteen multiple-choice questions accompanying them.

An item analysis (McNamara, 1996) was not conducted after the tests because it is assumed that these students were already within the coverage level of the test, since they were admitted to study in the college based on their previous performances

in the two examinations. This conclusion is also suggested by the readability test results.

The reading comprehension passages were selected because they were found to measure the participants' ability to read English texts for main ideas, details, inferences and other strategic processing necessary to enhance effective comprehension. A multiple-choice test was preferred over other test formats because of the popularity of the multiple-choice test format in the examination system of Nigeria and because there is a 'well-established procedure for analyzing multiple-choice' test item results (Wesche & Paribakht, 1996). At all standardized examinations in Nigeria, reading comprehension is measured through multiple-choice tests. This is probably because it provides examiners with the room to examine a broad content area, which may not be feasible with other methods. It also has the benefit of limiting the possible answers to comprehension questions, thereby controlling the 'test-takers' thinking process when they are responding to test task' (Phakiti, 2003b: 659). The limited number of possible answers provided in a multiple-choice test therefore controls for subjectivity in examiners' assessment of readers' reading comprehension ability. I therefore consider the multiple-choice test an ideal choice for the study reported here. Alderson (2000) observed that different techniques for testing reading might permit the evaluation of different components of the reading construct. Therefore, there is no one best format for testing reading. However, since in every format, there exists some pros and cons, (ibid) the availability of 'statistical support for the analysis of multiple-choice tests and straightforward interpretation of test analysis result' (Phakiti, 2003b: 659), also constitutes a strong attraction for the choice of the multiple-choice format of testing in the current study.

The word counts for each of the reading comprehension passages in the study ranged between 284 and 352 words. Passage 1 contains 310 words, passage 2, 284 words while passage 3 352 words. The passages are provided in Appendix B.

3.4.1.2. Oxford placement test

To measure the L2 proficiency of the participants, the grammar test of the Oxford Placement Test (OPT) was used. The OPT has been found to provide a reliable and efficient means of appropriately placing students, especially at the start of a course of study. The calibration of the test, according to Allan (2004), follows the levels system provided by the Common European Framework of Reference for Languages (CEFR).

All the participants took this test on the first day and the reading comprehension test on the second day of the study. The mean score of the participants' performance in the OPT was 50.16, and their scores ranged from 15 to 82%. Based on the OPT scale, this result suggests that this group of English L2 learners consists of learners whose proficiency levels cut across the OPT proficiency spectrum of proficient advanced user (3), upper intermediate user (7), lower intermediate modest user (3), elementary limited user (4), basic extremely limited user (2), and beginner user (8) participants.

3.4.1.3. Vocabulary size test

In order to determine the vocabulary size of the participants, the vocabulary size test (VST) by Nation and Beglar (2007) was used. The VST is a test of written receptive vocabulary size, consisting of 14 frequency bands. The bands span the first to the 14th 1000 most frequent spoken word families in the British National Corpus (BNC). Each

1000 band is tested via multiple-choice question on 10 words randomly selected from this band. The test has been found to be reliable and valid (Beglar, 2010).

Though other receptive vocabulary size measures, such as yes/no tests, have also been found to be reliable and valid (Huibregtse, Admiral & Meara, 2002), the fact that they are self-report questionnaires is a concern. It has been suggested that test results between test-takers in such tests can be different due to test-takers' 'relative judgment behaviour', which can lead to test-takers' over- or underestimation of their vocabulary knowledge. Moreover, there is no agreed-upon penalization method for wrong answers (Schmitt, 2010: 200).

Nation's VST was used in the current study because it eliminates some of the concerns mentioned above. The test design is such that 'in order to answer the items, the test-takers have to have a moderately developed idea of the meaning of the word' (Nation & Beglar, 2007: 11). Moreover, Willis and Ohashi (2012) point out that although the VST being a multiple-choice test may also suffer some degree of inaccuracy errors, such error of inaccuracy may not be as severe as those posed by the yes/no test.

The test used in the study included the first ten levels of the VST. The entire fourteen levels were not used because a pilot study of the fourteen levels, which was conducted with six teachers in the College, revealed that their average score on the eleventh to fourteenth 1000 bands levels was less than 40%. Although the researcher recognizes the importance of testing the participants on all the levels, recommended by Nguyen and Nation (2011), the teachers' performance in the pilot led the researcher to conclude that administering the very infrequent levels on this category of participants, might probably skew the data, thereby reducing the statistical power

of the data generated for the study (see Willis & Ohashi, 2012 for the same rationale). Therefore, only the first ten levels of the VST were used for the study.

3.4.1.4. Cognitive and metacognitive strategy questionnaire

A self-report Cognitive and metacognitive strategy (C&MS) questionnaire was used to elicit responses on strategy use from the participants. The C&MS questionnaire used for the study was adapted from Phakiti's (2003) 5-point Likert scale questionnaire; it requires participants to assess strategy use as 1 (never), 2 (sometimes), 3(often), 4 (usually) and 5 (always). The original questionnaire contains 35 items testing cognitive and metacognitive strategy use in reading.

Phakiti reported the results of the exploratory factor analysis (EFA) carried out on the questionnaire items to identify group of variables that were homogeneous. Several factor analyses were conducted on the cognitive and metacognitive strategy items. The analysis accounting for 46.21% of the variance was considered to have yielded the most appropriate factor loading resulting in the emergence of two factors. Planning and monitoring strategies loaded on one factor, labeled MSs, while comprehending strategies loaded on the second factor, labeled CSs. Based on this dichotomy, items 2, 6, 7, 8 and 9 in the 35-item strategy questionnaire were shortlisted as items relating to CS use and items 14, 15, 19, 21, 22, 24, 30, 31, 32, and 33 were also shortlisted as relating to MS use in the study. In all, a total of 15 items were shortlisted from the 35 items, and it was these 15 items that constituted the strategy questionnaire used to conduct the current study. However, only 14 were used in the analysis. Item 33, 'I determined how to solve the test', was excluded because over 90% of the participants in a norming exercise conducted on the questionnaire

reported that they were unable to understand this statement. Apart from changing the name 'Thai' to 'Igbo' in item 2, there was no other change made on the items.

3.5. Results

The first research question of the study asks which RCSs Igbo ESL learners deploy when reading English texts. In order to answer this question, the mean rating on all strategy items reported by the participants was calculated. Tables 1 and 2 present descriptive statistics of the learners' reported rating for the cognitive- and metacognitive-strategy questionnaire items, respectively. To arrive at an average rating for the items, individual participants' ratings for each item on the questionnaire across the three passages read were added up and divided by three, and then by the number of respondents. Analyzing Likert scale data in this manner has often been criticized, the rationale being that since Likert scale data are ordinal data, they should not be analyzed like interval data (see Kuzon et al. 1996; Jamieson 2004 for more details). However, Carifio and Perla (2008), and Norman (2010) consider the concerns as unwarranted, arguing that such reasoning ignores the fact that summing across items reduces the ordinal data to an interval data. For example, Norman (2010: 5) claims that summing Likert scales across items is analogous to the accepted 'practice of treating the sum of correct answers on a multiple choice test, each of which is binary, as an interval scale'.

Table 1: Mean, standard deviation, skewness and kurtosis for the item-level cognitive strategy use across the three reading comprehension passages

Cognitive item	*Mean*	*SD*	*Skewness*	*Kurtosis*

1. I translated the reading text and tasks into Igbo to enhance my understanding.	1.96	1.136	1.197	.860
2. I tried to understand the text and questions regardless of my vocabulary knowledge.	3.04	1.207	-.082	-.712
3. I tried to find topics and main ideas of the passage without reading it in detail.	2.64	1.680	1.483	2.961
4. I read the text and questions several times to better understand them.	3.60	1.258	-.382	-1.066
5. I used my prior knowledge to help understand the text.	3.20	1.041	-.675	-.215

Table 2: Mean, standard deviation, skewness and kurtosis for item-level metacognitive strategy use across the three reading comprehension passages

Metacognitive item	*Mean*	*SD*	*Skewness*	*Kurtosis*
6. I was aware of what and how I was doing in the test.	3.56	1.227	-.224	-1.011
7. I checked my answers as I progress in the test.	2.96	1.274	.081	-1.156
8. I corrected mistakes immediately when found.	2.96	1.306	.080	-.893
9. I determined what the test questions require me to do.	2.80	.913	-.286	-.616
10. I was aware of the need to plan a course of action.	2.28	1.061	1.202	1.838
11. I tried to understand the questions	3.79	1.179	-.776	-.209

adequately before attempting to answer.				
12. I was away of selected strategies to help me complete the test questions before solving them.	2.91	1.109	-.267	-.537
13. I checked my accuracy as I progressed through the test.	2.55	1.143	.403	.300
14. I identified relevant information in the text to help me understand the text and answer the questions.	3.41	1.260	-.561	-.712

To determine the specific cognitive and metacognitive strategy items significantly used by the participants during the English reading task, a cut-off point of .8 for equal intervals between the 5 levels in the Likert scale was set, following Akkakoson (2013). This cut-off point was used to enable the researcher to decide which items were highly scored by the students in the strategy questionnaires. Therefore it was decided that:

6. A mean score of 1.00 – 1.80 would indicate that the students never use a particular strategy (the lowest level).
7. A mean score of 1.81 – 2.60 would indicate that the students sometimes use a particular strategy (the low usage level).
8. A mean score of 2.61 – 3.40 would indicate that the students often use a particular strategy (the medium-usage level).
9. A mean score of 3.41 – 4.20 would indicate that the students usually use a particular strategy (the high-usage level).

10. A mean score of 4.21 – 5.00 would indicate that the students use a particular strategy always whenever they read (the highest level).

Questionnaire items whose scores fall within levels 1 and 2, are not reported because they are of low usage, and therefore were not considered to be of any significance in the strategy repertoire of these L2 readers. Details of the distribution of cognitive and metacognitive strategy items that received average ratings above 2 are presented in Table 3.

Table 3: Distribution of highly scored cognitive and metacognitive strategy items

Cognitive item	*Rating*	*Metacognitive item*	*Rating*
2	Medium usage	6	High usage
3	Medium usage	7	Medium usage
4	High usage	8	Medium usage
5	Medium usage	9	Medium usage
		11	High usage
		12	Medium usage
		14	High usage

Table 3 shows that the participants in general used, within the medium and high usage levels, 11 out of the 14 strategy items during reading comprehension tests in English. The distribution of C&MS use items presented in Table 3 shows that this group of Igbo ESL readers used cognitive strategy items 2, 3, 4, and 5, and metacognitive strategy items 6, 7, 8, 9, 11, 12, and 14 within the medium and high usage ranges during the English reading comprehension task. In response to the first research question, these strategies could therefore be considered as the cognitive and

metacognitive strategies largely used by these readers when they read the English texts. However, participants did not largely use strategy items 1, 10, and 13, and no strategy items were reported used at the highest usage level during the reading task. Therefore 50% of the reported strategy use for this group of Igbo ESL readers is at the medium usage level, 29% at the high usage level, while 21% was at the low and lowest usage levels.

The contribution of cognitive and metacognitive strategy use to English reading scores is the focus of research question 2. To answer this research question, a multiple regression was conducted to see if the reported levels of cognitive and metacognitive strategy use predicted the reading comprehension scores of this group of Igbo ESL readers. Reading comprehension scores was the outcome variable (see Table 4 for the descriptive statistics of the reading scores), while the overall cognitive and metacognitive strategies used by students when reading the texts (calculated as the reported overall average ratings of all cognitive strategy items, and metacognitive strategy items) were the predictor variables. Table 4 also presents the descriptive statistics of the overall cognitive and metacognitive strategy use, while item-level descriptive statistics of each of the 5 CS items, and 9 MS items are presented in Tables 1 and 2, respectively.

Table 4: Mean, median, mode, standard deviation, skewness and kurtosis of the reading comprehension scores, CSU, MSU, VST, and OPT

	Mean	*Median*	*Mode*	*SD*	*Skewness*	*Kurtosis*
Reading comprehension	35.00	33.00	27	12.53	.101	-.160
Cognitive strategies	2.89	3.00	2.6	.63	-.066	-.651

Metacognitive strategies	2.91	2.90	3.0	.58	.271	.151
Vocabulary size test	5360	5600	5300	1456	-1.698	.106
Oxford placement test	50.16	52	16	19.54	-0.51	-0.743

Before conducting the multiple regression, the data was tested for all the assumptions of multiple regression. First, the presence of outliers in the data was checked through the analysis of standard residuals, which showed absence of outliers (Std. Residual Min. = -1.727, Std. Residual Max. = 2.055) in the data. The test for the assumption of collinearity also indicated that multicollinearity was not a concern (CS, VIF = 1.005; MS, VIF = 1.005). The data also met the assumption of independent errors (Durbin-Watson value = 1.226), while the histogram of the standardized residuals indicated that the data contained approximately normally distributed errors, as suggested by the P-P plot of standardized residuals. The scatterplot of the standardized residuals indicated that the data met the assumptions of homoscedasticity and linearity.

In the multiple regression analyses, which tested research question 2, hierarchical method was used to enter predictors into the regression model. However, irrespective of whether MS or CS was entered first, results suggested that cognitive and metacognitive strategy use did not explain a significant amount of the variance in the reading comprehension scores of Igbo ESL readers (F (2, 22) = 1.55, $p > .05$, R^2 = .12, R^2 Adjusted = .04). The analysis further shows that although CSU and MSU could not explain any significant proportion of the variance associated with English reading comprehension scores as indicated by the non-significant values of the standardized regression coefficient (CSU, $\beta = .35$, t (24) = 1.76, $p = .092$, and MSU, β = -.034, t (24) = -.17, $p = .87$), the contribution of CSU to the reading comprehension

of these readers was approaching a statistically significant level. The result tends to indicate that performance in reading comprehension for this group of ESL readers could be a function of CSU, and not MSU.

The third research question, which examined the role of vocabulary size and L2 proficiency in C&MS use during reading comprehension by Igbo ESL readers, was tested using multiple regression analysis, and paired-samples *t*-test. Multiple regression analyses were conducted with CSU and MSU as different dependent variables, while vocabulary size, and L2 proficiency levels were the predictor variables in the regression models. (The descriptive statistics for the VST and OPT are presented in Table 4 above.)

To ensure that the data were suitable for conducting multiple regression, screening for outliers was conducted using the analysis of standard residuals. The analysis of standard residuals of the data for the regression model for CSU reveals that the data contained no outliers (Std. Residual Min. = -1.94, Std. Residual Max. = .975); that of the regression model for MSU also showed the absence of outliers (Std. Residual Min. = -2.08, Std. Residual Max. = 1.96). The result of the test for the assumption of low collinearity in the data for the regression model for CSU and MSU indicated that multicollinearity was not a concern (VST Scores, VIF = 1.65, and OPT Scores, VIF = 1.65) when either MSU or CSU was the outcome variable. The data also met the assumption of independent errors (Durbin-Watson value = 1.83 and 2.53 for CSU and MSU, respectively). The histogram of the standardized residuals, for the conditions in the regression models (CSU and MSU) indicated that the data contained approximately normally distributed errors, as indicated by the normal P-P plot of standardized residuals. Also, the scatterplots of the standardized residuals indicated that the data met the assumptions of homoscedasticity and linearity.

The question about the role of vocabulary size and L2 proficiency in cognitive and metacognitive strategy use during reading comprehension was answered by first conducting two multiple regression analyses, using the forced entry method, one with CSU and the other with MSU as the outcome variable; in both analyses VST scores and OPT scores were the predictor variables. The analyses showed that vocabulary size and L2 proficiency did not explain a significant proportion of the variance in the CS and MS use of the Igbo ESL readers (F (2, 22) = .906, p = .419, R^2 = .28, and F (2, 22) = 1.205, p = .319, R^2 = .31) respectively. The results suggest that the readers' vocabulary size, and proficiency levels in English had no significant effects on cognitive and metacognitive strategy use during reading comprehension in the L2, and could therefore be assumed that they made no significant contribution in C&MS use among these ESL readers.

However, to ensure that this finding is not an artefact of the aggregation of scores, which has 'a potential to alter the findings' (Phakiti 2003b: 672), paired-samples t-tests were conducted. These tests compared the role of vocabulary size and L2 proficiency on cognitive and metacognitive strategy use of readers with high and low VST and OPT scores. Median split was used to create two groups of high and low performers on the VST and OPT. Paired-samples *t*-tests were then used to compare the means of cognitive and metacognitive strategies used by high and low performing ESL readers in relation to their performance on each of the two tests. Data in all conditions were normally distributed. Table 5 presents the descriptive statistics for the cognitive and metacognitive strategies data for the sets of groupings based on the readers' performance on the two tests.

Table 5: Mean, standard deviation, skewness and kurtosis for cognitive and metacognitive strategy use by readers with low and high VST & OPT scores

Group	*Mean*	*SD*	*Skewness*	*Kurtosis*
Cognitive strategy use for low VST	2.52	.573	.199	-1.152
Cognitive strategy use for high VST	3.25	.483	.252	-.947
Metacognitive strategy use for low VST	2.90	.772	.281	-.716
Metacognitive strategy use for high VST	2.91	.362	.002	.124
Cognitive strategy use for low OPT	2.83	.584	.065	-1.235
Cognitive strategy use for high OPT	2.93	.715	-.160	-.396
Metacognitive strategy use for low OPT	2.84	.526	.142	.123
Metacognitive strategy use for high OPT	2.97	.665	.226	.196

Table 6 presents the result of the paired-samples *t*-tests. The *t*-test results indicate that CSs used by readers with low vocabulary size, and CSs used by students with high vocabulary size were the only pairs in the matrix that yielded a significant *t*-value. We could interpret this outcome as suggesting that high vocabulary size led to the use of significantly more CSs in reading L2 texts, while low vocabulary size significantly resulted in less use of CSs by the readers during L2 reading. However, there was no significant effect of L2 proficiency, as measured by the OPT, on the use of cognitive and metacognitive strategies for the low and high proficient Igbo ESL readers in the study.

Table 6: Paired samples t-test results for cognitive and metacognitive strategy use by groups with high and low VST scores (VSTs), and OPT scores (OPTs).

Group	*Mean*	*t-value*	*df*	*Sig.*
Cognitive strategy use by readers with low VSTs	2.52			
Vs.		-3.344	11	.007
Cognitive strategy use by readers with high VSTs	3.25			
Metacognitive strategy use by readers with low VSTs	2.90			
Vs.		-.029	11	.977
Metacognitive strategy use by readers with high VSTs	2.91			
Cognitive strategy use by readers with low OPTs	2.83			
Vs.		-.336	11	.743
Cognitive strategy use by readers with high OPTs	2.93			
Metacognitive strategy use by readers with low OPTs	2.84			
Vs.		-.525	11	.610
Metacognitive strategy use by readers with high OPTs	2.97			

3.6. Discussion

With regards to the first research question, the result of the analysis presented in Table 3 indicates that out of the five cognitive, and nine metacognitive items listed in the questionnaire, the participants rated the usage for cognitive items 2, 3, 4, and 5, and metacognitive items 6, 7, 8, 9, 11, 12, & 14 to be of medium and high levels. The usage of cognitive items 1, 10, and 13 was however rated as low. The low rated use of cognitive item 1, 'I translated the reading text and tasks into Igbo to enhance my understanding', is curious given that studies have shown translation to be a common RCS among L2 readers (e.g. Kern, 1994; Upton & Lee-Thompson, 2001). In fact,

translating from L2 to L1 during reading tasks has been found to be a strategic behaviour that L2 readers often employ to enhance comprehension when they encounter comprehension challenges in L2 reading. Upton and Lee-Thompson (2001: 487) reported that 'L2 readers most frequently shifted into their L1 simply to translate a word or phrase meaning or to confirm their understanding of a sentence they had read'. However, this could just be true of situations where the readers have reasonable levels of academic competence in the L1. In the presented study, most Igbo speakers appear to be much more at home with speaking and reading in English than in Igbo. For instance, the participants were offered the option to respond to the strategy questionnaire in Igbo and English, but none accepted to respond in Igbo. In fact, there is an apparent low usage of Igbo among the speakers, as suggested by the fact that 18 of the 27 participants indicated that their initial experience with L1 literacy was as teenagers. This is attributable to the social and linguistic dominance of English in Igbo society (see Mustapha, 2014; Christopher, 2014). This situation probably could explain why Igbo ESL readers are unlikely to translate from English to Igbo to enhance reading comprehension in English. This study therefore argues that use of translation strategy by ESL readers may hold true only when the L2 does not occupy a dominant position in the sociolinguistic and economic life of the ESL reader. The use of this strategy could therefore be context dependent.

The participants also rated their use of two metacognitive strategy items as low: 'I was aware of the need to plan a course of action' and 'I checked my accuracy as I progressed through the test'. Metacognitive strategies are advanced reading strategies that are often associated with skilled readers, and the awareness and use of these strategies are hallmarks of good reading ability (Rasekh & Ranjbary, 2003; Zhang et al., 2008; Zhang & Wu, 2009). The effective use of planning (item 10) and

monitoring (item 13) strategies has been found to correlate with higher achievement in English reading (see Anderson, 1991; Block, 1992; Zhang, 2002; Zhang & Wu, 2009).

It is therefore arguable that poor use of RCSs, particularly the metacognitive strategies of planning and monitoring could have been responsible for why the participants performed poorly in the reading task (M = 35, SD = 12.53). The inability to monitor comprehension during reading, researchers argue, 'can result in unsuccessful comprehension' (Morrison, 2004: 83). Apparently, this could be the case with this group of ESL readers as indicated by their reported rated use of the planning and monitoring strategies during the reading task. The process of monitoring the cognitive process (Baker & Brown, 1884) refers to the ability of readers to be conscious of the extent to which comprehension is taking place during a reading task (Morrison, 2004). Studies that investigated the effect of comprehension monitoring in reading comprehension achievement found it to be vital in reading comprehension and related to reading proficiency (Baker, 1989; Block, 1992; Morrison, 2004; Yang, 2002). The low usage of these metacognitive strategies during the reading task also suggests ineffective use of other strategies too. Metacognitive strategies perform executive functions of overseeing the application of cognitive strategies (Oxford, 2011; Phakiti, 2006). It has been suggested that the effective use of RCSs relies heavily on the readers' comprehension monitoring (metacognitive ability) ability (Kimmel & MacGinite, 1984). Further analysis of the rating for strategy use reported by the readers provides more support to the possibility that low performance at the reading comprehension task could truly be a function of inefficient use of reading strategies. For example, 50% of the reported strategy use for this group of Igbo ESL readers is at the medium usage level, 29% at the high usage level, while 21% was at

the low and lowest usage levels, which tends to suggest that these readers, strategically speaking are mediocre.

Therefore, it could rightly be assumed that the application of strategies affected the readers' performance at the reading test. According to Cohen (1986: 133) '…strategies may contribute to successful comprehension or detract from it'. In fact, their contribution depends on how they are effectively or ineffectively used by the reader. This group of Igbo ESL readers appears not to have effectively deployed their RSs during the reading task, and as a result they were ineffective leading to poor performance. Anderson (1991) is of the opinion that it is not enough to know what strategies to use, what is of great importance is how to use them. In reading strategies research, quantity and quality of use have been suggested to be necessary for RCSs to significantly contribute to reading comprehension performance (Noli & Sabariah, 2011; Nordin et al., 2013). Therefore this study tends to provide an indirect corroboration for the assumption that the way RCSs are used could determine the level of reading comprehension achieved.

The regression analyses conducted in respect of the second research question for the study further confirms the assumption that RCS use could only affect reading comprehension when used properly. The second research question for the study concerns how RCSs used during the reading tasks contributed to the reading comprehension performance of the participants. The results of the regression analyses suggest that the use of CSs and MSs did not significantly contribute to the reading comprehension of the participants, which is in contrast to the findings of several previous studies (e.g. Guo & Roehrig, 2011; Nergis, 2013; Phakiti, 2003a, 2003b; Shoerey & Mokhtari, 2001; Yau, 2009). This finding can be explained if it is assumed that the RCSs were ineffectively employed during the reading task. This assumption

is suggested by the fact that the readers rating of the use of these strategies tended to indicate that CSs were used more than MSs (although not significantly), even when more metacognitive items (9 against 5 cognitive items) were listed on the questionnaire. The rating for the use of MS reported by these participants therefore does not suggest that the readers possess the prerequisite metacognitive skills required to facilitate reading comprehension. It could be assumed that it was as a consequence that RCSs used by this group of students during the reading tasks could not contribute significantly to their reading comprehension. MS use is considered to be a function of skilled readership (Rasekh & Ranjbary, 2003; Zhang et al. 2008; Zhang & Wu 2009). However, the rating of metacognitive strategy use by the participants in the current study does not seem to indicate skilled readership.

The relative effect of the participants' vocabulary size, and L2 proficiency on the use of CSs and MSs was investigated in research question 3. To the best of the knowledge of the researcher, the current study is probably the second attempt at exploring how the two relate to the use of RCSs during reading comprehension. Multiple regression analysis and paired-samples *t*-tests were used for the investigation. The results of the regression analyses suggest that the two predictor variables; VST scores, and the participants' scores on the grammar section of the OPT could not explain a significant proportion of the variance in CSU and MSU (F (2, 22) = .906, p = .419, R^2 = .28, and F (2, 22) = 1.205, p = .319, R^2 = .31), respectively. The finding tends to suggest that some other variables, outside the duo, are responsible for the way these readers used their RCSs. Strangely, even L2 proficiency could not explain a significant proportion of the variance in CSU and MSU, contrary to the findings of several previous studies on L2 reading comprehension (see Ghafournia & Afghari, 2013; Phakiti, 2003b; Zhang & Wu, 2009).

Although few other studies (e.g. Rahimi et al., 2009; Sarig 1987), also found no relationship between strategy use and proficiency, further analysis was conducted to ensure that this conclusion is accurate for this group of students. Because it is probable that the finding could just be an artefact of the aggregation of scores in the analysis, the researcher decided to control for the effect of aggregation on the data by grouping the participants into two groups of low and high proficiency and vocabulary size participants. Then the means of CSU and MSU for the groups of high and low achievers on each test were compared using paired-samples *t*-tests, since limited sample size could not allow for regression analyses to be conducted at this juncture. The only significant effect found was that of vocabulary size on the CS use. Participants with high vocabulary size reported using significantly more CSs during the reading tasks than those with low vocabulary size.

Vocabulary size has been associated with increase in the frequency of strategies used by reader (Brisbois, 1995; Cromley & Azevedo, 2007; Nassaji, 2004), which tends to be supported by the finding in the current study. In a related EFL study, Al-Nujaidi (2003) also reported that participants with larger vocabulary size reported using reading strategies more frequently than their counterparts with low vocabulary size. Chou (2013: 187) cited 'dictionary consultation, note taking of new and unfamiliar words, frequent return to the passages, and translation into the L1' as cognitive strategies that readers often used due to the presence of unfamiliar words in the text. Although vocabulary size was not measured in the study, it is probably plausible to assume that unfamiliar words elicited the use of more cognitive strategies, as was reported, probably for readers with high vocabulary size than for those with low vocabulary size, given the relationship between the use of certain cognitive strategies and vocabulary size. For example, researchers (e.g., Calvo, 2005; Nassaji,

2004; Oakhill et al., 2015) suggest that vocabulary knowledge is related to the use of cognitive strategy of inferencing, while others (e.g. Fisher & Frey, 2009) suggest that the use of background knowledge as a cognitive strategy to aid comprehension is related to vocabulary knowledge. The current study contributes to the literature on the relationship between vocabulary and RCS use, showing that vocabulary size is particularly important for CSU.

For example, participants with high vocabulary size in the current study reported significantly higher use of the five cognitive strategies listed in the questionnaire. As in previous studies, the study found that high vocabulary size readers also reported significant use of inferencing strategy, as well as the strategy of using background knowledge to aid comprehension. This is in addition to the higher use of the strategy of rereading and using topics and main ideas in a text to arrive at meaning construction. It may not be exactly clear why readers with high vocabulary size in the study tended to use more cognitive strategies than those with low vocabulary size. Chou (2013) suggests that the use of some cognitive strategies by L2 readers is an indication of the presence of unfamiliar words in the text, which however does not explain why readers with high vocabulary size readers would use more CSs. Another way of explaining this behaviour could be that CSs are knowledge based, and they rely heavily on the linguistic competence of the reader (Phakiti, 2003). Therefore possessing large vocabulary size, which could be deemed an indication of some degree of linguistic competence, would suggest potential to employ more cognitive strategies when faced with comprehension challenges. This is probably why readers with high vocabulary size reported using cognitive strategies more than readers with low vocabulary size.

Therefore, this study has added to the few studies that found no relationship between RCS use and L2 proficiency. Some of these studies have been criticized based on methodological considerations. For instance, Sarig's (1987) study has been criticized for providing 'vague methodological explanations', which Morrison (2004: 82) argues make it difficult to truly evaluate the findings. The fact that the participants in Sarig (1987) appear to have read different texts has also been criticised. However, the current study appears not to suffer from some of these concerns given that the participants in this study read the same texts, and their L2 proficiency was measured and used for the analyses. Also, unlike in Sarig's study, strategy use was elicited through a self-report questionnaire. Given that the various measures employed in the current study tend to provide an equal evaluation of the constructs of interest, the researcher therefore would wish to assume that these findings are probably true accounts of the cognitive processing abilities of this group of Igbo ESL students.

3.7. Conclusion

The findings of this study have implications for reading strategy researchers, ESL teachers, as well as ESL readers, given the dearth of research on the relationship between vocabulary knowledge and reading strategy use. For reading strategies researchers, the result obtained in this study suggests that vocabulary could probably play a unique role in RCS use. Further studies are therefore required to determine how this happens and the extent to which strategy use is dependent on the knowledge of vocabulary. The study also has implication for the teaching and learning of English in ESL classes, with regards to reading strategy instruction. So, while efforts are focused on providing instructions on reading strategy use, improving the students' vocabulary knowledge should be considered a necessary component in the process. Improved

vocabulary size could be a recipe for increased strategy use, which could lead to increased reading comprehension among ESL readers.

Finally, this study has also shown that RCS use may not significantly contribute to reading comprehension always, and readers of different proficiency levels may not differ in the use of RCSs. Within reading strategy research, there is an established notion that the effectiveness of RCS use depends on the efficiency at which the reader uses them. But the finding, which suggests that proficiency plays no role in RCS use, was inconsistent with those of previous studies. The implication of these findings is that researchers may have to take another look at RCS use by examining how varying sociocultural contexts could relate to RCS use.

3.8. References

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Appendix A: Biodata questionnaire

About the Questionnaire

This questionnaire is designed to elicit some background information about you. Please rest assured that all information provided will be kept confidential.
Please note that there are no right or wrong answers to the questions in this questionnaire, so feel free to provide the answers that you deem right.

Questionnaire

Please take some time and respond to all the questions in this questionnaire. Please ask me for clarification if a question is unclear.

Tick as appropriate, please. You are also free to tick as many answers as you think appropriate to each question.

2. Which is your native language?

Igbo ☐ **Hausa** ☐ **Yoruba** ☐ **English** ☐ **None** ☐

2.Which other language(s) do you speak?

Hausa ☐ **Yoruba** ☐ **English** ☐ **Others _____(Please name the languages)**

3. At which age did you start learning English? _____

4. Please rate your *Reading Ability* in the *English Language* using the scale below:

No ability (0) ☐ **Low (1)** ☐ **Fairly low (2)** ☐ **Fairly high (3)** ☐ **High (4)** ☐ **V. High (5)** ☐

5. Which language(s) do you speak at home? _____**(Please name the languages)**

6. In which of these other languages can you read?

Hausa ☐ **Yoruba** ☐ **English** ☐ **Others ----------(Please name the languages)**

Participant Information

What is your Registration Number? _____

What is your subject combination or name of your degree? _____

What is your class level or year of study? _____

How old are you? _____

Do you have any hearing problem? **Yes** ☐ **No** ☐

If YES please say the nature of the hearing problem_____
_____

Do you have any problem with your vision? **Yes** ☐ **No** ☐

If YES please say the nature of the vision problem you have _____
_____

Do you have any problem with reading texts? **Yes** ☐ **No** ☐

If YES please say the nature of the problem _____
_____

Please indicate your gender **Male** ☐ **Female** ☐

Please write your phone number. I would like to contact you to ask for more information, if necessary. _____

Thank you for participating in my study!

Appendix B: Reading comprehension test

General Instructions

Before you start the test please write your registration in the space provided on the answer sheet.

Read the passages carefully and then answer the questions below each passage by choosing a, b, c, or d from the options provided. Only one answer is correct in the options provided for each question. Each question carries 1 mark.

There are three passages, and you are to answer all the questions on each passage.

After reading and answering questions on a passage, you must immediately answer the questionnaire regarding your thinking as you were reading and trying to answer questions on it. This means that you are to answer three questionnaires, one for each of the passages read.

Note also that any form of cheating will not be tolerated because it will affect the research findings.

Passage I: ***Youth and Old-Age***

Young men have strong passions and tend to gratify them indiscriminately. Of the bodily desires, it is the sexual by which they are most swayed and in which they show absence of self-control. They are changeable and fickle in their desires, which are violent while they last, but quickly over: their impulses are keen but not deep-rooted and are like sick people's attacks of hunger and thirst. They are hot-tempered and quick-tempered, and apt to give way to their anger, bad tempter often gets the better of them, for owing to their love of honour they cannot bear being slighted, and are indignant if they imagine themselves unfairly treated. While they love honour, they love victory still more, for youth is eager for superiority over others, and victory is one form of this. They love both more than they love money, which indeed they love very little, not having yet learnt what it means to be without it. They look at the good side rather than the bad, not having yet witnessed many instances of wickedness. They trust others readily, because they have not yet been cheated. They are sanguine; *nature warms their blood as though with excess of wine*; and besides that, they have as yet met with few disappointments. Their lives are mainly spent *not in memory but in expectation*, for youth has a long future before it and a short past behind it: on the first day of one's life one has nothing at all to remember, and can only look forward. They are easily cheated owing to the sanguine disposition just mentioned. Their hot tempers and hopeful dispositions make them more courageous than older men are; the hot temper prevents fear, and the hopeful disposition creates confidence; we cannot feel fear so long as we are feeling angry, and any expectation of good makes us confident.

Aristotle's Youth and Old-Age
p.197

1. According to the passage, young men are

    a) Violent when they have sexual desires
    b) Hot-tempered when they are hungry or thirsty
    c) Indignant and fickle in satisfying their sexual desires
    d) Active and restive until they satisfy their desires

2. The analogy between young men and sick people is that:

    a) Their emotions are active but short-lived
    b) They are easily controlled by hunger and thirst
    c) They are easily swayed by emotions
    d) They are apt to give way to anger.

3. The writer says that young people are optimistic in their dealings with people because they are:
    a) Steadfast
    b) Reckless
    c) Discreet
    d) Courageous

4. The statement 'nature warms their blood as though with excess of wine' as used in the text, means:

    a) Respond with suspicion and alertness
    b) Act with considerable confidence and trust
    c) Behave shamelessly like a drunkard
    d) Move with care and self-control

5. The expression, 'not in memory but in expectation', as used in the passage, implies:

    a) Past, not present
    b) Future, not present
    c) Innocence, not experience
    d) Hopelessness, not hopefulness

Passage II: ***Gun Violence***

Time was when boys used to point toy guns and say 'Bang!' Now, they aim real guns and shoot one another. Firearms killed nearly 4,200 teenagers in 1990. Only motor vehicle accidents kill more teenagers than firearms and *the firearms figures are rising*. The chance that a gun will kill a black male between the ages of 15 and 19 has almost tripled since 1985 and almost doubled for white males, according to the National Centre for Health Statistics.

Who could disagree with Health and Human Services Secretary, Donna Shalala, when she pronounced these statistics 'frightening and intolerable?' In the shameful light of this *'waste of young lives'* in Ms. Shalala' words, an often asked question seems urgently due to be raised again: Would less violence on television – the surrounding

environment for most children and young adults – make violence in actual life has normal, less accepted, less horrifying?
It may be difficult to prove an exact correlation between the viewer of fantasized violence and the criminal who acts out violence after turning off the set. But *if the premise of education is granted* – that good models can influence the young – then it follows that bad models can have an equivalent harmful effect. This is the reasonable hypothesis held by 80 percent of the respondents to a recent Times Mirror poll who think that violent entertainment is 'harmful' to society.
Witness enough mimed shootouts, see enough 'corpses' fall across the screen, and the taking of a human life seems no big deal. Even if a simple causal relationship cannot be established between watching violence and acting it out, is not this *numbed sensitivity* reason enough for cutting back on the overkill in films and TV?

From: The Christian Science Monitor, April 16-22, 1993, p 20, CSPS, Boston, M.A, USA

6. From the passage, it can be inferred that since 1985

    a) More black males between the ages of 15 and 19 have been killing one another with guns
    b) More white than black males have been getting killed by guns
    c) More black males between the ages of 15 and 19 have been getting killed by guns
    d) More black than white males have been killing one another with guns

7. The writer says 'the firearms figures are rising' because.

    a) More teenagers are now getting killed by firearms than by motor vehicle accidents
    b) More teenagers are now getting killed by firearms than used to be the case
    c) More teenagers now carry firearms than used to be the case
    d) Firearms now have figures that are terribly high.

8. The writer uses 'numbed sensitivity' to refer to

    a) Heartlessness on the part of actors
    b) Objectionable behavior
    c) Deadening of the capacity to feel
    d) Unreasonable violence

9. In Secretary Donna Shalala's view, the situation depicted by the statistics is

    a) Alarming and unbearable
    b) Topical and intimidating
    c) Tense and reassuring
    d) Disturbing and conducive

10. What will actually be proved 'if the premise of education is granted'?

    a) Entertainment on television is harmful to society
    b) Good models can influence the young

c) Violence on television encourages violence in real life
d) The viewer of fantasized violence is the criminal who acts out violence.

Passage III: ***Common Cold; Facts and Fancies.***
You would think that the common cold should be easy enough to study, but it is not so easy as it looks. Colds often seem to spread from one person to another, so it is often assumed that the cold must be infectious, but there are some puzzling observations, which do not fit in with this theory. An investigator in Holland examined some eight thousand volunteers from different areas and came to the conclusion that in each group the colds all appeared at the same time – transfer of infection from case to case could not account for that. Yet at the Common Cold Research Unit in Salisbury the infection theory has been tested out; two series of about two hundred people each were inoculated, one with salt water and the other with secretions from known cold victims. Only one of the salt-water group got a cold, compared with seventy-three in the other group.
In the *British Medical Journal* the other day, there was a report of a meeting. 'The Common Cold – Fact and Fancy', at which one of the speakers reported a study of colds made in Cirencester over the last five years. Three hundred and fifty volunteers had kept diary records of their colds and on an average each had seven every year, with an annual morbidity of seventy days. So nearly one-fifth of our lives is spent in more or less misery, coughing and sneezing. Some widely held beliefs about the common cold have turned out not to be true. It seems that old people are just as liable to cold as the young. Sailors in isolated weather ships have just as many colds while on board and not in contact with the outside world as when on shore. It is a truism that common illness pose more problems than the rare. The rare disease is by comparison much easier to handle. There are not so many cases and all of them have been intensively studied. Someone has read up all the literature about the disease and published a digest of it. There will be more facts and fewer fancies.

Miles Howard: 'The Spectator'

11. A rare disease can be more easily dealt with than the common cold because

a) Medical experts are fed up with the rampant cases of common colds
b) Adequate research exists to uncover facts about such rare diseases
c) People easily develop resistance to the common colds
d) Common colds are easily not the province of the orthodox medical experts

12. The Cirencester volunteers kept a record of their colds through

a) The British Medical Journal
b) Morbidity rates
c) Personal diaries
d) Temperature recordings

13. From the information in the passage, there is evidence

a) For the theory that the common cold is indeed infectious
b) Against the theory that the common cold is infectious
c) That old people are immune against the common cold
d) That medical reports are silent on facts about common colds.

14. Which of the following statements can be implied from the passage?

    a) People catch more colds in winter
    b) People catch more colds in warm weather
    c) The origin of colds is inconclusive
    d) People catch colds equally in warm and cold weather

15. According to the writer, some widely held beliefs about the common colds are

    a) Fallacious
    b) Irreconcilable
    c) Inevitable
    d) Societal

Chapter 4

4. Exploring the effect of cognitive and metacognitive strategy use on ESL learners' reading comprehension performance in Nigeria

Abstract

This study investigated the effect of cognitive and metacognitive strategies on the reading comprehension performance of English as Second Language (ESL) learners who are native speakers of Igbo in Nigeria. Although several studies on reading comprehension (RC) strategies suggest a positive relationship between strategy use and RC, Phakiti (2003) has suggested that readers' strategic behavior could be a function of L2 learning context (e.g. English as a Foreign Language (EFL) versus ESL). To explore this assumption, 80 ESL students who are Igbo native speakers enrolled in two tertiary institutions in Nigeria read two passages, answered multiple-choice comprehension questions about them, and completed a cognitive and metacognitive strategy use questionnaire after reading each passage. Results indicate that cognitive and metacognitive strategy use jointly had a significant positive effect on RC performance. However, only metacognitive strategy use uniquely contributed significantly to RC performance. Frequency of use data for cognitive and metacognitive strategy items were also compared between high and low performers on the reading task. The usage levels for cognitive and metacognitive strategies distinguished high performers from low performers in the RC test. However, the cognitive strategy of translation, which has been reported in several studies as a prominent reading strategy for second language learners, was hardly used by this

group of ESL readers. This finding may be due to the sociolinguistic environment of the study participants.

4.1. Introduction

Language testing research suggests that variability in performance in ESL and EFL tests derives from two broad sources: the nature of the individual and the nature of the task (Bachman, 1990). Phakiti (2003: 32) claims that reading comprehension research in various contexts is necessary because 'the use of cognitive and metacognitive strategies may depend on the kind of test-taker, the setting in which testing occurs and the nature of test tasks'. Individual learner factors such as language proficiency, gender, culture, motivation, and anxiety have been found to play a role in cognitive and metacognitive strategy use (Phakiti, 2006). The nature of the task is the type of tasks (e.g. cloze, multiple-choice, summary tasks) used to assess performance, and the level of task difficulty (see Alderson, 2000 for a detailed account of the role of task on reading comprehension performance).

In line with previous research, the current study examines the role of cognitive and metacognitive strategy use in RC. These factors (cognitive and metacognitive strategies) have been identified as sources of variability in language performance (see Phakiti, 2003 for more details). They are very relevant to performance in language (Chou, 2013; Oxford, 2011). Therefore the nature of the variability in language performance cannot be assessed in exclusion of these factors since they have been found to affect linguistic performance (Phakiti, 2006). However, the contribution of cognitive and metacognitive strategy use to variability in L2 reading comprehension has mainly been investigated in EFL contexts. It is expected that the mental processes involved in ESL reading could diverge from EFL reading ones, particularly in ESL

contexts where English is dominant as in Nigeria. Therefore, the current study is warranted as it will examine reading strategy use in Nigeria, a country where reading comprehension has not been examined before and where English is not only a second language, as it is in, for example, Singapore, the Philippines and Ghana, but also a lingua franca (Adedimeji, 2004). Nigeria's context seems unique particularly because the use of English as a lingua franca has led to the underutilization of some, if not all, local languages. This linguistic context therefore could potentially produce ESL learners with unique characteristics warranting the current investigation. No study, to the knowledge of the researcher, has previously investigated the use of cognitive and metacognitive strategies in the reading comprehension of Igbo ESL learners in Nigeria.

4.1.1. Cognitive and metacognitive strategies

Cognitive strategies are cognitive mechanisms that learners employ to ease comprehension challenges (Oxford, 2011). They involve consciously targeted actions taken by readers to overcome comprehension challenges when they occur (Sheorey & Mokhtari, 2001). It could involve simple actions like underlining some sections of a text, rereading portions of a text to increase understanding, or reducing reading speed when comprehension is threatened. Other targeted actions which could be considered cognitive strategies include the manipulation of learning materials to enhance learning, or the application of specific techniques to a learning task to attain a better learning outcome (Rahimi & Katal, 2012). For example, in order to improve reading comprehension in L2, a reader may choose to translate the L2 text into the L1. A reader could also decide to use mnemonics to aid ability to recall, or attempt to summarize texts in order to make comprehension better (Oxford, 1990). In his

conceptualization of cognitive strategies, which was inspired by the works of Alderson (2000), Baker and Brown (1984), O'Malley & Chamot (1990), Oxford (1990), and Purpura (1999), Phakiti (2003b: 651) conceived cognitive strategies to include 'making predictions, translating, summarizing, linking with prior knowledge or experience, applying grammar rules, and guessing meaning from text'.

Cognitive strategies, which Oxford (2011: 44) also refers to as 'cognitive processing', operate at three different stages, 'the declarative, associative, and procedural knowledge stages'. The declarative stage, said to be 'conscious, effortful, halting, and nonhabitual' (Chou, 2013: 176), is a platform that allows learners to employ strategies to aid their ability to notice and cope with new information. At the associative stage, learners are able to practice the new information on the target language, strengthen schemata, expand and connect such schemata to newly acquire information on the task being learned, with the aid of strategies. Finally at the procedural stage, strategies used for processing new information at the associative stage may become automatized, beyond the conscious control of the learner, and can now be deployed with less effort to the point of being an unconscious habitual behaviour (Chou, 2013; Oxford, 2011). Some researchers argue that once any strategy can be used automatically and unconsciously by a learner, it loses its status as strategy because learner may no longer describe the strategy (Ellis, 1994). Such actions should therefore be considered skills (Afflerbach et al., 2008; Manoli & Papadopoulou, 2012). This study also considers strategies as conscious mental processes.

Flavell (1979) and Brown et al. (1983) claim that there are two distinct components of metacognition, metacognitive knowledge and metacognitive strategies. They explain that while metacognitive knowledge concerns the information acquired by learners in relation to their learning, metacognitive strategies help the learner

manage, regulate, direct, and guide the process of acquiring knowledge. Due to the regulatory and control functions associated with metacognitive strategies, it is believed that they often oversee the application of cognitive processes. For example, in second language learning, all planning, focusing, eliciting of information, organizing, coordinating, monitoring and evaluating of the cognitive processes, which underpin the construction of knowledge, is believed to be a function of metacognitive processing (Chou, 2013 citing Oxford, 2011).

In conclusion, cognitive and metacognitive strategies are two closely related constructs: learners employ cognitive strategies to facilitate the attainment of cognitive goals, while metacognitive strategies are used to monitor and regulate their use (Flavell, 1979). In the learning process, the effectiveness of the use of cognitive strategies relates to the role of metacognitive strategies as an overseeing, directing and regulating entity. Cognitive progress is particularly made when metacognitive strategies are effectively deployed to monitor it. Hence, as metacognition is said to be contingent on cognition, metacognitive strategies are also contingent on cognitive strategies; metacognitive strategies are considered higher-order agents overlooking and governing the use of cognitive strategies (Phakiti, 2006; Veenman et al., 2006).

4.1.2. Reading in the L2

The 'interactive compensatory' (I-C) model of reading conceptualizes the L2 reading process as a 'juggling or switching process in cognition' (Bernhardt, 2005: 140). The I-C model, which was proposed by Stanovich (1980) holds that the comprehension process operates at many levels, from letter recognition to word recognition to phrase recognition to sentence level recognition. The model therefore assumes that recognition of meaning involves a simultaneous application of many different

knowledge sources (Stanovich, 1980). According to the model, the sources can be high-level sources such as topic knowledge, or low-level sources such as orthographic or syntactic knowledge. However, the model assumes that 'deficiencies at any level in the processing hierarchy can be compensated for by greater use of information from other levels, irrespective of the level of the deficient process' (Stanovich, 1980: 49).

The 'compensatory model of second language reading' (CMSLR) proposed by Bernhardt (2005) does not differ significantly from the I-C, since for both models the most appropriate conceptualization of the L2 reading process resides in compensatory processing. However, CMSLR does not only recognize, like I-C, the role of compensatory processing in L2 reading, but goes further to predict how knowledge sources assist or take over from other knowledge sources that are inadequate or nonexistent in L2 reading. Bernhardt's CMSLR is a tridimensional reading model that captures literacy, language, particularly vocabulary, and dimensions of knowledge sources in L2 reading that are yet to be explained.

The model posits that 'knowledge sources are not additive, but rather are considered to operate synchronically, interactively, and synergistically' (Bernhardt (2005: 140). For example, it is assumed within the model that:

> *Familiarity with orthographic patterns can facilitate the word recognition process without actual language knowledge, …the higher the L1 literacy level, the more it is available to buttress impoverished second language process, …the more word knowledge is developed, the more it frees up resources to operate on more complex patterns* (Bernhardt, 2005: 140).

McNeil (2012) extended the compensatory model of L2 reading by proposing a compensatory model of L2 reading that accommodates the contribution of L2 language knowledge, L1 reading ability, strategic knowledge, and background knowledge to L2 reading. McNeil (2012: 74) argues that his extended model of L2 reading 'explains ways in which the L2 readers draw from knowledge sources as they

construct meaning from written texts'. In McNeil's model, therefore, L2 reading is facilitated by the reader's background and cultural knowledge (McNamara & Kintsch, 1996; Pritchard, 1990). The reader's linguistic skills, background knowledge, cultural knowledge, and individual characteristics all contribute to reading performance. The inclusion of strategic knowledge as a component of the model, which the I-C model did not recognize, is significant. McNeil (2012: 67), citing Bernhardt (2005) claims that strategic knowledge is the 'core of the compensatory model' because the art of using a knowledge source to compensate for deficiency in another amounts to a strategic behaviour. Hence the I-C could as well be called the 'strategic model of L2 reading'.

The extended compensatory model of L2 reading therefore suggests that when tackling comprehension challenges, L2 readers compensate for 'insufficient knowledge sources' with strategic knowledge, which enables them use cognitive and metacognitive strategies to improve text comprehension (McNeil, 2012). The implication is that the use of cognitive and metacognitive strategies as an attribute in L2 reading could potentially influence RC (see Bachman, 1990). Therefore, the explicit inclusion of the role of cognitive and metacognitive strategy use in the compensatory models of L2 reading, which also inspired one of the research questions in the study, informed the choice of the models for the current research.

4.1.3. Strategy use in L2 reading

One approach to explaining variability in L2 RC is the investigation of how cognitive and metacognitive strategy use affects L2 RC. Many of these studies (e.g. Guo & Roehrig, 2011; Nergis, 2013; Phakiti, 2003a, 2003b, 2008; Shoerey & Mokhtari,

2001) found a significant positive effect of cognitive and metacognitive strategy use on L2 RC.

For example, in a study with Thai university EFL students, Phakiti (2003) examined the relationship between cognitive and metacognitive strategy use and L2 reading comprehension. A strategy questionnaire was used to measure cognitive and metacognitive strategy use, while reading comprehension was measured with multiple-choice and gap-fill tasks. 15- 22% of variance in the reading performance of the participants in the study was explained by the combination of cognitive and metacognitive strategy use. Also in a later study, Phakiti (2008) found that cognitive and metacognitive strategies explained 11% - 30% of the variance in the reading scores of 561 Thai university students.

Apart from having a positive effect on RC, cognitive and metacognitive strategy use was also found to distinguish poor and good readers in some studies. Skilled readers effectively regulate the use of cognitive and metacognitive strategies (Nergis, 2013; Sheorey & Mokhtari, 2001). Sheorey and Mokhatari (2001: 445) claim that in addition to being aware of the strategies to use, skilled readers 'also tend to be better at regulating the use of such strategies while reading'. They use more cognitive and metacognitive strategies during reading (Baker & Brown, 1984; Ikeda & Takeuchi, 2006). For example, Ikeda and Takeuchi (2006) used journal entries of 10 Japanese university EFL readers to examine the differences in the use of strategic knowledge among proficient and less-proficient L2 readers. Proficient L2 readers were found to use more combination of strategies. It has also been suggested that this group of readers are better able to monitor their comprehension (Baker, 1989; Morrison, 2004; Yang, 2002). In a study with French as Second Language undergraduate students, Morrison (2004) reported a highly positive correlation

between comprehension monitoring ability measured with a monitoring task and reading proficiency in L1 (English) and L2 (French).

In conclusion, the various theoretical assumptions on RC performance and reading strategy use so far articulated tend to suggest that all that is required to enable the formulation of a viable theory of performance variation in language use, or in L2 reading is already in place. However, this may not be entirely true given that 'the use of cognitive and metacognitive strategies may depend on the kind of test-taker, the setting in which testing occurs and the nature of test tasks' (Phakiti, 2003: 32). Phakiti argues that since certain situational or contextual factors could have influenced the findings of previous studies, more research is required in varying situations or settings. For example, the socio-linguistic context in which English is spoken in Nigeria as a lingua franca could lead to different reading strategies being used than in EFL or other ESL contexts.

Moreover, the Igbo ESL learners in the study may possess unique characteristics that set them apart from participants in previous studies. For example, their attitude towards their L1, which could be described as 'negative', and that towards their L2, which is very positive (see Igboanusi (2006) for a discussion on the attitude of Igbos towards the language) is an attribute that could be lacking in other ESL contexts. Their age of acquisition (AoA) of English, as well as their variability in terms of academic orientations probably set them apart from participants in most previous studies. In those studies, participants were often drawn from students enrolled in English related programmes, and were probably ESL learners of late AoA given that most of those studies were conducted with EFL participants. No study, to the knowledge of the researcher, has previously examined the relationship between

cognitive and metacognitive strategy use and performance in RC among Igbo ESL learners in Nigeria. The following research questions were therefore set for the study:

1. Which are the cognitive and metacognitive strategies used by this group of ESL learners during the English reading tasks?
2. What is the relative effect of cognitive and metacognitive strategy use on the participants' RC performance in English?
3. Did high achievers in the RC test differ from low achievers in their use of cognitive and metacognitive strategies?
4. Which strategy item was the most frequently used during the RC test?
5. Which strategy item was the least frequently used during the RC test?

4.2. Method

4.2.1. Participants

Participants in the study consist of 80 Igbo students, 31 males and 49 females (mean age = 26.3 years). 40 of the students were trainee teachers at the Federal College of Education. The rest were undergraduate students at a Federal University of Technology close to the Federal College of Education. All the participants have been studying in these two institutions for a period of one to five years.

All participants volunteered to participate in the study. Participants were provided with transportation to attend all the data collection sessions, and a token of ₦1,000. A Global System for Mobile communication top-up voucher was given to each participant as compensation.

A language learning and use self-report questionnaire was used to elicit information on the participants' L1, the language use of the participants at home, the age at which learning of English as a second language commenced, and the participants' perceived level of reading ability in English (see Appendix A). Because Igbo is spoken only in the southeastern part of Nigeria, and the study was conducted in a Federal college located in the northern part of Nigeria, collecting information about their native language were necessary to ensure that only native speakers of Igbo would participate in the study.

Regarding their habitual language use at home, 68.75% of the participants indicated that they exclusively communicate in Igbo at home, 23.75% said they communicate in English and Igbo, while 7.5% indicated that they communicate exclusively in English. It is important to note that communicating both in English and Igbo is not an unusual behaviour among the Igbo native speakers. This finding agrees with previous research, which indicates that English is a second rather than a foreign language in Nigeria.

The average age at which the participants reported that they started learning English is 4.6 years. This AoA of English indicates that to most of these participants, the acquisition of English commenced very early in their development.

The participants' perceived level of reading ability in English was measured with an item on a five-point Likert scale that required the participants to rate their reading ability in English as 0 (No ability), 1 (Low), 2 (Fairly low), 3 (Fairly high), 4 (High), and 5 (Very high). Several studies suggest that self-report proficiency scales correlate very highly with actual measures of language ability (e.g., MacIntyre et al., 1997; Kroll et al., 2002), and self-report scales have been used widely (e.g., Colzato et al., 2008; Dewaele et al., 2008; Rai et al., 2011). 12.5% of the participants rated

their English reading ability to be Very high, 41.25% High, 42.5% Fairly high, and 3.75% rated their reading ability in English Fairly low. The overall average rating of their reading ability in English on the Five-point scale is 3.63, which could be considered high.

4.2.2. Measures

4.2.3. Reading comprehension measures

Two reading comprehension passages, all expository essays, were used to test RC in the study. Passage 1 is about ants' intelligence, while passage 2 is on the effects of noise on task performance. Passage 1 contains 511 running words, while passage 2 617 (see appendix B). The reading passages were taken from Cambridge IELTS 7 (2009) with some modifications. For example, to abridge the passages, parts that have no bearing to the comprehension questions were deleted without distorting the flow of discourse in the passage. Additional questions were created to achieve a balance of 15 multiple-choice questions per passage. None of the passages was presented with a title because titles would have made it too easy for the participants to answer some of the questions.

Each passage was accompanied by ten multiple-choice questions, and a summary cloze-test with five gaps to fill. The summary cloze-test was a summary of the reading passages, which included some gaps. The remainder of this section will explain the rationale behind choosing each of these test types for the study and will also describe each test.

The multiple-choice test (MCT) format was preferred to other test formats (e.g., free-recall) due to its popularity in the examination system in Nigeria, and the

participants' unfavorable attitude towards the free-recall and summarization test formats during the pilot study. The MCT format was preferred over other formats also because there is a well-established procedure in place for analyzing MCT answers (Wesche & Paribakht, 1996), which helps achieve high scorer reliability (Alptekin & Ercetin, 2011). I am aware of the controversy on the validity of the multiple-choice test for assessing reading comprehension (see Rupp, Ferne, & Choi, 2006). However, because they restrict the possible answers to comprehension questions, they make data analysis easy (Phakiti, 2003).

Each multiple-choice question has four distractors. The questions were designed to be sensitive to some of the mental representations that readers form as they attempt to construct meaning from a text such as using available clues in a text to enhance comprehension, or engaging information that is not within the text to engender better text comprehension (see Magliano et al., 2007). In particular, five out of the ten multiple-choice questions set for each passage are local questions, and the remaining five are inferential questions. Local questions were designed to test readers' general ability to locate explicit information in the text, at the sentential or contextual level (e.g. *which of these abilities, according to the passage distinguishes humans from ants? The statement, 'subjects exposed to noise find it difficult at first to concentrate on problem-solving tasks' is attributed to which of these researchers?*). Inferential questions tested readers' ability to go beyond the text to use information from the text and previous knowledge to provide explanations, draw analogies, or predict meaning (Pascual & Goikoetxea, 2014). Examples of inferential questions are: *What does the phrase 'the forcing house of intelligence' suggests in the context it was used? Which of the following statements best reflects the author's view on noise?*

The summary cloze tests, each with five gaps were created by deleting some content words from short summaries of the texts read by the participants with the purpose of testing the participants' understanding of the overall meaning of the text (Alderson, 2000). Therefore, words essential to the main ideas of the text or to text coherence are deleted from the summary texts. Multiple-choice options from which test-takers were to select appropriate words to fill the 5 gaps in each summary text were presented alphabetically after each text. Text 1 had 15 alternative words including 10 distractors, while text 2 had 10 alternative words including 5 distractors to choose from. In addition to the popularity of this test format in Nigeria, the reason for the choice of the summary task was to ensure that overall understanding of the text was also assessed.

4.2.4. Cognitive and metacognitive strategy measure

A cognitive and metacognitive strategy questionnaire was used in the study. The questionnaire was based on the 15 items in the two composites of cognitive and metacognitive strategies identified by means of exploratory factor analysis (EFA) conducted on a 35-item questionnaire by Phakiti (2003). Phakiti reported that the EFA result revealed that the items in the questionnaire clustered in two factors, one factor related mainly to cognitive strategies, and the other mainly related to metacognitive strategies. Based on this dichotomy, five strategy items in the 35-item questionnaire (e.g. '*I translated the reading text and tasks into English to enhance my understanding*', '*I read the text and questions several times to better understand them*') were shortlisted as items relating to cognitive strategy use, while 10 items (e.g. '*I was aware of what and how I was doing in the test'*, '*I checked my answers as I progressed in the test'*, '*I corrected mistakes immediately when found'*) were also

shortlisted as relating to metacognitive strategy use in the study. The 15 items shortlisted for this study were each followed by a 5-point Likert scale, which requires participants to assess whether a strategy is used 1 (never), 2 (sometimes), 3(often), 4 (usually) and 5 (always).

In the end, only 14 items were used in the study. Item 33 *('I determined how to solve the test'*) was excluded and hence did not appear in the strategy questionnaire because it did not seem to be intelligible to most participants when the questionnaire was piloted in an earlier study by the researcher. Apart from changing the word 'Thai' to 'Igbo' in item 2, no other modification was made to the questionnaire items.

Strategy use was measured only via this self-report questionnaire for reasons similar to those given by Phakiti (2003). I was concerned that introspective verbal reporting could affect participants' performance on the RC task given that participants found it very difficult to combine it with reading in the pilot study. The combination of think-aloud protocols and retrospective interviews was not used because during the piloting phase of this study, learners were unable to think-aloud during the reading test, while they found the retrospective interview intrusive.

In the current study, reading comprehension performance was measured with a timed RC test. The 14 items in the two composites of cognitive and metacognitive strategies identified by means of EFA in Phakiti (2003) were chosen for the questionnaire because they were designed to measure specific cognitive and metacognitive strategies associated with RC in a testing context.

4.3. Data collection procedure

The study was conducted at a Federal College of Education in the north of Nigeria. Data collection took place when the students' regular academic activities were in

progress. Participants were students in two institutions, enrolled in different academic programmes with incongruous academic schedules. It was, therefore, difficult for all participants to take the RC test and answer the reading strategy questionnaire at the same time. It was agreed with participants to hold the sessions in groups, based on their availability. Six groups were created.

Participants completed the Participant's Information Sheet and Consent Form and a bio-data questionnaire before taking the RC test.

The RC test involved reading two passages and answering a total of 30 multiple-choice questions. Participants were given 40 minutes to read each passage and answer the 15 multiple-choice questions accompanying the passage. An average of 5 minutes was allowed for participants to respond to the reading strategy questionnaire immediately after reading each passage. The test-retest internal consistency reliability coefficient (Cronbach's alpha) for the questionnaire was 0.84, which is considered high (Field, 2013).

4.4. Results

Delineation of cognitive and metacognitive strategies used by the readers

Tables 1 and 2 present the descriptive statistics (mean, standard deviation, skewness, and kurtosis) of the cognitive and metacognitive strategy questionnaire item ratings, respectively. The statistical results in these tables and all subsequent tables are based on the participants' average ratings for each of the items. Although analyzing ordinal data like interval data has been criticized (see Kuzon et al., 1996; Jamieson, 2004), this approach was adopted because ordinal scales are reduced to interval data when they consist of sums across items (Carifio & Perla, 2008; Norman, 2010).

Table 1: Cognitive strategy items' mean, standard deviation, skewness, and kurtosis

Cognitive strategy items	Mean	SD	Skewness	Kurtosis
1. I translated the reading text and tasks into Igbo to enhance my understanding.	1.64	.879	1.580	2.248
2. I tried to understand the text and questions regardless of my vocabulary knowledge.	3.73	1.082	-.499	-.786
3. I tried to find topics and main ideas of the passage without reading it in detail.	2.26	1.113	.650	-.646
4. I read the text and questions several times to better understand them.	3.85	.931	-.422	-.687
5. I used my prior knowledge to help understand the text.	3.43	1.050	-.125	-.950

Table 2: Metacognitive strategy items' mean, standard deviation, skewness, and kurtosis

Metacognitive strategy items	Mean	SD	Skewness	Kurtosis
6. I was aware of what and how I was doing in the test.	3.25	1.21	-.114	-1.096
7. I checked my answers as I progress in the test.	3.60	1.14	-.655	-.434
8. I corrected mistakes immediately when found.	3.90	1.30	-.978	-.243
9. I determined what the test questions require me to do.	3.70	1.00	-.377	-.870
10. I was aware of the need to plan a course of action.	2.85	1.16	.040	-.937
11. I tried to understand the questions adequately before attempting to answer.	4.39	.72	-1.084	.395
12. I was aware of selected strategies to help me complete the test questions before solving them.	3.25	1.05	-.059	-.792

13. I checked my accuracy as I progressed through the test.	3.54	1.06	-.540	-.234
14. I identified relevant information in the text to help me understand the text and answer the questions.	4.04	1.00	-.952	-.028

It is clear from the skewness and kurtosis values obtained that the distribution of some items in the dataset in Table 1 and 2 is not normal, with skewness scores greater than 1 or below -1 for some questionnaire items. This distribution does not support running a parametric analysis. Therefore, the overall degree of use for each cognitive and metacognitive strategy item by the participants was determined by setting a cut-off point of 0.8 for equal intervals between the 5 levels in the questionnaire's Likert scale (see Akkakoson, 2013 for a similar procedure). Five levels, signifying five different degrees of use for each strategy item, which correspond with the five levels in the questionnaire, were created as follows:

1. A mean score of 1.00 – 1.80 would indicate that the students never use a particular strategy (the lowest level).
2. A mean score of 1.81 – 2.60 would indicate that the students sometimes use a particular strategy (the low usage level).
3. A mean score of 2.61 – 3.40 would indicate that the students often use a particular strategy (the medium-usage level).
4. A mean score of 3.41 – 4.20 would indicate that the students usually use a particular strategy (the high-usage level).
5. A mean score of 4.21 – 5.00 would indicate that the students use a particular strategy always whenever they read (the highest level).

Using the above criteria, it was decided that items that are within level 1 (never = lowest level of use), and level 2 (sometimes = low usage level), should be considered

respectively as items never used or used only a few times by the participants during the reading test. Therefore, these strategies may not have played an important role in their performance in the RC test.

The rating of the strategy items indicates that only one strategy item (‘*I tried to understand the questions adequately before attempting to answer.’*) out of the 14 strategy items surveyed received the highest level of usage, suggesting that participants used the strategy ‘always’ during the RC test. Eight strategy items (‘*I tried to understand the text and questions regardless of my vocabulary knowledge.’ ‘I read the text and questions several times to better understand them.’ ‘I used my prior knowledge to help understand the text.’ ‘I checked my answers as I progress in the test’. ‘I corrected mistakes immediately when found.’ ‘I determined what the test questions require me to do.’ ‘I checked my accuracy as I progressed through the test’. and ‘I identified relevant information in the text to help me understand the text and answer the questions.’*) received high usage level rating indicating that participants ‘usually’ used these strategy items during the RC test. Three strategy items (‘*I was aware of what and how I was doing in the test.’ ‘I was aware of the need to plan a course of action.’ and ‘I was aware of selected strategies to help me complete the test questions before solving them.’*) received medium usage level ratings, which suggests that the participants ‘often’ used these strategies during the RC test. In all, twelve strategies (3 cognitive and 9 metacognitive) were used, one (cognitive strategy) was not used, and another was used just a few times during the RC test. Usage of the strategies at the highest level is 7%, 58% at the high usage level, and 21% at the medium usage level.

Determining the effect of cognitive and metacognitive strategies on RC performance.

Pearson correlation between cognitive strategy use and RC scores (r = .253, p < 0.05, N = 80), and metacognitive strategy use and RC scores (r = .342, p = < .05, N = 80) indicated that readers that achieved high scores in the RC test tended to report a higher rate of usage for cognitive and metacognitive strategies during the RC test. These significant correlations suggest a positive relationship between the use of these reading strategies and performance in RC. Therefore, a multiple regression analysis was conducted, with cognitive and metacognitive strategy use as predictors and the RC scores as the outcome, to determine the effect of cognitive and metacognitive strategy use on the RC performance of the ESL readers.

In order to check whether the requirements of multiple regression analysis were met, the data was checked for outliers using the analysis of standard residuals, which indicated that there were no outliers in the dataset (Std. Residual Min = -1.916, Std. Residual Max = 1.952). The test for the assumption of collinearity was conducted. The result indicated that multicollinearity was not evident in the data (Cognitive strategy use, Tolerance = .76, Metacognitive strategy use, Tolerance = .76). The residuals were also uncorrelated, indicating that the data met the assumption of independent errors (Durbin-Watson value = 1.87). The visual examination of the histogram of standardized residuals indicated that it is comfortable to conclude that the data contained errors that are approximately normally distributed. The normal P-P plot of the standardized residuals revealed points that lie almost perfectly on the regression line. The scatterplot of the standardized residual indicated that the assumptions of homogeneity of variance and linearity were met in the data.

Predictors were entered into the multiple regression analysis using the sequential approach. Following Nergis (2013), it was decided that reported use of metacognitive strategies should enter the multiple regression analysis as the first

predictor variable since it yielded the highest correlation (r = .342, p = < .05, N = 80) with reading comprehension scores, which purported to measure reading comprehension performance. The results, presented in Table 3, indicated that the two predictors explained 12.7% of the variance. The results further indicated that metacognitive strategy use significantly predicted RC performance (β = .29, p < .05), whereas cognitive strategy use did not. The standardized coefficient for metacognitive strategy use indicated that one unit change in metacognitive strategy use by this group of ESL readers led to an increase of .29 in their RC scores, if cognitive strategy use was kept at mean level.

Table 3: Coefficients of cognitive and metacognitive strategy use with overall RC scores

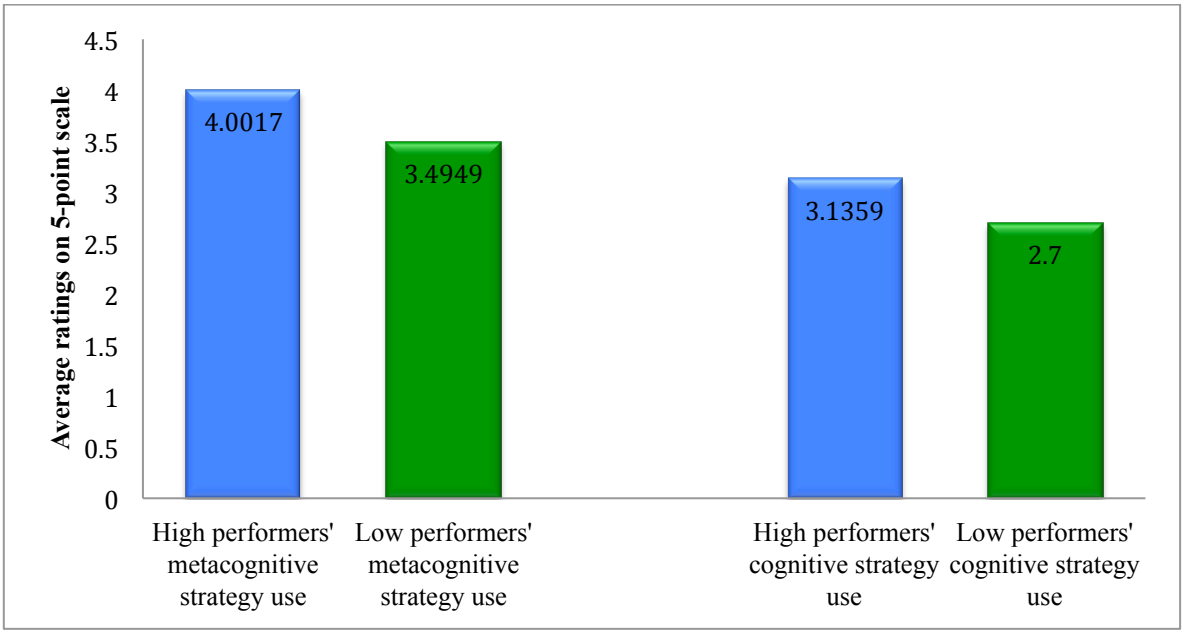
		Unstandardized coefficients		Standardized coefficients			95% Confidence interval for B	
Model		*B*	Std. error	Beta	*t*	Sig.	Lower bound	Upper bound
R^2 = 0.127	Constant	7.48	2.87		2.61	.011	1.77	13.20
	Cognitive strategy	.853	.922	.113	.925	.358	-.984	2.69
	Metacognitive strategy	1.84	.786	.287	2.346	.022	.279	3.41

Establishing the difference in cognitive and metacognitive strategy use between high and low achievers in the RC test

A paired samples t-test was conducted to determine the difference in participants' reported use of cognitive and metacognitive strategies in the study, before conducting further t-tests to determine if there was a significant difference between high and low achievers in the use of these strategies. The first group of t-tests was conducted to determine if it would be necessary to conduct the second one. Not finding significant differences at this point would indicate that the subsequent tests were not warranted.

Normality tests indicated that data in the two conditions (cognitive strategy use and metacognitive strategy use) was approximately normally distributed. Graphic representation of the mean ratings for cognitive and metacognitive strategy items for the HPs and LPs is presented in Figure 2.

Figure 2: High and Low performers' mean ratings for metacognitive and cognitive strategy questionnaire items



The result of the paired sample t-test indicated that participants in the study reported significantly higher levels of usage for the metacognitive (M = 3.62, SD = .72) than the cognitive strategies (M = 2.98, SD = .61), t (79) = 8.31, $p < .01$, d = 0.94. To

conduct the analysis to determine the difference between high and low achievers at the RC test in the use of cognitive and metacognitive strategies, participants were split into high and low achievers based on the mean of the RC scores. Participants whose scores in the RC test are above the mean (M = 16.7) were grouped as high achievers (N = 39), while those that their scores are not above the mean (N = 41), were grouped as low achievers.

These two groups of participants were then compared in terms of their mean ratings for cognitive strategy use and metacognitive strategy use. Normality tests indicated that the distributions for the HP metacognitive strategy use and LP cognitive strategy use ratings were not normal. The case-wise diagnostics identified 7 outliers in HP metacognitive strategy use group data and 4 in LP cognitive strategy use group data. The outliers were excluded, which resulted in running the paired sample t-tests with unequal sample sizes. SPSS was instructed to treat the excluded outliers as missing values in the subsequent analysis. The results of the paired sample t-test conducted to determine if the high and low achievers differed significantly in their reported level of use for cognitive and metacognitive strategies indicated that there were statistically significant differences in the reported levels of usage between these groups:

- HP cognitive strategy use (M = 3.136, SD = .583) vs. LP cognitive strategy use (M = 2.7, SD = .431), t (36) = 3.99, $p < .01$, d = 0.8
- HP metacognitive strategy use (M = 4.002, SD = .424) vs. LP metacognitive strategy use (M = 3.495, SD = .683), t (32) = 3.12, $p < .05$, d = 0.89.

Statistical results suggest that in general, HPs in the RC test had higher usage level for cognitive and metacognitive strategies compared to the LPs during the RC test, which tends to account for their better performance at the RC if all other factors are constant.

In other words, high achievers in the RC test used more cognitive and metacognitive strategies than low achievers. Cohen's d test of effect size indicated that the high usage of these strategies by high performers in the current study had a large effect on their RC performance (cognitive strategy, d = 0.8, metacognitive strategy, d = .89).

Identifying cognitive or metacognitive strategy item(s) used most frequently, and least frequently by the readers

The number of participants that rated each scale of every strategy item and their percentage was computed to enable a decision to be made on the strategy items that the participants used the most and least. A strategy item was considered as the least frequently used if most participants had indicated on the strategy use questionnaire that they 'Never' used it; a strategy was considered as the most frequently used if most participants had answered that they 'Always' used the item during the RC test. Table 4 presents the number and percentage of participants that selected each point in the Likert-scale of each item in the strategy-use questionnaire.

Table 4: Number and percentage of participants that selected each point in the Likert-scale of each item in the strategy-use questionnaire

Strategies	**Never**	**Sometimes**	**Often**	**Usually**	**Always**
1. I translated the reading text and tasks into Igbo to enhance my understanding.	47 (59%)	25 (31%)	4 (5%)	4 (5%)	0
2. I tried to understand the text and questions regardless of my vocabulary knowledge.	2 (2.5%)	15 (18.75%)	19 (23.75%)	24 (30%)	20 (25%)
3. I tried to find topics and main ideas of the passage without reading it in detail.	32 (40%)	22 (27.5%)	15 (18.75%)	10 (12.5%)	1 (1.25%)

4. I read the text and questions several times to better understand them.	1 (1.25%)	11 (13.75%)	21 (26.25%)	27 (33.75%)	20 (25%)
5. I used my prior knowledge to help understand the text.	2 (2.5%)	21 (26.25%)	24 (30%)	21 (26.25%)	12 (15%)
6. I was aware of what and how I was doing in the test.	9 (11.25%)	20 (25%)	21 (26.25%)	18 (22.5%)	12 (15%)
7. I checked my answers as I progress in the test.	8 (10%)	7 (8.75%)	23 (28.75%)	27 (33.75%)	15 (18.75%)
8. I corrected mistakes immediately when found.	7 (8.75%)	9 (11.25%)	13 (16.25%)	16 (20%)	35 (43.75%)
9. I determined what the test questions require me to do.	3 (3.75%)	13 (16.25%)	22 (27.5%)	28 (35%)	14 (17.5%)
10. I was aware of the need to plan a course of action.	15 (18.75%)	24 (30%)	22 (27.5%)	15 (18.75%)	4 (5%)
11. I tried to understand the questions adequately before attempting to answer.	0	1 (1.25%)	14 (17.5%)	28 (35%)	37 (46.25%)
12. I was aware of selected strategies to help me complete the test questions before solving them.	5 (6.25%)	19 (23.75%)	29 (36.25%)	19 (23.75%)	8 (10%)
13. I checked my accuracy as I progressed through the test.	6 (7.5%)	11 (13.75%)	26 (32.5%)	25 (31.25%)	12 (15%)
14. I identified relevant information in the text to help me understand the text and answer the questions.	2 (2.5%)	8 (10%)	13 (16.25%)	29 (36.25%)	28 (35%)

Table 4 indicates that 59% of the participants in the study had answered that they ‘Never’ used the strategy of translating into the L1 to enhance comprehension. It also shows that 46.25% of the participants in the study had stated that they ‘Always’ used

the strategy of trying to adequately understand a question before answering it.

It is worth mentioning that the rating of these scale points ('Never' and 'Always') for the strategy items (1 and 11) is not just the highest in the entire observations but are also the highest rating received by the other remaining scales (Sometime, Often, and Usually) for any of the other strategy items surveyed. It is probably safe to conclude that participants in the study used strategy item 1 ('I translated the reading text and tasks into Igbo to enhance my understanding'.) and 11 ('I tried to understand the questions adequately before attempting to answer'.) differently from the rest of other strategy items surveyed.

4.5. Discussion

The perceived use of cognitive and metacognitive strategies by the ESL readers in the current study is substantially related to their performance in RC. According to the regression analysis, cognitive and metacognitive strategies jointly explained 12.7% of the variance in their RC scores (see Phakiti, 2003, 2008, for related results). Perceived cognitive and metacognitive strategy use also distinguished high performers from low performers in the reading comprehension test, with high performers reporting higher use of cognitive and metacognitive strategies during the reading task. In other words, the study identified cognitive and metacognitive strategies as sources of variability in reading comprehension, which in the current study was measured via a RC test. This finding offers support to claims about the relevance of cognitive and metacognitive strategies to language performance (Chou, 2013; Oxford, 2011). Hence, the nature of the variability in language performance probably should not be assessed in exclusion of the strategies used to cope with reading or other language comprehension tasks (Phakiti, 2006), as is evident between high and low achievers in the study.

This study's findings are also congruent with studies which have suggested that high achievers in RC tests can be distinguished from low achievers by the quantity of cognitive and metacognitive strategies they use: skilled readers use more cognitive and metacognitive strategies during reading, which often is not the case with poor readers (Baker & Brown, 1984; Ikeda & Takeuchi, 2006). However, the standardized coefficients for cognitive and metacognitive strategy use in the regression analysis indicated that cognitive strategy use did not contribute significantly to the students' performance in the RC test. By contrast, metacognitive strategy use had a significant positive effect on the students' performance on the RC test (β = .29, p < .05). The positive effect of metacognitive strategy use on RC performance, particularly with advanced ESL readers, has been reported in several previous studies (e.g., Dabarera, Renandya, & Zhang, 2014; Guo & Roehrig, 2011; Nergis, 2013). For example, Nergis (2013) found in her study with Singaporean students that metacognitive reading strategy was the strongest predictor of academic reading comprehension; Dabarera, Renandya, and Zhang (2014) found that metacognitive strategy awareness and use improved through instruction led to higher RC scores for ESL students. The current study therefore provides additional evidence in support of the position that metacognitive strategy use improves performance in RC tasks in the L2. Readers that often use metacognitive strategies during RC tests are more likely to perform better than those who do not.

It is worth noting also that the perceived use of the strategies by the ESL readers in the study was not uniform for the various categories. Although this is not unexpected, it is noteworthy that while doing the RC task the readers appear to have rated two strategy questionnaire items distinctively. A metacognitive strategy ('*I tried to understand the questions adequately before attempting to answer.*' and a cognitive

strategy (‘*I translated the reading text and tasks into Igbo to enhance my understanding.*’), stood out in terms of their ratings from other questionnaire items. While the former was the most highly used strategy, the readers mostly never used the latter. Taking time to adequately understand the meaning of a question before answering it could be considered a strategy expected of every test-taker attempting to get high scores in a test. However, it is unusual for ESL readers to indicate that they never used the strategy of translating into their L1 to enhance RC in the L2, since translating from L2 to L1 has been reported in several previous studies with EFL readers as a strategy often used by L2 readers, which has a positive effect on RC performance (Kern, 1994; Li & Munby, 1996; Mushait, 2003; Yau, 2009). For example, Yau (2009) found mental translation to be a prominent strategy among Taiwanese EFL students in his study. He therefore claims that ‘mental translation can be a constructive means for promoting L2 text comprehension’ (Yau, 2009: 231). However, it is important to note that most studies that investigated L2 reading were conducted in EFL contexts, not in ESL contexts, where English is a lingua franca. EFL readers often have well developed L1 reading skills prior to reading in English, which could explain why they are more likely to resort to the L1 to aid reading comprehension in English. But for the ESL readers in the current study, this probably could not be the case because of poorly developed L1 reading ability. 59% of the participants indicated that they never used this strategy during the RC test. In addition to this number, 31% of participants indicated that they use it sometimes suggesting also that they do not use it frequently.

The contrast between the rare use of the translation strategy found in the current study and the frequent use of this strategy in other studies may indicate that the use of this strategy is L2-context sensitive. The suggestion by Oxford (1990) and

Rahimi and Katal (2012) that people from different cultures adopt different strategies when tackling learning tasks appears to be congruent with this finding.

An alternative explanation for the low use of the translation strategy by Igbo learners of English may be that English is a second language and a lingua franca in Nigeria. As a result, children start learning English very early in life, as the average AoA (4.6 years) of English, which the participants in the study indicated, tends to suggest. One consequence of this early exposure to English in this context coupled with the frequent use of English for the rest of an L1 Igbo child's life is that one's L1 tends to play a secondary role in his/her communication needs. Such ESL learners tend to constantly switch from the L1 to English as a communicative strategy (Akere, 1981), a behaviour that is very common with most Igbo native speakers each time they try to communicate in Igbo. The consequence is that children consider English as central to their linguistic performance (Mustapha, 2014) and, consequently, do not tend to translate into the L1 to make meaning during English reading tasks.

4.6. Limitations of the study and conclusion

This study aimed to locate the cognitive and metacognitive strategies used by Igbo L1 speakers in Nigeria and assess quantitatively their possible impact on English RC performance. A limited number of cognitive and metacognitive strategies were targeted for the study and only one indirect measure, self-report questionnaire used retrospectively. These aspects of the study constitute its limitations. As a result, caution should be applied in interpreting the finding of the study. However, the first limitation could have worked in favour of the validity of the study. Considering that the test-takers were just volunteers, and there was nothing academically at stake for them, they may not have been patient enough to answer a strategy questionnaire with

many items twice during the test. In terms of the second limitation of the study, a self-report questionnaire was used because in the relevant pilot study think-loud proved to be an inappropriate data elicitation method.

To summarise, the study's findings suggest that the combination of cognitive and metacognitive strategy use, as was reported by the readers, was significantly related to performance in reading comprehension. However, only metacognitive strategy use uniquely contributed significantly to reading comprehension performance. High achievers in the reading comprehension test reported the use of more cognitive and metacognitive strategies. Therefore, in terms of reading comprehension in general, the study suggests that cognitive and metacognitive strategies are very important tools in L2 reading comprehension performance. Performance in a reading comprehension test therefore is, to a certain degree, a function of the readers' ability to employ these strategies at a reasonable level of usage, as suggested by the difference between the reported use of cognitive and metacognitive strategies between the high and low achievers in the reading task.

This study also identified the frequency of reported use of each strategy measured with the questionnaire. It also focused on the most and least frequently used strategies. A notable finding was that the L1-translation strategy was not associated with reading in the L2 for the ESL readers in the study. The use of some strategies may be driven by certain sociolinguistic or cultural situation. Therefore, L2 readers in varying contexts may or may not use a particular strategy during RC tests. The study posits that the L1-translation strategy, which has been reported by researchers as a prominent strategy among L2 readers, is probably not a universally applied strategy by L2 readers.

4.7. References

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Appendix A: Biodata questionnaire

About the Questionnaire

This questionnaire is designed to elicit some background information about you. Please rest assured that all information provided will be kept confidential.
Please note that there are no right or wrong answers to the questions in this questionnaire, so feel free to provide the answers that you deem right.

Questionnaire

Please take some time and respond to all the questions in this questionnaire. Please ask me for clarification if a question is unclear.

Tick as appropriate, please. You are also free to tick as many answers as you think appropriate to each question.

3. Which is your native language?

Igbo ☐ **Hausa** ☐ **Yoruba** ☐ **English** ☐ **None** ☐

2.Which other language(s) do you speak?

Hausa ☐ **Yoruba** ☐ **English** ☐ **Others _____(Please name the languages)**

3. At which age did you start learning English? _____

4. Please rate your *Reading Ability* in the *English Language* using the scale below:

No ability (0) ☐ **Low (1)** ☐ **Fairly low (2)** ☐ **Fairly high (3)** ☐ **High (4)** ☐ **V. High (5)** ☐

5. Which language(s) do you speak at home? _____**(Please name the languages)**

6. In which of these other languages can you read?

Hausa ☐ **Yoruba** ☐ **English** ☐ **Others ----------(Please name the languages)**

Participant Information

What is your Registration Number? _____

What is your subject combination or name of your degree? _____

What is your class level or year of study? _____

How old are you? _____

Do you have any hearing problem? **Yes** ☐ **No** ☐

If YES please say the nature of the hearing problem_____
_____

Do you have any problem with your vision? **Yes** ☐ **No** ☐

If YES please say the nature of the vision problem you have _____
_____

Do you have any problem with reading texts? **Yes** ☐ **No** ☐

If YES please say the nature of the problem _____
_____

Please indicate your gender **Male** ☐ **Female** ☐

Please write your phone number. I would like to contact you to ask for more information, if necessary. _____

Thank you for participating in my study!

Appendix B: Reading comprehension tasks

Reg. No.:

Instructions

Before you start the test please write your registration number.

Read the passage carefully, making sure you have a good understanding of the passage

Below the passage there are two different tasks, with different instructions. Please follow the instructions provided for each task while doing the task.

Reading passage 1

When we think of intelligent members of the animal kingdom, the creatures that spring immediately to mind are apes and monkeys. But the social lives of some members of the insect kingdom are sufficiently complex to suggest more than a hint of intelligence. ***Among these***, the world of the ants has come in for considerable scrutiny lately, and the idea that ants demonstrate sparks of cognition has certainly not been rejected by those involved in these investigations.

Ants store food, repel attackers and use chemical signals to contact one another in case of attack. Such chemical communication can be compared to the human use of visual and auditory channels (as in religious chants, advertising images and jingles, political slogans and martial music) to arouse and propagate moods and attitudes. The biologist Lewis Thomas wrote, 'Ants are so much like human beings as to be an embarrassment. They farm fungi, raise aphids as livestock, launch armies to war, use chemical sprays to alarm and confuse enemies, capture slaves, engage in child labour, exchange information ceaselessly. They do everything but watch television.'

However, in ants there is no cultural transmission – everything must be encoded in the genes – whereas in humans the opposite is true. Only basic instincts are carried in the genes of a newborn baby, other skills being learned from others in the community as the child grows up. It may seem that this cultural continuity gives us a huge advantage over ants. They never mastered fire nor progressed. Their fungus farming and aphid herding crafts are sophisticated when compared to the agricultural skills of humans five thousand years ago but have been totally overtaken by modern human agribusiness.

Or have they? The farming methods of ants are at least sustainable. They do not ruin environments or use enormous amounts of energy. Moreover, recent evidence suggests that the crop farming of ants may be more sophisticated and adaptable than was thought.

Ants were farmers fifty million years before humans were. Ants can't digest the cellulose in leaves – but some fungi can. The ants therefore cultivate these fungi in

their nests, bringing them leaves to feed on, and then use them as a source of food. Farmer ants secrete antibiotics to control other fungi that might act as 'weeds', and spread waste to fertilize the crop.

It was once thought that the fungus that ants cultivate was a single type that they had propagated, essentially unchanged from distant past. Not so. Ulrich Mueller of Maryland and his colleagues genetically screened 862 different types of fungi taken from ants' nests. These turned out to be highly diverse: it seems that ants are continually domesticating new species. Even more impressively, DNA analysis of the fungi suggests that the ants improve or modify the fungi by regularly swapping and sharing strains with neighbouring ant colonies.

Whereas prehistoric man had no exposure to urban lifestyle – the forcing house of intelligence – the evidence suggests that ants have lived in urban settings for close on a hundred million years, developing and maintaining underground cities of specialized chambers and tunnels.

Task i.
Now answer the questions below. You are free to refer to the passage while answering the questions in task ii and iii. Please circle, a, b, c, d, or e to indicate the answer that you consider correct in the options provided. Please note that only one answer is correct in the options, so you should circle only one answer per multiple-choice question.

1. Which of the following phrases could be considered to represent the main idea of the passage?
   a. Ants' agriculture
   b. Ants' intelligence
   c. Ants' communication
   d. Ants' farming
   e. Ants' culture

2. Which of these abilities, according to the passage distinguishes humans from ants?
   a. The ability to communicate.
   b. The ability to transmit culture.
   c. The ability to cultivate food.
   d. The ability to make war.
   e. The ability to exchange information.

3. Which of the following conclusions can be drawn from the passage?
   a. Apes and monkeys are more intelligent than ants.
   b. Humans are not more intelligent than ants.
   c. Ants exhibit elements of human intelligence.
   d. Apes and monkeys do not have the intelligence to farm like ants.
   e. Human intelligence differs from ants' intelligence.

4. According to the passage, which of the following statements is not true about ants?

a. Ants' agricultural skills are considered advanced because it does not impact negatively on the environment.
b. Ants' sophisticated agricultural skills enable them to cultivate different types of their food.
c. Ants have sophisticated agricultural skills that are energy efficient.
d. Ants' sophisticated farming skills are deemed to be very unsustainable.
e. Ants developed their sophisticated farming skill long before humans.

5. The phrase, ***Among These,*** found in line four makes reference to which of these in the context that it was used?
   a. The worlds of ants.
   b. The sparks of ants' cognition.
   c. The creatures in animal kingdom.
   d. The complex social lives of insects.
   e. The intelligent members of animal kingdom.

6. Which of the following claims did the author make about human agriculture?
   a. Human agriculture is not sophisticated.
   b. Human agriculture is good for herding aphids.
   c. Human agriculture is not good for the environment.
   d. Human agriculture is energy efficient.
   e. Human agriculture is not good for fungi farming.

7. According to the passage, which of the following represents ants' communication?
   a. Visual communication.
   b. Audio-visual communication.
   c. Sensory communication.
   d. Audio communication.
   e. Verbal communication.

8. Which is not true about ants' sophisticated farming?
   a. Ants cultivate a single type of fungus.
   b. Ants were farmers million years ago.
   c. Ants cultivate with fertilizer.
   d. Ants control weeds in their farm.
   e. Ants herd aphids.

9. Which are the main reasons, according to the passage, why ants could be deemed intelligent?
   a. Farming fungi and herding aphids.
   b. Developing and maintaining underground cities.
   c. Controlling weeds and using waste as fertilizer.
   d. Farming, social life, and communication ability.
   e. Storing food and repelling attackers.

10. What does the phrase 'the forcing house of intelligence' suggest in the context it was used?
    a. Ants used forced intelligence to develop their houses.
    b. Intelligent prehistoric men were forced to live in houses.

c. Ants' underground cities were intelligently built with force.
d. Prehistoric men forcefully developed urban life with intelligence.
e. Urban life enabled the development of intelligence.

Task ii.
The text below is a summary of the reading text you read earlier. Please complete the summary using the list of words provided in the table below the summary. You are to write only the correct letter, A – O, in the blank spaces in the summary. You are free to refer to the passage while doing this task.

Ants have sophisticated methods of farming, including herding livestock and growing crops, which are in many ways similar to those used in human agriculture. The ants cultivate a large number of different species of edible fungi, which convert 11 ……. into a form which they can digest. They use their own natural 12 …… as weed-killers and also use unwanted materials as 13 …… . Genetic analysis shows they constantly upgrade these fungi by developing new species and by 14 …… species with neighbouring ant colonies. In fact, the farming methods of ants could be said to be more advanced than human agribusiness, since they use 15 …… methods.

A. aphids	**B.** agriculture	**C.** cellulose	**D.** exchanging
E. energy	**F.** fertilizers	**G**. food	**H**. fungi
I. growing	**J.** interbreeding	**K**. natural	**L.** other species
M. secretions	**N.** sustainable	**O.** environment	

Instructions

Read the passage carefully, making sure you have a good understanding of the passage.

Below the passage there are two different tasks, with different instructions. Please follow the instructions provided for each task while doing the task.

Reading passage 2

In general, it is plausible to suppose that we should prefer peace and quiet to noise. And yet most of us have had the experience of having to adjust to sleeping in the mountains or the countryside because it was initially 'too quiet', an experience that suggests that humans are capable of adapting to a wide range of noise levels. Research supports this view. For example, Glass and Singer (1972) exposed people to short bursts of very loud noise and then measured their ability to work out problems and their physiological reactions to the noise. The noise was quite disruptive at first, but after about four minutes the subjects were doing just as well on their tasks as ***control subjects*** who were not exposed to noise. Their physiological arousal also declined quickly to the same levels as those of the control subjects.

But there are limits to adaptation and loud noise becomes more troublesome if the person is required to concentrate on more than one task. For example, high noise levels interfered with the performance of subjects who were required to monitor three dials at a time, a task not unlike that of an aeroplane pilot or an air-traffic controller (Broadbent, 1957). Similarly, noise did not affect a subject's ability to track line with a steering wheel, but it did interfere with the subject's ability to repeat numbers while tracking (Finkelman and Glass, 1970).

Probably the most significant finding from research on noise is that its predictability is more important than how loud it is. We are much more able to 'tune out' chronic background noise, even if it is quite loud, than to work under circumstance with unexpected intrusions of noise. In Glass and Singer study, in which subjects were exposed to bursts of noise as they worked on a task, some subjects heard loud bursts and others heard soft bursts. For some subjects, the bursts were spaced exactly one minute apart (predictable noise); others heard the same amount of noise overall, but the bursts occurred at random intervals (unpredictable noise). Subjects reported finding the predictable and unpredictable noise equally annoying, and all subjects performed at about the same level during the noise portion of the experiment. But the different noise conditions had quite different after-effect when the subjects were required to proofread written material under conditions of no noise. The unpredictable noise produced more errors in the later proofreading task than predictable noise; and soft, unpredictable noise actually produced slightly more errors on this task than the loud, predictable noise.

Apparently, unpredictable noise produces more fatigue than predictable noise, but it takes a while for this to take its toll on performance.

Predictability is not the only variable that reduces or eliminates the negative effects of noise. Another is control. If the individual knows that he or she can control the noise, this seems to eliminate both its negative effects at the time and its after-effects. This is true even if individual never actually exercises his or her option to turn the noise off (Glass and Singer, 1972). Just the knowledge that one has control is sufficient.

The studies discussed so far exposed people to noise for only short periods and only transient effects were studied. But the major worry about noisy environments is that living day after day with chronic noise may produce serious, lasting effects. One study, suggesting that this worry is a realistic one, compared elementary school pupils who attended schools near Los Angeles's busiest airport with students who attended schools in quiet neighborhoods (Cohen et al., 1980). It was found that children from noisy schools had higher blood pressure and were more easily distracted than those who attended the quiet schools.

Task i.

Now answer the questions below. You are free to refer to the passage while answering the questions in task ii and iii. Please circle, a, b, c, d, or e to indicate the answer that you consider correct in the options provided. Please note that only one answer is correct in the options, so you should circle only one answer per multiple-choice question.

1. The writer suggests that people may have difficulty sleeping in the mountains because
   a. humans do not prefer peace and quiet to noise.
   b. they may be exposed to short bursts of very strange sounds.
   c. humans prefer to hear a certain amount of noise while they sleep.
   d. they may have adapted to a higher noise level in the city.
   e. humans are scared of the quiet and peace in the mountains.

2. In noise experiments, Glass and Singer found that
   a. problem-solving is much easier under quiet conditions.
   b. physiological arousal prevents the ability to work.
   c. bursts of noise do not seriously disrupt problem-solving in the long term.
   d. the physiological arousal of control subjects declined quickly.
   e. unexpected noise intrusion is not a problem in problem-solving conditions.

3. Researchers discovered that high noise levels are not likely to interfere with the
   a. successful performance of a single task.
   b. tasks of pilots or air traffic controllers.
   c. ability to repeat number while tracking moving lines.
   d. ability to monitor three dials at once.
   e. successful performance on a multiple task.

4. According to the passage, people are less able to work in conditions
   a. where they are able to predict noise.
   b. where they are able to control noise.
   c. where they are unable to predict noise.
   d. where the background noise is quite loud.
   e. where they are exposed to no noise.

5. The statement, 'subjects exposed to noise find it difficult at first to concentrate on problem-solving tasks' is attributed to which of these researchers?
   a. Glass and Singer
   b. Broadbent
   c. Finkelman and Glass
   d. Cohen et al.
   e. None of the above

6. According to the passage, in how many ways can humans control the adverse effect of noise on performance?
   a. In 3 ways.
   b. In 2 ways.
   c. In 4 ways.
   d. In 6 ways.
   e. In 5 ways.

7. Which of the researchers found permanent effect for noise on humans?
   a. Cohen et al. (1980).
   b. Finkelman and Glass (1970).
   c. Glass and Singer (1972).

d. Broadbent (1957).
e. None.

8. Which of the following statements best reflects the author's view on noise?
   a. Noise could affect performance in every condition.
   b. Humans could function well in every noise condition.
   c. Humans function well in noise conditions they could predict or control.
   d. Noise could affect the performance of elementary school pupils.
   e. Noise could affect performance only if intense.

9. The phrase ***control subjects*** refer to which of the following in the context it was used in the passage?
   a. Subjects exposed to short burst of noise.
   b. Subjects that worked in silence.
   c. Subjects that monitored three dials.
   d. Subjects that could not repeat numbers while tracking.
   e. Subjects that could be controlled.

10. According to the passage, individuals could be able to do away with the short and long term negative effect of noise,
    a. if the noise is predictable.
    b. if the noise is controllable.
    c. if the noise is unpredictable.
    d. if the noise is indispensible.
    e. if the noise is uncontrollable.

Task ii.

The text below is a summary of the reading text you read earlier. Please complete the summary using the list of words provided in the table below the summary. You are to write only the correct letter, A – J, in the blank spaces in the summary. You are free to refer to the passage while doing this task. You may use any letter more than once.

Glass and Singer (1972) showed that situation in which there is intense noise have less effect on performance than circumstance in which 11…… noise occurs. Subjects were divided into groups to perform a task. Some heard loud bursts of noise, others soft. For some subjects, the noise was predictable, while for others its occurrence was random. All groups were exposed to 12…… noise. The predictable noise group 13…… the unpredictable noise group on this task.
In the second part of the experiment, the four groups were given a proofreading task to complete under conditions of no noise. They were required to check written material for errors. The group, which had been, exposed to unpredictable noise 14…… the group, which had been exposed to predictable noise. The group, which had been exposed to loud predictable noise, performed better than those who had heard soft, unpredictable bursts. The results suggest that 15…… noise produces fatigue but that this manifests itself later.

A. no control over	**B.** unexpected
C. intense	**D.** the same amount of
E. performed better than	**F**. performed at about the same level as

G. no	**H**. showed more irritation than
I. made more mistakes than	**J.** different types of

Chapter 5

5. Summary, synthesis and prospect

While explaining the inconsistent findings in studies that investigated the LIH, Cummins (1976) observed that transferability of L1 academic skills to L2 is most likely to occur in 'additive bilingual' situations (where competent L1 readers are also gaining competence in L2 reading) than in 'subtractive bilingual' situations (where L1 reading competence is diminishing in favour of L2 reading competence). Several previous investigations conducted in EFL contexts, with 'additive bilingual' readers, have suggested a positive relationship between reading comprehension performance in L1 and L2, and cognitive and metacognitive strategies used while processing texts in the languages. However, the relationship between cognitive and metacognitive processing and reading comprehension performance in L1 and L2 had not been examined in ESL contexts where English is a lingua franca, and readers therefore could better be described as 'subtractive bilinguals'. Although the current study was not designed to test this assumption, it is being viewed that Cummins' position suggests that L1 and L2 reading in EFL and ESL contexts may diverge. Deliberate investigation of L1 and L2 text processing in an ESL context is warranted to be able to provide broader understanding of reading in L1 and L2 in EFL and ESL contexts. This thesis therefore investigated cognitive and metacognitive strategy use in first and second language text processing among Igbo ESL readers in Nigeria. It focused particularly on the effect of cognitive and metacognitive processes on L1 and L2 reading comprehension performance.

The effect of L2 language proficiency and vocabulary size on cognitive and metacognitive processes during L2 text processing was also investigated. Previous investigations on the role of L2 proficiency on cognitive and metacognitive processes yielded conflicting results. Some researchers claim that L2 language proficiency plays a role in cognitive and metacognitive processing, while others suggested that L2 language proficiency play no role in cognitive and metacognitive processing. It is however unfortunate that in many of these studies, L2 proficiency was not explicitly measured. In respect of the relationship between cognitive and metacognitive processes and L2 vocabulary size during L2 text processing, not much is known given that the only study which explored this relationship (Al-Nujaidi, 2003) in an EFL context tended to measure the EFL readers' 'trait' cognitive and metacognitive strategies, rather than the 'state' cognitive and metacognitive strategies used by the readers during the reading test.

In this chapter, the results from three studies reported in chapters 2, 3, and 4 are summarized and evaluated. Then a synthesis of the results from the three studies is conducted to draw some general conclusions on cognitive and metacognitive processes in L1 and L2 text processing as it affects this group of ESL readers.

5.1. Summary

The first article in the thesis – reported in Chapter 2 – was guided by the hypotheses that this group of Igbo L1 readers, who are not highly skilled readers in their native language, will report the use of more metacognitive strategies to process Igbo texts, which will have a significant positive effect on their reading comprehension performance in Igbo text processing. These hypotheses were based on previous L1 reading studies with additive bilinguals readers in EFL contexts that have suggested

that readers, particularly at higher-grade levels reported more frequent use of cognitive and metacognitive strategies, which had a significant effect on their reading comprehension performance (Schoonen et al., 1998; Tercanlioglu, 2004; Young & Oxford, 1997). Therefore three research questions were formulated to explore the hypotheses as follows:

1: Which are the cognitive and metacognitive strategies used during Igbo reading tasks by native speakers of Igbo enrolled in a teacher-training programme in Nigeria?

2: What is the relative effect of cognitive and metacognitive strategy use on these participants' reading comprehension?

3: Which cluster of strategies (cognitive or metacognitive) did readers report using most frequently while processing Igbo texts?

To answer the research questions, a study was conducted with a group of Igbo native speakers studying in a teacher trainees' college in Nigeria. Reading comprehension ability in Igbo was tested, and strategies used by the readers to aid comprehension during the reading test were measured using a strategy questionnaire. It was expected, based on the hypotheses set for the study that this group of Igbo readers will report more metacognitive than cognitive strategy use, and that metacognitive strategy use will have significant positive effect on their reading comprehension performance. It turned out that the first hypothesis was not supported for this group of L1 readers because their reported use of cognitive and metacognitive strategies did not differ significantly. However, the second hypothesis was supported as metacognitive strategy use contributed significantly to their reading comprehension performance, while cognitive strategy use did not. Therefore, with respect to the first hypothesis, it was concluded to the contrary that cognitive and metacognitive strategies were used at similar rates during the reading text, whereas in respect of the

second hypothesis it was concluded that metacognitive strategy use particularly aided reading comprehension in Igbo.

Subsequently, the effect of cognitive and metacognitive strategy use on reading comprehension performance in ESL reading, and the role of second language vocabulary size and proficiency in the use of cognitive and metacognitive strategies during ESL reading was explored in chapter 3. This study was motivated by the hypothesis that cognitive and metacognitive strategy use will have a significant positive effect on reading comprehension performance. It was also hypothesized that L2 proficiency will have a positive and significant relationship with cognitive and metacognitive strategy use in L2 reading comprehension of the Igbo native speakers, and that vocabulary knowledge will positively and significantly relate with cognitive and metacognitive strategy use during L2 text processing. The first hypothesis was inspired by previous studies in EFL contexts (e.g., Nergis, 2013; Phakiti, 2003a, 2003b), which suggest that cognitive and metacognitive strategy use significantly contribute to reading comprehension performance. The second hypothesis derives from previous studies with EFL readers (e.g. Bernhardt, 2000; Ghafournia & Afghari, 2013; Zhang & Wu, 2009) claiming that L2 proficiency contributes to cognitive and metacognitive strategy use in L2 reading comprehension, and the third hypothesis derives from a claim in the only study (Al-Nujaidi, 2003) that previously investigated the relationship between cognitive and metacognitive strategy use and vocabulary size in EFL setting, in which strategy use was measured as 'trait' strategy use. Al-Nujaidi's study suggests that cognitive strategy use is related with vocabulary size. Three research questions were therefore formulated to enable the investigation of these hypotheses as follows:

1. Which are the RCSs used by teacher training students who are native speakers of Igbo, during L2 reading tasks?

2. What is the relative effect of cognitive and metacognitive strategy use on reading comprehension for the Igbo ESL speakers?

3. Which is the relative effect of L2 vocabulary size, and L2 proficiency levels on the cognitive and metacognitive strategies used by teacher training students, who are native speakers of Igbo, during L2 reading?

A study with a group of Igbo ESL readers enrolled in a teacher trainee college in Nigeria was therefore conducted to provide answers to these research questions. In the study, the participants did reading comprehension tasks in English; strategies used to process the L2 texts were measured with a reading strategies questionnaire. The L2 proficiency of the participants was tested with the grammar part of the Oxford Placement Test (Allan, 2004), while the participants' vocabulary size was measured with the Vocabulary Size Test (Nation & Beglar, 2007). Based on the hypotheses that motivated the study, it was expected that cognitive and metacognitive strategy use, as in previous studies, would have significant positive effect on reading comprehension performance of the readers. It was also hoped that L2 proficiency would have a positive and significant relationship with cognitive and metacognitive strategy use in L2 reading comprehension of the Igbo native speakers, as was the case in some previous EFL studies. And in contrast with Al-Nujaidi's findings, it was anticipated that vocabulary knowledge would positively and significantly relate with both cognitive and metacognitive strategy use during L2 text processing. However, cognitive and metacognitive strategy use did not contribute significantly to reading comprehension performance of this group of ESL readers, and their L2 language proficiency was also not related with their cognitive and metacognitive strategy use

during L2 text processing. Therefore, the first two hypotheses were not supported. However, the study, as Al-Nujaidi (2003), found that high cognitive strategy use was significantly related with high vocabulary size. This finding suggests that the hypothesis on the relationship between these variables was partly correct for the ESL readers in the study.

The effect of cognitive and metacognitive strategy use on ESL learners' reading comprehension performance was reexamined in chapter 4. Previous L1 and L2 studies have consistently claimed that cognitive and metacognitive strategy use significantly contributes to reading performance (e.g., Phakiti, 2003a, 2003b; Schoonen et al., 1998), which however was not supported by the finding in the study reported in chapter 3, casting some doubt on the veracity of the claim in the study. The decision was therefore taken to conduct another study, in which in depth reexamination of the effect of cognitive and metacognitive strategy use on the reading performance of Igbo ESL learners would be carried out. Therefore as the studies reported in chapters 2 and 3, the study in chapter 4 was also motivated by the hypothesis that cognitive and metacognitive strategy use would have significant positive effect on reading comprehension performance of the ESL readers, as was the case in previous L1 and L2 studies (e.g., Schoonen et al., 1998; Shoerey & Mokhtari, 2001; van Gelderen et al., 2007). And as has previously been reported (e.g. Phakiti, 2003, 2008), it was also hypothesized that cognitive and metacognitive strategy use would distinguish high and low achievers in ESL reading comprehension. The effect of the L2 learning context (i.e. ESL context where English is a lingua franca, and not a foreign language) on the strategic behaviour of Igbo ESL readers was also anticipated. Three research questions were therefore formulated to explore these hypotheses thus:

1. Which are the cognitive and metacognitive strategies used by this group of ESL learners during the English reading tasks?

2. What is the relative effect of cognitive and metacognitive strategy use on the participants' RC performance in English?

3. Did high achievers in the RC test differ from low achiever in the use of cognitive and metacognitive strategies?

4. Which strategy item was most frequently used, and least frequently used during the RC test?

Another study with a group of Igbo ESL readers drawn from two tertiary institutions in Nigeria was therefore conducted to provide answers to these research questions. Reading comprehension performance was measured with another set of reading comprehension tasks in English, while cognitive and metacognitive strategy use was still measured with the same strategy questionnaire used for the study in chapter 3. On the basis of the hypotheses that motivated the study it was expected that cognitive and metacognitive strategy use, as has previously been reported, would have significant positive effect on reading comprehension performance of Igbo ESL readers in the study. The second expectation was that high achievers would report higher frequency of use for cognitive and metacognitive strategies than the low achievers in the reading task, while the third expectation was that the reported use of some strategy items in the study could suggest effect of the ESL context in which the study was conducted. As the first hypothesis predicted, and in contradiction to the finding reported for the study in chapter 3, the combination of cognitive and metacognitive strategy use significantly and positively contributed to reading comprehension performance of the ESL readers in the study, although only metacognitive strategy use uniquely contributed significantly to performance in the

reading comprehension task. It also turned out that as the second hypothesis holds, high achievers on the reading comprehension task reported higher frequency usage for cognitive and metacognitive strategies during the reading task. And as was anticipated in the third hypothesis, the effect of ESL context on strategy use was suggested by the low rating of the use of translation strategy by participants. Contrary to findings reported in many previous studies (e.g. Kern, 1994; Yau, 2009) with EFL readers on the popularity of translation strategy among EFL readers, the study again as in chapter 3, reported that the readers never used translation strategy during the reading task. On the strength of these findings, the study concluded that high frequency use of cognitive and metacognitive strategies in ESL reading comprehension is essential for improved performance in reading comprehension, and it also has the capacity to distinguish high achievers from low achievers in reading comprehension tasks. The study also concluded that there is a chance that the use of translation as a reading strategy is context sensitive.

The next section presents a synthesis of the findings in all the three studies with a view to running some comparative analysis between them in order to draw some broad conclusions on cognitive and metacognitive strategy use in L1 and L2 reading comprehension.

5.2. Synthesis and conclusions

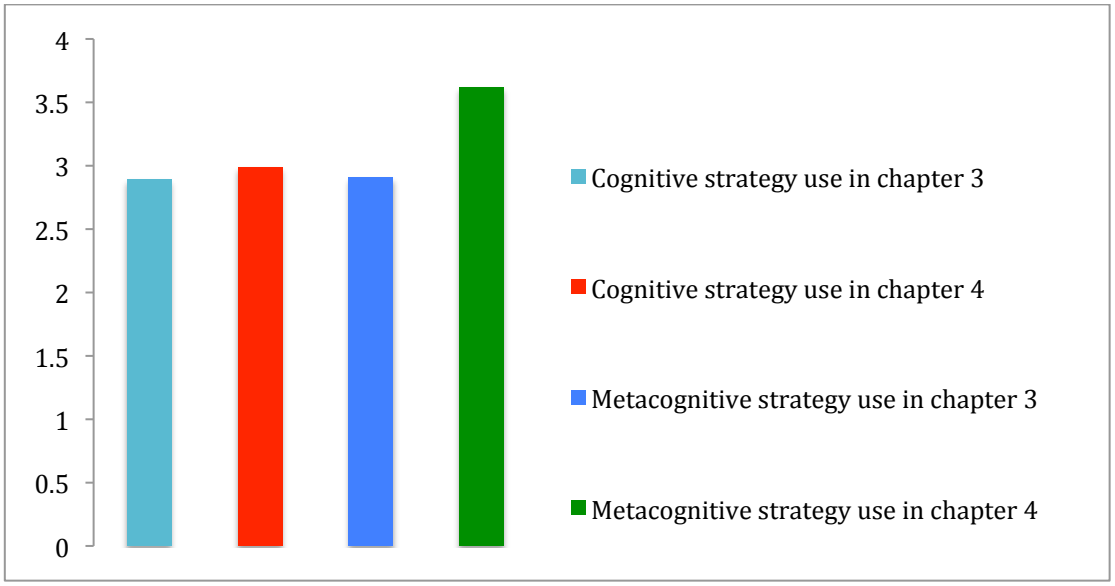
The articles in this thesis have provided some insight into how cognitive and metacognitive strategy use could affect reading in the L1 (Igbo) and L2 (English) for a group of Igbo native speakers in Nigeria. However, the finding in chapter 3, which suggested that cognitive and metacognitive strategy use do not significantly contribute to performance in reading comprehension was curious as it is contrary to

claims in many previous studies (e.g. Phakiti, 2003a, 2003b, 2008; Schoonen et al., 1998; van Gelderen at al., 2007). Although few studies (e.g. Guo & Roehrig, 2011) made a similar claim, the study reported in chapter 4 was conducted to ensure that sound and valid conclusions are reached. As it turned out, cognitive and metacognitive strategy use significantly contributed to performance in reading comprehension in the study reported in chapter 4, contrary to the finding of the study in chapter 3. The conflicting findings in the two studies raises question as to whether or not the L2 reader's cognitive and metacognitive strategy use varied in relation to performance at different reading tasks situations. It is important to note that the mean performance of participants on the reading comprehension task in the study reported in chapter 3 (M = 35, SD = 12.53) appears substantially lower than the mean performance of participants on the reading comprehension task in the study reported in chapter 4 (M = 53.2, SD = 16.49). Therefore it is hypothesized that if cognitive and metacognitive strategy use substantially contributes to performance in reading comprehension tasks, higher usage rates for cognitive and metacognitive strategies would be reported for the reading comprehension task in the study reported in chapter 4 in which reading performance was higher.

To test the hypothesis, a decision was made to assess whether or not the t-values obtained in the t-tests comparing cognitive and metacognitive strategy use in the two studies yielded similar or dissimilar t-values, since the issue of assumed unequal variance and unequal sample size could not permit direct statistical comparison between the variables. The visual inspection of Figure 2, which is a chart indicating cognitive and metacognitive strategies used during reading tasks in studies in chapter 3 and 4, suggests higher frequency of use for cognitive and metacognitive

strategies during reading tasks in the study in chapter 4 in contrast with the study in chapter 3, which indicates lower frequency of use for the strategies.

Fig. 2. Average ratings of cognitive and metacognitive strategy use for reading tasks in Chapter 3 and Chapter 4



However, there is no way of telling, whether or not this perceived visual difference is significant.

To address this concern, a second layer of analysis was conducted in which perceived cognitive and metacognitive strategy use in the study reported in Chapter 3, as well as in the study reported in Chapter 4 was compared with *t*-tests. This analysis was to enable a decision to be made on whether or not cognitive and metacognitive strategy use for this group of ESL readers differed in relation to performance on the reading tasks. It was decided that if the *t*-tests comparing cognitive and metacognitive strategy use for reading tasks in Chapter 3 and 4 should yield similar *t*-values (i.e. both yielding either significant or non significant *t*-values), it would be interpreted as

indicating that variation in performance observed between the two reading tasks may not be attributed to cognitive and metacognitive strategy use. However, if on the other hand the *t*-tests yield dissimilar *t*-values (i.e. one yielding significant *t*-value, while the other yields non-significant *t*-value), it would then be interpreted as indicating that the observed variation in performance in reading comprehension between the two studies could be attributed to the frequency of cognitive and metacognitive strategies reported used during the reading tasks. The assumption is that if the variation observed in the reading comprehension performance of the ESL readers between the two studies may not be attributed to the reported frequency of use for cognitive and metacognitive strategies, the *t*-test result should then be similar otherwise it should be assumed that the variation between performance in the reading tasks could be a function of the varied frequency of cognitive and metacognitive processes underlying the processing of texts in the two reading conditions.

The result of the paired sample *t*-test, which compared reported use of cognitive strategies with reported use of metacognitive strategies during text processing in study 1, indicated that the reported use of metacognitive strategies during text processing in study 1 (M = 2.91, SD = .578) was not significantly higher than the reported use of cognitive strategies (M = 2.89, SD = .627), t (24) = -.121, $p >$ .05. Whereas the paired samples *t*-test result comparing reported use of cognitive strategies with metacognitive strategies during text processing in study 2 indicated that the reported use of metacognitive strategies during text processing in study 2 (M = 3.61, SD = .718) was significantly higher than reported use of cognitive strategies (M = 2.99, SD = .612), t (79) = 8.31, $p <$ .000. Therefore, on the basis of the fact that participants in the study in chapter 4 reported significantly higher use of metacognitive strategies than participants in the study reported in chapter 3, it could

be concluded that higher frequency use for metacognitive strategies may have accounted for the variability in reading comprehension performance observed between the study in Chapter 3 and 4 in the thesis. While readers in the study Chapter 3 tended to have employed cognitive and metacognitive strategies at equal rates during text processing, readers in the study Chapter 4 employed significantly higher frequency use of metacognitive strategies to process texts. As such it could be assumed that high frequency use of metacognitive strategy may have accounted for variability in the reading performance of the ESL readers in the two studies. The implication therefore is that reading performance in the study in Chapter 3 would have been better had the frequency of metacognitive strategy use been higher. This finding corroborates the claim that metacognitive processing is important for reading comprehension in the L2 (Nergis, 2013; van Gelderen et al., 2004).

The conclusions that could be drawn from the studies reported in this thesis is that in L1 and L2 reading, context could be important in determining cognitive and metacognitive processes that readers employ, and how they employ those processes. Therefore cognitive and metacognitive processes during text processing in L1 and L2 in an EFL context may differ for ESL readers in contexts where English is a lingua franca. Where such readers appear to use cognitive and metacognitive strategies at similar rates while processing L1 texts, they tend to use higher rates of metacognitive strategies to process L2 texts.

Secondly, high frequency of metacognitive strategy use would almost certainly guarantee better performance on reading comprehension tasks whether in the L1 or L2. But the inability to substantially use metacognitive strategies during text processing tends to diminish performance in reading comprehension.

Thirdly, L2 language proficiency did not significantly facilitate cognitive and metacognitive processing in L2 text processing. This suggests that strategic ability may not be influenced by linguistic knowledge. The two are therefore unrelated as the study in chapter 3 indicates.

Fourthly, the ESL readers' vocabulary size is important in determining readers' ability to utilize cognitive strategies. High use of cognitive strategies was associated with higher vocabulary size. Therefore ESL readers found to have high vocabulary size in English tended to use cognitive strategies to a higher degree.

Lastly, translation strategy could be context sensitive and is most likely to be used by readers in EFL contexts as opposed to ESL reading contexts where English is a lingua franca. Therefore, it may be necessary in the future not to label this strategy as strategy used in L2 reading, but rather as strategy used by L2 readers who are 'additive bilingual' readers.

5.3. Limitations of the studies

At this juncture it may be necessary to observe that studies reported in this thesis are generally plagued with some limitations, which makes it necessary to advise that caution should be applied in interpreting some of the findings. One limitation of the studies in this thesis is the use of one single instrument to elicit data on reading strategy use, which potentially could have reduced the validity of the findings in the studies. Single data elicitation method has been found to suffer from measurement bias leading to current preference for multiple data elicitation methods in research. Therefore, it is being assumed that the use of multiple strategy elicitation methods could have increased the validity of the findings of the studies because it could have checked the measurement bias concerns created by the use of a single data elicitation

method. In recent times, the popular position in research is that multiple data elicitation method enables the testing of validity of findings by converging information from different sources on a particular phenomenon (Carter, et al., 2014; Denzin, 1970; Doyle, et al., 2016; Lynch, 1996). In studies reported in this thesis, the use of an additional strategy elicitation method for confirmatory purposes, particularly relating to the research results and conclusions, or the appropriateness of the strategy questionnaire used to elicit data in the studies, could have been ideal. This however was not possible due to the challenges encountered by the researcher while trying to elicit data using alternative data elicitation methods during the pilot study (see chapter one for details).

Another limitation of studies in the thesis, particularly the ones reported in Chapter 2 and 3, derives from sample size. Small sample bias could be a concern in these studies given that it has been suggested that small sample sizes in research can detect large effect size, which could lead a researcher to committing a type II error by rejecting the null hypothesis when the null hypothesis is actually correct (Field, 2013). In other words, small sample size has the tendency to increase the chance that a researcher would assume as true a false premise. In this case, it is probably right to advise that caution should be applied in interpreting some aspects of the findings of studies reported in chapter 2 and 3. Of particular concern are aspects of the study that examined the differential in the relationship between reading comprehension performance and cognitive and metacognitive strategy use of high and low achievers in reading comprehension tasks. Splitting of groups in those studies could have resulted in using small sample sizes for the analyses conducted, which may prevent some findings in such studies from being extrapolated.

Studies reported in this thesis did not explore the role that L1 literacy of the participants could have played in their L2 reading strategy use. This is also considered a limitation of the thesis. Several studies with EFL readers have indicated that L1 literacy levels relate to L2 reading strategy use (e.g. Upton and Lee-Thompson, 2001; van Gelderen et al., 2007). Within the linguistic interdependency (LI) school of thought, there is a strong belief that readers transfer their L1 literacy skills and strategies to L2 reading. Many of the studies reviewed in the thesis provided support for this position. However, it was also clear that most of these studies were with EFL readers, and not ESL readers. Therefore examining the role that L1 literacy of the ESL readers in the thesis could have played in their strategy use during L2 reading tasks could have provided additional insight into the nature of L2 reading strategy use. The researcher did not however conduct this examination because the studies reported in this thesis were not intended to test the LIH or LTH.

5.4. Implications of the studies

The above-mentioned limitations notwithstanding, the three studies reported in this thesis still have some positive implications for the teaching of reading in first and second languages, particularly Igbo and English in Nigerian schools. For example, these studies have demonstrated that even in Nigerian classrooms, the role that cognitive and metacognitive strategy use plays in enhancing performance in reading comprehension tasks in first and second language can no longer be overlooked. Talking from experience as a teacher, it is often not clear to teachers, particularly language teachers in Nigerian classrooms why some readers struggle to comprehend written texts. As a result, language teachers in Nigeria are often faced with the 'maddening experience of having a student who appears to understand every sentence

and yet cannot answer the simplest question about a passage as a whole' (Eskey, 1973: 177). These studies therefore draw the attention of teachers, who have very often found themselves in this difficult situation, to the fact that such students could probably be helped to comprehend written texts better if only they could be instructed on how to effectively use cognitive and metacognitive strategies during reading. Several studies (e.g. Akkakoson, 2013; Dabarera et al., 2014) have indicated that strategy instruction facilitates effective use of reading strategies, which resulted in improved students' performance in reading comprehension tasks. Hence L1 and L2 teachers in Nigeria could therefore move away from the traditional method of teaching reading and adopt a pragmatic approach in which strategy instruction is considered vital in teaching reading.

In addition to having positive implication on how teachers teach reading in L1 and L2, particularly in Nigerian schools, the study reported in chapter 3 has substantial implication for the teaching of L2 vocabulary to L2 readers. The study suggests a strong relationship between L2 readers' vocabulary size and the rate at which they use cognitive strategies. Readers with high vocabulary size reported more frequent use of cognitive strategies, while readers with low vocabulary size reported less frequent use of these strategies. The implication is that the teaching of L2 vocabulary could potentially increase L2 readers' use of cognitive strategies, which in turn could facilitate RC performance during L2 reading tasks. As language teachers become aware of these developments, assisting L2 readers to have better comprehension of written texts would become less challenging to language teachers. For example, the L2 teacher that is aware of the relationship between vocabulary size and cognitive strategy use needs not to be told of the need to the students L2 vocabulary and cognitive and metacognitive strategy use.

5.5. Future research

By investigating cognitive and metacognitive strategy use in L1 and L2 reading comprehension with teacher trainees and undergraduate students in a context where English is a lingua franca, this thesis has provided insight into text processing among this group of ESL readers. We now know that cognitive and metacognitive ability may not be contingent on L2 language proficiency of the readers in the study, high vocabulary size is related to high use of cognitive strategies by the readers, and that the group of readers in this study do not use translation strategy during reading. Each one of these findings raises some unanswered questions that call for further investigations in the future.

For example, the claims in the study about the ESL readers' use of cognitive and metacognitive processes during L1 and L2 texts processing, were based on the analysis of self-reported cognitive and metacognitive strategies used by the readers during the reading tasks. Given social desirability concerns with self-report questionnaires like the one used in the study, would those claims be reaffirmed if a more objective measurement tool were employed to elicit data? On the basis of this question, it would be interesting to use a more objective method, e.g. eye tracking, to investigate text processing in L1 and L2 among this group of ESL readers. Such future study would focus on processing speed in Igbo and English, and how reading comprehension is affect by this factor. To be able to make a broader claim that L1 and L2 text processing diverge in contexts where English is a lingua franca, it is proposed that such future study would include participants from other major linguistic groups in Nigeria.

It is also envisaged that a eye tracking study would provide a more objective conclusion on whether or not L2 language proficiency bears any relationship with text processing in the L2. In the current study, it is claimed that no relationship exists between cognitive and metacognitive processing and L2 language proficiency. The question is; how tenable is this claim given that cognitive and metacognitive processes were measured with self-report questionnaire? Although similar claims had been made in previous studies, and those studies, like the current one, were also plagued with methodological constraints (e.g. inability to explicitly measure L2 proficiency, as well as the use of self-report questionnaires to elicit data on strategy use), leading them to draw conflicting conclusions on the relationship between L2 proficiency and the use of cognitive and metacognitive strategies to process L2 texts. The eye tracking methodological consideration has the potential to provide more objective assessment of readers' online cognitive processes, which could then be correlated with their explicitly measured L2 language proficiency to draw more acceptable conclusions on the relationship between L2 language proficiency and cognitive strategies in L2 text processing.

There is also need to further explore the use of translation strategy in a large-scale study involving ESL readers from the three major ethnic groups in Nigeria. Such a large-scale study will potentially reveal whether the use of the cognitive strategy of translation is actually a strategic trait associated with EFL readers, and not ESL readers in contexts where English is a lingua franca, as the current study suggests. Or whether the inability to use the cognitive strategy of translation could be a strategic trait associated with only the Igbo native speakers in Nigeria, and therefore should not be generalized to other ESL readers in Nigeria or elsewhere that English is a lingua franca. The cognitive strategy of translation or metal translation, as Kern

(1994) refers to it, has widely been reported as a strategy popular with reading in the L2. But most studies that reported the use of this strategy among L2 readers were conducted with 'additive bilingual' readers. As an Igbo ESL reader myself, I find it difficult to believe that L2 readers translate into their L1 to make meaning. This is a strategy that I have never used in reading, and I believe that most Igbo ESL readers are not likely to use this strategy too, as this study has indicated. However, it may not be the case with native speaker of other native languages in Nigeria, who sometimes appear keener to speak and read in their L1 than the Igbo native speakers. It is therefore on the basis of this background that I am looking forward to conducting a study that will include ESL readers from the three major Nigerian languages, in which reading is taught, to thoroughly investigate the phenomenon of translating from L2 to L1 to construct meaning in the L2. Such study will provide better understanding about how this cognitive strategy relates to L2 text processing. It also would be interesting to know if this strategy actually leads to meaningful comprehension among readers who use it. The question is; how could readers with limited ability to comprehend the L2 text manage to 'successfully' translate into the L1 the L2 text that the readers find challenging to comprehend, particularly when their L1 and L2 share no historical links?

Lastly, the role that cognitive and metacognitive strategy use could play during reading comprehension is probably well established. However, the question of which other factors, apart from proficiency, could affect the use of cognitive and metacognitive strategies among L2 readers needs to be explored further. As such, investigating how factors like the L2 reader's reading motivation and working memory capacity could affect the use of these strategies forms part of my future research. Within the framework of the proposed research, it is hoped that how

variables like L2 language proficiency, vocabulary size, reading motivation, and working memory capacity relate and interact with cognitive and metacognitive processes during L2 text processing would be explored. The aim being to model cognitive and metacognitive strategy use in L2 text processing based on readers individual differences, which is hoped would provide deeper understanding of cognitive and metacognitive processes underlying text processing in L2.

5.6. References

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Appendix A: Cognitive and metacognitive strategies questionnaire

REG. NO. _____

Directions: Below are a number of statements that describe some of the things people do when they are taking a reading test. Read each statement and indicate how you thought during the test. Please feel free to take a look at the passage as you answer the questionnaire. Choose 1 (Never), 2 (Sometimes), 3(Often), 4(Usually), and 5(Always).

Your thinking

1. I translated the reading text and tasks into Igbo to enhance my understanding	1	2	3	4	5
2. I tried to understand the text and questions regardless of my vocabulary knowledge	1	2	3	4	5
3. I tried to find topics and main ideas of the passage without reading it in detail	1	2	3	4	5
4. I read the text and questions several times to better understand them	1	2	3	4	5
5. I used my prior knowledge to help understand the text	1	2	3	4	5
6. I was aware of what and how I was doing in the test	1	2	3	4	5
7. I checked my answers as I progress in the test	1	2	3	4	5
8. I corrected mistakes immediately when found	1	2	3	4	5
9. I determined what the test questions require me to do	1	2	3	4	5
10. I was aware of the need to plan a course of action	1	2	3	4	5

11. I tried to understand the questions adequately before attempting to answer	1	2	3	4	5
12. I was aware of selected strategies to help me complete the test questions before solving them	1	2	3	4	5
13. I checked my accuracy as I progressed through the test	1	2	3	4	5
14. I identified relevant information in the text to help me understand the text and answer the questions	1	2	3	4	5

Appendix B: Oxford placement test

Oxford Placement Test 1

Grammar Test **PART 1**

Name .....

Total Listening ..... / 100

Total Grammar ..... / 100

Grand Total ..... / 200

Look at these examples. The correct answer is ticked.

a In warm climates people | like ✓ | likes | are liking | sitting outside in the sun.

b If it is very hot, they sit | at | in ✓ | under | the shade.

Now the test will begin. Tick the correct answers.

1 Water | is to boil | is boiling | boils | at a temperature of 100°C.

2 In some countries | there is | is | it is | very hot all the time.

3 In cold countries people wear thick clothes | for keeping | to keep | for to keep | warm.

4 In England people are always talking about | a weather | the weather | weather |.

5 In some places | it rains | there rains | it raining | almost every day.

6 In deserts there isn't | the | some | any | grass.

7 Places near the Equator have | a warm | the warm | warm | weather even in the cold season.

8 In England | coldest | the coldest | colder | time of year is usually from December to February.

9 | The most | Most of | Most | people don't know what it's really like in other countries.

10 Very | less | little | few | people can travel abroad.

11 Mohammed Ali | has won | won | is winning | his first world title fight in 1960.

12 After he | had won | have won | was winning | an Olympic gold medal he became a professional boxe

13 His religious beliefs | have made him | made him to | made him | change his name when he became champion.

14 If he | has | would have | had | lost his first fight with Sonny Liston, no one would have been surprised.

15 He has travelled a lot | both | and | or | as a boxer and as a world-famous personality.

16 He is very well known [all in | all over | in all] the world. 1

17 Many people [is believing | are believing | believe] he was the greatest boxer of all time. 1

18 To be the best [from | in | of] the world is not easy. 1

19 Like any top sportsman Ali [had to | must | should] train very hard. 1

20 Such is his fame that people [would | will | did] always remember him as a champion. 2

The history of [aeroplane | the aeroplane | an aeroplane] is 2
[quite a | a quite | quite] short one. For many centuries men 2
[are trying | try | had tried] to fly, but with 2
[little | few | a little] success. In the 19th century a few people 2
succeeded [to fly | in flying | into flying] in balloons. But it wasn't until 2
the beginning of the [this | next | last] century that anybody 2
[were | is | was] able to fly in a machine 2
[who | which | what] was heavier than air, in other words, in 2
[who | which | what] we now call a 'plane'. The first people to achieve 2
'powered flight' were the Wright brothers. [His | Their | Theirs] 3
was the machine which was the forerunner of the jumbo jets
that are [such | such a | so] common sight today. 3
They [could | should | couldn't] hardly have imagined that in 1969, 3
[not much | not many | no much] more than half a century later, 3
a man [will be | had been | would be] walking on the moon. 3
Already [a man | man | the man] is taking the first steps towards the stars. 3
Space satellites have now existed [since | during | for] around 3
half a century and we are dependent [from | of | on] them for all 3
kinds of [informations | information | an information]. Not only 3
[are they | they are | there are] being used for scientific research in
space, but also to see what kind of weather [is coming | comes | coming]. 4
By 2008 there [would | must | will] have been satellites in space for fifty 4
years and the 'space superpowers' will be [having | making | letting] 4
massive space stations built. When these [will be | are | will have been] 4
completed it will be the first time [when | where | that] astronauts will be
able to work in space in large numbers. [Apart | For | Except] all that,
in many ways the most remarkable flight [of | above | at] all was
[it | that | that one] of the flying bicycle, which the world saw on television,
[flying | to fly | fly] across the Channel from England to France, with nothing
[apart | but | than] a man to power it. As the bicycle-flyer said,
'It's the first time [I realize | I've realized | I am realizing] what hard work it is to be a bird!'

Grammar Test **PART 2**

51 Many teachers [say to | say | tell] their students should learn a foreign language.

52 Learning a second language is not the same [as | like | than] learning a first language.

53 It takes [long time | long | a long time] to learn any language.

54 It is said that Chinese is perhaps the world's [harder | hardest | more hard] language to master.

55 English is quite difficult because of all the exceptions [who | which | what] have to be learnt.

56 You can learn the basic structures of a language quite quickly, but only if you [are wanting | will to | are willing to] make an effort.

57 A lot of people aren't used [to the study | to study | to studying] grammar in their own language.

58 Many adult students of English wish they [would start | would have started | had started] their language studies earlier.

59 In some countries students have to spend a lot of time working [on | by | in] their own.

60 There aren't [no | any | some] easy ways of learning a foreign language in your own country.

61 Some people try to improve their English by [hearing | listening | listening to] the BBC World Service.

62 [Live | Life | Living] with a foreign family can be a good way to learn a language.

63 It's no use [to try | trying | in trying] to learn a language just by studying a dictionary.

64 Many students of English [would rather not | would rather prefer not | would rather not to] take tests.

65 Some people think it's time we all [learn | should learn | learnt] a single international language.

Charles Walker is a teacher at a comprehensive school in Norwich. He [has joined | joined | joins] the staff of the school in 1998 and [has been working | worked | works] there ever since. Before [move | to move | moving] to Norwich, he taught in Italy and in Wales, and before that he [has been | was | was being] a student at Cambridge University. So far he [isn't | wasn't | hasn't been] in Norwich for as long as he was in Wales, but he likes the city a lot and [should | would | could] like to stay there for at least another two years, or, [how | which | as] he puts it, until his two children [have | will have | will be] grown up a bit. He met his wife, Kate, in 1992 while he [was to live | was living | had been living] abroad for a while, and they got married in 1996. Their two children, Mark and Susan, [are | were | have been] both born in Norwich.

The Walkers' boy, [who | which | he] is five, has just started at school, but [his | their | her] sister [shall stay | stays | will be staying] at home for another couple of years, because she is nearly two years [younger | more young | the younger] than him. Charles and Kate Walker [are used | use | used] to live in the country, but now that they have children, they [have moved | move | moved] into the city. Charles wanted a house [next | near | close] the school [in order | for | to] get to work easily. Unfortunately [the | a | that] one the two of them really wanted was too expensive, so they [must | should | had to] buy one a bit further away. By the time the children [go | will go | will have gone] to secondary school, [that | which | what] Charles and Kate hope will be in Norwich, the Walkers [will have been | have been | will be] living there for at least fifteen years. They can't be sure if they [stay | do stay | will stay], but if they [don't | didn't | won't], their friends won't be too surprised.

Look at the following examples of question tags in English. The correct form of the tag is ticked.

a He's getting the 9.15 train, [isn't he ✓ | hasn't he | wasn't he] ?

b She works in a library, [isn't she | doesn't she ✓ | doesn't he] ?

c Tom didn't tell you, [hasn't he | didn't he | did he ✓] ?

d Someone's forgotten to switch off the gas, [didn't one | didn't they | haven't they ✓] ?

Now tick the correct question tag in the following 10 items:

91 John's coming to see you, [hasn't he | wasn't he | isn't he] ?

92 It's been a long time since you've seen him, [hasn't it | isn't it | haven't you] ?

93 He's due to arrive tomorrow, [won't he | isn't he | will he] ?

94 He won't be getting in till about 10.30, [isn't he | is he | will he] ?

95 You met him while you were on holiday, [didn't you | weren't you | haven't you] ?

96 I think I'm expected to pick him up, [aren't I | don't I | are you] ?

97 No doubt you'd rather he stayed in England now, [didn't you | wouldn't you | shouldn't you] ?

98 Nobody else has been told he's coming, [is he | has he | have they] ?

99 We'd better not stay up too late tonight, [didn't we | have we | had we] ?

100 I suppose it's time we called it a day, [didn't we | isn't it | don't] ?

Appendix C: Vocabulary size test

Vocabulary Size Test[1]

Circle the letter a-d with the closest meaning to the key word in the question.

1. SEE: They **saw** it.
   a. cut
   b. waited for
   c. looked at
   d. started

2. TIME: They have a lot of **time**.
   a. money
   b. food
   c. hours
   d. friends

3. PERIOD: It was a difficult **period**.
   a. question
   b. time
   c. thing to do
   d. book

4. FIGURE: Is this the right **figure**?
   a. answer
   b. place
   c. time
   d. number

5. POOR: We are **poor**.
   a. have no money
   b. feel happy
   c. are very interested
   d. do not like to work hard

6. DRIVE: He **drives** fast.
   a. swims
   b. learns
   c. throws balls
   d. uses a car

7. JUMP: She tried to **jump**.
   a. lie on top of the water
   b. get off the ground suddenly
   c. stop the car at the edge of the road
   d. move very fast

8. SHOE: Where is your **shoe**?
   a. the person who looks after you
   b. the thing you keep your money in
   c. the thing you use for writing
   d. the thing you wear on your foot

9. STANDARD: Her **standards** are very high.
   a. the bits at the back under her shoes
   b. the marks she gets in school
   c. the money she asks for
   d. the levels she reaches in everything

10. BASIS: This was used as the **basis**.
    a. answer
    b. place to take a rest
    c. next step
    d. main part

[1] The test is created by Paul Nation, Victoria University of Wellington, and found at http://www.lextutor.ca/. This test is freely available and can be used by teachers and researchers for a variety of purposes.

Second 1000

1. MAINTAIN: Can they **maintain** it?
   a. keep it as it is
   b. make it larger
   c. get a better one than it
   d. get it

2. STONE: He sat on a **stone**.
   a. hard thing
   b. kind of chair
   c. soft thing on the floor
   d. part of a tree

3. UPSET: I am **upset**.
   a. tired
   b. famous
   c. rich
   d. unhappy

4. DRAWER: The **drawer** was empty.
   a. sliding box
   b. place where cars are kept
   c. cupboard to keep things cold
   d. animal house

5. PATIENCE: He has no **patience**.
   a. will not wait happily
   b. has no free time
   c. has no faith
   d. does not know what is fair

6. NIL: His mark for that question was **nil**.
   a. very bad
   b. nothing
   c. very good
   d. in the middle

7. PUB: They went to the **pub**.
   a. place where people drink and talk
   b. place that looks after money
   c. large building with many shops
   d. building for swimming

8. CIRCLE: Make a **circle**.
   a. rough picture
   b. space with nothing in it
   c. round shape
   d. large hole

9. MICROPONE: Please use the **microphone**.
   a. machine for making food hot
   b. machine that makes sounds louder
   c. machine that makes things look bigger
   d. small telephone that can be carried around

10. PRO: He's a **pro**.
    a. someone who is employed to find out important secrets
    b. a stupid person
    c. someone who writes for a newspaper
    d. someone who is paid for playing sport etc

Third 1000

1. SOLDIER: He is a **soldier**.
   a. person in a business
   b. student
   c. person who uses metal
   d. person in the army

2. RESTORE: It has been **restored**.
   a. said again
   b. given to a different person
   c. given a lower price
   d. made like new again

3. JUG: He was holding a **jug**.
   a. A container for pouring liquids
   b. an informal discussion
   c. A soft cap
   d. A weapon that explodes

4. SCRUB: He is **scrubbing** it.
   a. cutting shallow lines into it
   b. repairing it
   c. rubbing it hard to clean it
   d. drawing simple pictures of it

5. DINOSAUR: The children were pretending to be **dinosaurs**.
   a. robbers who work at sea
   b. very small creatures with human form but with wings
   c. large creatures with wings that breathe fire
   d. animals that lived a long time ago

6. STRAP: He broke the **strap**.
   a. promise
   b. top cover
   c. shallow dish for food
   d. strip of material for holding things together

7. PAVE: It was **paved**.
   a. prevented from going through
   b. divided
   c. given gold edges
   d. covered with a hard surface

8. DASH: They **dashed** over it.
   a. moved quickly
   b. moved slowly
   c. fought
   d. looked quickly

9. ROVE: He couldn't stop **roving**.
   a. getting drunk
   b. travelling around
   c. making a musical sound through closed lips
   d. working hard

10. LONESOME: He felt **lonesome**.
    a. ungrateful
    b. very tired
    c. lonely
    d. full of energy

Fourth 1000

1. COMPOUND: They made a new **compound**.
   a. agreement
   b. thing made of two or more parts
   c. group of people forming a business
   d. guess based on past experience

2. LATTER: I agree with the **latter**.
   a. man from the church
   b. reason given
   c. last one
   d. answer

3. CANDID: Please be **candid**.
   a. be careful
   b. show sympathy
   c. show fairness to both sides
   d. say what you really think

4. TUMMY: Look at my **tummy**.
   a. cloth to cover the head
   b. stomach
   c. small furry animal
   d. thumb

5. QUIZ: We made a **quiz**.
   a. thing to hold arrows
   b. serious mistake
   c. set of questions
   d. box for birds to make nests in

6. INPUT: We need more **input**.
   a. information, power, etc. put into something
   b. workers
   c. artificial filling for a hole in wood
   d. money

7. CRAB: Do you like **crabs**?
   a. sea creatures that walk sideways
   b. very thin small cakes
   c. tight, hard collars
   d. large black insects that sing at night

8. VOCABULARY: You will need more **vocabulary**.
   a. words
   b. skill
   c. money
   d. guns

9. REMEDY: We found a good **remedy**.
   a. way to fix a problem
   b. place to eat in public
   c. way to prepare food
   d. rule about numbers

10. ALLEGE: They **alleged** it.
    a. claimed it without proof
    b. stole the ideas for it from someone else
    c. provided facts to prove it
    d. argued against the facts that supported it

Fifth 1000

1. DEFICIT: The company had a large **deficit**.
   a. spent a lot more money than it earned
   b. went down a lot in value
   c. had a plan for its spending that used a lot of money
   d. had a lot of money in the bank

2. WEEP: He **wept**.
   a. finished his course
   b. cried
   c. died
   d. worried

3. NUN: We saw a **nun**.
   a. long thin creature that lives in the earth
   b. terrible accident
   c. woman following a strict religious life
   d. unexplained bright light in the sky

4. HAUNT: The house is **haunted**.
   a. full of ornaments
   b. rented
   c. empty
   d. full of ghosts

5. COMPOST: We need some **compost**.
   a. strong support
   b. help to feel better
   c. hard stuff made of stones and sand stuck together
   d. rotted plant material

6. CUBE: I need one more **cube**.
   a. sharp thing used for joining things
   b. solid square block
   c. tall cup with no saucer
   d. piece of stiff paper folded in half

7. MINIATURE: It is a **miniature**.
   a. a very small thing of its kind
   b. an instrument to look at small objects
   c. a very small living creature
   d. a small line to join letters in handwriting

8. PEEL: Shall I **peel** it?
   a. let it sit in water for a long time
   b. take the skin off it
   c. make it white
   d. cut it into thin pieces

9. FRACTURE: They found a **fracture**.
   a. break
   b. small piece
   c. short coat
   d. rare jewel

10. BACTERIUM: They didn't find a single **bacterium**.
    a. small living thing causing disease
    b. plant with red or orange flowers
    c. animal that carries water on its back
    d. thing that has been stolen and sold to a shop

Sixth 1000

1. DEVIOUS: Your plans are **devious**.
   a. tricky
   b. well-developed
   c. not well thought out
   d. more expensive than necessary

2. PREMIER: The **premier** spoke for an hour.
   a. person who works in a law court
   b. university teacher
   c. adventurer
   d. head of the government

3. BUTLER: They have a **butler**.
   a. man servant
   b. machine for cutting up trees
   c. private teacher
   d. cool dark room under the house

4. ACCESSORY: They gave us some **accessories**.
   a. papers allowing us to enter a country
   b. official orders
   c. ideas to choose between
   d. extra pieces

5. THRESHOLD: They raised the **threshold**.
   a. flag
   b. point or line where something changes
   c. roof inside a building
   d. cost of borrowing money

6. THESIS: She has completed her **thesis**.
   a. long written report of study carried out for a university degree
   b. talk given by a judge at the end of a trial
   c. first year of employment after becoming a teacher
   d. extended course of hospital treatment

7. STRANGLE: He **strangled** her.
   a. killed her by pressing her throat
   b. gave her all the things she wanted
   c. took her away by force
   d. admired her greatly

8. CAVALIER: He treated her in a **cavalier** manner.
   a. without care
   b. politely
   c. awkwardly
   d. as a brother would

9. MALIGN: His **malign** influence is still felt.
   a. evil
   b. good
   c. very important
   d. secret

10. VEER: The car **veered**.
    a. went suddenly in another direction
    b. moved shakily
    c. made a very loud noise
    d. slid sideways without the wheels turning

Seventh 1000

1. OLIVE: We bought **olives**.
   a. oily fruit
   b. scented pink or red flowers
   c. men's clothes for swimming
   d. tools for digging up weeds

2. QUILT: They made a **quilt**.
   a. statement about who should get their property when they die
   b. firm agreement
   c. thick warm cover for a bed
   d. feather pen

3. STEALTH: They did it by **stealth**.
   a. spending a large amount of money
   b. hurting someone so much that they agreed to their demands
   c. moving secretly with extreme care and quietness
   d. taking no notice of problems they met

4. SHUDDER: The boy **shuddered**.
   a. spoke with a low voice
   b. almost fell
   c. shook
   d. called out loudly

5. BRISTLE: The **bristles** are too hard.
   a. questions
   b. short stiff hairs
   c. folding beds
   d. bottoms of the shoes

6. BLOC: They have joined this **bloc**.
   a. musical group
   b. band of thieves
   c. small group of soldiers who are sent ahead of others
   d. group of countries sharing a purpose

7. DEMOGRAPHY: This book is about **demography**.
   a. the study of patterns of land use
   b. the study of the use of pictures to show facts about numbers
   c. the study of the movement of water
   d. the study of population

8. GIMMICK: That's a good **gimmick**.
   a. thing for standing on to work high above the ground
   b. small thing with pockets to hold money
   c. attention-getting action or thing
   d. clever plan or trick

9. AZALEA: This **azalea** is very pretty.
   a. small tree with many flowers growing in groups
   b. light material made from natural threads
   c. long piece of material worn by women in India
   d. sea shell shaped like a fan

10. YOGHURT: This **yoghurt** is disgusting.
    a. grey mud found at the bottom of rivers
    b. unhealthy, open sore
    c. thick, soured milk, often with sugar and flavouring
    d. large purple fruit with soft flesh

Eighth 1000

1. ERRATIC: He was **erratic**.
   a. without fault
   b. very bad
   c. very polite
   d. unsteady

2. PALETTE: He lost his **palette**.
   a. basket for carrying fish
   b. wish to eat food
   c. young female companion
   d. artist's board for mixing paints

3. NULL: His influence was **null**.
   a. had good results
   b. was unhelpful
   c. had no effect
   d. was long-lasting

4. KINDERGARTEN: This is a good **kindergarten**.
   a. activity that allows you to forget your worries
   b. place of learning for children too young for school
   c. strong, deep bag carried on the back
   d. place where you may borrow books

5. ECLIPSE: There was an **eclipse**.
   a. a strong wind
   b. a loud noise of something hitting the water
   c. The killing of a large number of people
   d. The sun hidden by a planet

6. MARROW: This is the **marrow**.
   a. symbol that brings good luck to a team
   b. Soft centre of a bone
   c. control for guiding a plane
   d. increase in salary

7. LOCUST: There were hundreds of **locusts**.
   a. insects with wings
   b. unpaid helpers
   c. people who do not eat meat
   d. brightly coloured wild flowers

8. AUTHENTIC: It is **authentic**.
   a. real
   b. very noisy
   c. Old
   d. Like a desert

9. CABARET: We saw the **cabaret**.
   a. painting covering a whole wall
   b. song and dance performance
   c. small crawling insect
   d. person who is half fish, half woman

10. MUMBLE: He started to **mumble**.
    a. think deeply
    b. shake uncontrollably
    c. stay further behind the others
    d. speak in an unclear way

Ninth 1000

1. HALLMARK: Does it have a **hallmark**?
   a. stamp to show when to use it by
   b. stamp to show the quality
   c. mark to show it is approved by the royal family
   d. Mark or stain to prevent copying

2. PURITAN: He is a **puritan**.
   a. person who likes attention
   b. person with strict morals
   c. person with a moving home
   d. person who hates spending money

3. MONOLOGUE: Now he has a **monologue**.
   a. single piece of glass to hold over his eye to help him to see better
   b. long turn at talking without being interrupted
   c. position with all the power
   d. picture made by joining letters together in interesting ways

4. WEIR: We looked at the **weir**.
   a. person who behaves strangely
   b. wet, muddy place with water plants
   c. old metal musical instrument played by blowing
   d. thing built across a river to control the water

5. WHIM: He had lots of **whims**.
   a. old gold coins
   b. female horses
   c. strange ideas with no motive
   d. sore red lumps

6. PERTURB: I was **perturbed**.
   a. made to agree
   b. Worried
   c. very puzzled
   d. very wet

7. REGENT: They chose a **regent**.
   a. an irresponsible person
   b. a person to run a meeting for a time
   c. a ruler acting in place of the king
   d. a person to represent them

8. OCTOPUS: They saw an **octopus**.
   a. a large bird that hunts at night
   b. a ship that can go under water
   c. a machine that flies by means of turning blades
   d. a sea creature with eight legs

9. FEN: The story is set in the **fens**.
   a. low land partly covered by water
   b. a piece of high land with few trees
   c. a block of poor-quality houses in a city
   d. a time long ago

10. LINTEL: He painted the **lintel**.
    a. Beam over the top of a door or window
    b. small boat used for getting to land from a big boat
    c. beautiful tree with spreading branches and green fruit
    d. board showing the scene in a theatre

Tenth 1000

1. AWE: They looked at the mountain with **awe**.
   a. worry
   b. interest
   c. wonder
   d. respect

2. PEASANTRY: He did a lot for the **peasantry**.
   a. local people
   b. place of worship
   c. businessmen's club
   d. poor farmers

3. EGALITARIAN: This organization is **egalitarian**.
   a. does not provide much information about itself to the public
   b. dislikes change
   c. frequently asks a court of law for a judgement
   d. treats everyone who works for it as if they are equal

4. MYSTIQUE: He has lost his **mystique**.
   a. his healthy body
   b. the secret way he makes other people think he has special power or skill
   c. the woman who has been his lover while he is married to someone else
   d. the hair on his top lip

5. UPBEAT: I'm feeling really **upbeat** about it.
   a. upset
   b. good
   c. hurt
   d. confused

6. CRANNY: We found it in the **cranny**!
   a. sale of unwanted objects
   b. narrow opening
   c. space for storing things under the roof of a house
   d. large wooden box

7. PIGTAIL: Does she have a **pigtail**?
   a. a rope of hair made by twisting bits together
   b. a lot of cloth hanging behind a dress
   c. a plant with pale pink flowers that hang down in short bunches
   d. a lover

8. CROWBAR: He used a **crowbar**.
   a. heavy iron pole with a curved end
   b. false name
   c. sharp tool for making holes in leather
   d. light metal walking stick

9. RUCK: He got hurt in the **ruck**.
   a. hollow between the stomach and the top of the leg
   b. pushing and shoving
   c. group of players gathered round the ball in some ball games
   d. race across a field of snow

10. LECTERN: He stood at the **lectern**.
    a. desk to hold a book at a height for reading
    b. table or block used for church sacrifices
    c. place where you buy drinks
    d. very edge

Eleventh 1000

1. EXCRETE: This was **excreted** recently.
   a. pushed or sent out
   b. made clear
   c. discovered by a science experiment
   d. put on a list of illegal things

2. MUSSEL: They bought **mussels**.
   a. small glass balls for playing a game
   b. shellfish
   c. large purple fruits
   d. pieces of soft paper to keep the clothes clean when eating

3. YOGA: She has started **yoga**.
   a. handwork done by knotting thread
   b. a form of exercise for body and mind
   c. a game where a cork stuck with feathers is hit between two players
   d. a type of dance from eastern countries

4. COUNTERCLAIM: They made a **counterclaim**.
   a. a demand made by one side in a law case to match the other side's demand
   b. a request for a shop to take back things with faults
   c. An agreement between two companies to exchange work
   d. a top cover for a bed

5. PUMA: They saw a **puma**.
   a. small house made of mud bricks
   b. tree from hot, dry countries
   c. very strong wind that sucks up anything in its path
   d. large wild cat

6. PALLOR: His **pallor** caused them concern.
   a. his unusually high temperature
   b. his lack of interest in anything
   c. his group of friends
   d. the paleness of his skin

7. APERITIF: She had an **aperitif**.
   a. a long chair for lying on with just one place to rest an arm
   b. a private singing teacher
   c. a large hat with tall feathers
   d. a drink taken before a meal

8. HUTCH: Please clean the **hutch**.
   a. thing with metal bars to keep dirt out of water pipes
   b. space in the back of a car for bags
   c. metal piece in the middle of a bicycle wheel
   d. cage for small animals

9. EMIR: We saw the **emir**.
   a. bird with long curved tail feathers
   b. woman who cares for other people's children in Eastern countries
   c. Middle Eastern chief with power in his land
   d. house made from blocks of ice

10. HESSIAN: She bought some **hessian**.
    a. oily pinkish fish
    b. stuff producing a happy state of mind
    c. coarse cloth
    d. strong-tasting root for flavouring food

Twelfth 1000

1. HAZE: We looked through the **haze**.
   a. small round window in a ship
   b. unclear air
   c. strips of wood or plastic to cover a window
   d. list of names

2. SPLEEN: His **spleen** was damaged.
   a. knee bone
   b. organ found near the stomach
   c. pipe taking waste water from a house
   d. respect for himself

3. SOLILOQUY: That was an excellent **soliloquy**!
   a. song for six people
   b. short clever saying with a deep meaning
   c. entertainment using lights and music
   d. speech in the theatre by a character who is alone

4. REPTILE: She looked at the **reptile**.
   a. old hand-written book
   b. animal with cold blood and a hard outside
   c. person who sells things by knocking on doors
   d. picture made by sticking many small pieces of different colours together

5. ALUM: This contains **alum**.
   a. a poisonous substance from a common plant
   b. a soft material made of artificial threads
   c. a tobacco powder once put in the nose
   d. a chemical compound usually involving aluminium

6. REFECTORY: We met in the **refectory**.
   a. room for eating
   b. office where legal papers can be signed
   c. room for several people to sleep in
   d. room with glass walls for growing plants

7. CAFFEINE: This contains a lot of **caffeine**.
   a. a substance that makes you sleepy
   b. threads from very tough leaves
   c. ideas that are not correct
   d. a substance that makes you excited

8. IMPALE: He nearly got **impaled**.
   a. charged with a serious offence
   b. put in prison
   c. stuck through with a sharp instrument
   d. involved in a dispute

9. COVEN: She is the leader of a **coven**.
   a. a small singing group
   b. a business that is owned by the workers
   c. a secret society
   d. a group of church women who follow a strict religious life

10. TRILL: He practised the **trill**.
    a. ornament in a piece of music
    b. type of stringed instrument
    c. Way of throwing a ball
    d. dance step of turning round very fast on the toes

Thirteenth 1000

1. UBIQUITOUS: Many weeds are **ubiquitous**.
   a. are difficult to get rid of
   b. have long, strong roots
   c. are found in most countries
   d. die away in the winter

2. TALON: Just look at those **talons**!
   a. high points of mountains
   b. sharp hooks on the feet of a hunting bird
   c. heavy metal coats to protect against weapons
   d. people who make fools of themselves without realizing it

3. ROUBLE: He had a lot of **roubles**.
   a. very precious red stones
   b. distant members of his family
   c. Russian money
   d. moral or other difficulties in the mind

4. JOVIAL: He was very **jovial**.
   a. low on the social scale
   b. likely to criticize others
   c. full of fun
   d. friendly

5. COMMUNIQUE: I saw their **communiqué**.
   a. critical report about an organization
   b. garden owned by many members of a community
   c. printed material used for advertising
   d. official announcement

6. PLANKTON: We saw a lot of **plankton**.
   a. poisonous weeds that spread very quickly
   b. very small plants or animals found in water
   c. trees producing hard wood
   d. grey clay that often causes land to slip

7. SKYLARK: We watched a **skylark**.
   a. show with aeroplanes flying in patterns
   b. man-made object going round the earth
   c. person who does funny tricks
   d. small bird that flies high as it sings

8. BEAGLE: He owns two **beagles**.
   a. fast cars with roofs that fold down
   b. large guns that can shoot many people quickly
   c. small dogs with long ears
   d. houses built at holiday places

9. ATOLL: The **atoll** was beautiful.
   a. low island made of coral round a sea-water lake
   b. work of art created by weaving pictures from fine thread
   c. small crown with many precious jewels worn in the evening by women
   d. place where a river flows through a narrow place full of large rocks

10. DIDACTIC: The story is very **didactic**.
    a. tries hard to teach something
    b. is very difficult to believe
    c. deals with exciting actions
    d. is written in a way which makes the reader unsure of the meaning

Fourteenth 1000

1. CANONICAL: These are **canonical** examples.
   a. examples which break the usual rules
   b. examples taken from a religious book
   c. regular and widely accepted examples
   d. examples discovered very recently

2. ATOP: He was **atop** the hill.
   a. at the bottom of
   b. at the top of
   c. on this side of
   d. on the far side of

3. MARSUPIAL: It is a **marsupial**.
   a. an animal with hard feet
   b. a plant that grows for several years
   c. a plant with flowers that turn to face the sun
   d. an animal with a pocket for babies

4. AUGUR: It **augured** well.
   a. promised good things for the future
   b. agreed well with what was expected
   c. had a colour that looked good with something else
   d. rang with a clear, beautiful sound

5. BAWDY: It was very **bawdy**.
   a. unpredictable
   b. enjoyable
   c. rushed
   d. rude

6. GAUCHE: He was **gauche**.
   a. talkative
   b. flexible
   c. awkward
   d. determined

7. THESAURUS: She used a **thesaurus**.
   a. a kind of dictionary
   b. a chemical compound
   c. a special way of speaking
   d. an injection just under the skin

8. ERYTHROCYTE: It is an **erythrocyte**.
   a. a medicine to reduce pain
   b. a red part of the blood
   c. a reddish white metal
   d. a member of the whale family

9. CORDILLERA: They were stopped by the **cordillera**.
   a. a special law
   b. an armed ship
   c. a line of mountains
   d. the eldest son of the king

10. LIMPID: He looked into her **limpid** eyes.
    a. clear
    b. tearful
    c. deep brown
    d. beautiful