Awareness, Aptitude, and French Grammatical Gender: An Exploratory Study

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Abstract

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This study investigates the effects of awareness on the accurate assignment of French grammatical gender, and the importance of aptitude in explaining differences in awareness levels amongst second language (L2) learners. Previous awareness research using form-focused exposure tasks has found aware learners improve with the targeted linguistic feature as compared to unaware learners. In addition, research has always found some participants that are aware and some who appear to be unaware (Leow, 1997). Further research is needed on the effects of awareness with a variety of L2s and linguistic features (Rosa & Leow, 2004), and on the interaction amongst aptitude, awareness, and L2 learning (Robinson, 1997). The present study further investigated the effects of awareness on the subsequent L2 learning of French grammatical gender using a meaning-focused rather than form-focused exposure task. This research also addressed the issue of different awareness levels. Following Robinson, the role of aptitude in explaining these differences in awareness levels amongst L2 learners was explored.

To investigate the effects of awareness on L2 learning, 36 beginner-French Anglophone adults completed a crossword following Leow (1997, 2000). The crossword provided participants with input on the reliably masculine noun ending *eau* (le plat*eau*) in French, but they were not explicitly guided to look for this rule. Think-aloud protocols collected during the exposure task and two probe questions, one after the exposure task and one after the posttest, were analysed for evidence of awareness at one of two levels: unaware

or aware. Learning was operationalised as pretest to posttest differences on a multiple-choice recognition task. There were two key findings: firstly, there were no differences in learning between the unaware and aware groups, and secondly, learners from both groups significantly improved in their ability to assign masculine gender to words they had encountered during the exposure task, but not to words that they had only encountered in the pretest. These findings run contrary to previous research on the effects of awareness (e.g. Leow; Rosa & O'Neill, 1999). Two possible explanations for these findings are that as the exposure task was meaning-focused rather than form-focused, participants did not verbalise their attention to form. Alternatively, it could be that French grammatical gender is being learnt as part of the exemplar-based system rather than the rule-based system (Skehan, 1998) and, as such, awareness may not be as important for linguistic features that are part of this system.

To investigate possible reasons for awareness differences amongst participants, learners completed five aptitude tests, all used in previous research, that addressed the aptitude factors of attention control, working memory, phonological memory, grammatical sensitivity, and inductive language learning ability. Dörnyei & Skehan (2003) suggested that these five factors were important at the beginning stages of input processing, which were to be included in the exposure task. The results indicate that scores on the inductive language learning test predicted membership to the aware or unaware group accurately 72.22% of the time. No other test had a predictive value. This suggests that inductive ability may have played a role in promoting awareness of French grammatical gender during meaning-based exposure to French grammatical gender. Another finding is that

the test for grammatical sensitivity (MLAT IV [Carroll & Sapon, 1957]) and the test for inductive (PLAB IV [Pimsleur, Reed, & Stansfield, 2004]) did not correlate. Aptitude research has often treated these two abilities together as analytic ability (Skehan, 1998), and used a grammatical sensitivity test to investigate the construct. The results from the present study suggest that these two tests may be tapping into different aptitude constructs and, as such, may need to be tested separately when investigating the role of individual differences to L2 learning.

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Chapter 1: Introduction

The aim of this study is to further investigate the role of awareness to subsequent L2 learning and to investigate why similar learners (e.g. same proficiency, same L1-background) do not all become aware of the same linguistic features when exposed to any available oral or written text (input). Awareness can be defined as the conscious noticing of a linguistic feature in the input. Currently, researchers in the field of Second Language Acquisition (SLA) generally believe that awareness is either necessary or very important for processing of the input (Schmidt, 1990; Robinson, 2003). To this end, many studies that have investigated awareness in SLA have addressed the issue of whether it is essential for the acquisition of linguistic features in the L2. This is typically done by asking participants to complete a task for one reason, but the task actually contains a target linguistic feature for the purposes of awareness research, for example, asking participants to complete a crossword to learn the Spanish preterite whilst actually testing learners on whether they become aware of a spelling change in the stem of certain Spanish preterite verbs contained in the crossword (Leow, 1997). During this exposure, evidence of awareness has usually been obtained from comments made during a think-aloud protocol, a measurement tool that requires the participants to verbalise their thought process whilst completing an exposure task. In addition, or alternatively, learners have been asked what they became aware of during the exposure task immediately after its completion, and immediately after the posttest. The results have consistently shown that those learners who are coded as being aware of the linguistic feature under investigation show greater gains in their ability to use this feature on a posttest than those learners coded as unaware (e.g. Leow, 1997, Rosa & Leow, 2004;

Rosa & O'Neill, 1999). Even though the essentialness of awareness is still unknown, the above-mentioned results highlight that awareness can play an effective role in the subsequent processing of L2 data by adult L2 learners. In other words, participants that become aware of a linguistic feature during exposure have been significantly more accurate with the linguistic feature on a posttest than participants that appear to have remained unaware. For the purposes of the present study, the term *efficient* will be used to define this finding in awareness research. Efficiency of awareness will refer to the positive role awareness appears to play on posttest accuracy of a linguistic feature after an initial exposure to this linguistic feature.

Although there is some evidence showing the importance of awareness to L2 learning, to date, studies have investigated a restricted set of linguistic features, largely based on Spanish or English as an L2, and exposure tasks have been form-focused rather than meaning-focused. The present study will investigate the role of awareness on Anglophone adults' ability to assign gender in French to nouns that end in the reliably masculine noun ending *eau* (le plat*eau*) and the reliably feminine noun ending *elle* (la gaz*elle*). In addition, the exposure task that the participants will complete will be meaning-focused, a vocabulary-based crossword. Awareness will be divided into three levels: no verbal report (seemingly unaware), noticing, and understanding. It is hypothesised that participants that become aware at the level of understanding will outperform participants aware at the level of noticing, who in turn will outperform seemingly unaware participants in their ability to accurately assign French grammatical gender to words ending in *eau* and *elle*. In addition, it is hypothesised that participants aware at the level of understanding will be able to accurately assign French grammatical

gender to nouns ending in *eau* and *elle* that are not contained in the exposure task (system learning), but participants aware at the level of noticing will only be able to accurately assign French grammatical gender to nouns ending in *eau* and *elle* that are contained in the exposure task (item learning).

Another issue that has arisen from previous research into the role of awareness in SLA is that learners do not always behave in the same way when presented with the same linguistic input (Leow, 1997; 2000; Robinson, 1997; Rosa & O'Neill, 1999; Williams, 2005). In fact, even when the groups are largely controlled for age, language background, and L2 proficiency, it is possible to see different levels of awareness. Some learners become aware of the targeted linguistic feature at a level of understanding, i.e. they can formulate a rule related to the target feature. Some learners become aware at a level of noticing, i.e. they have paid focal attention to the target feature, and are able to verbalise this, but not a rule. Furthermore, some learners appear to remain unaware of the target feature inasmuch as they do not mention its existence at any time during testing.

Little research has been done to probe reasons for these findings of different awareness levels amongst learners. Nevertheless, differences amongst learners suggests individual differences, and one possible individual difference factor that may be playing a role in awareness levels is aptitude, the ability that every individual has for learning a foreign language. Indeed, aptitude's role in awareness has been partially addressed. Robinson (1997) investigated the role of two aptitude factors, grammatical sensitivity and memory, on awareness levels. He found that both aptitude factors did play a role, but it depended on the type of input that the participants had received: incidental, implicit, explicit, or rule-search. In addition, the aptitude factors played a differing role depending

on the level of awareness. These findings suggest a role for aptitude on awareness and it seems that further understanding the nature of aptitudes role on awareness levels is important as awareness is considered a crucial part of SLA and knowing why these differences exist amongst learners in awareness levels may be able to contribute to the creation of efficient teaching materials. As such, the present study continues in Robinson's research vein by isolating five cognitive factors that are considered to be aspects of language learning aptitude (Dörnyei & Skehan, 2003): attention control, working memory, phonological memory, grammatical sensitivity, and inductive language learning ability. These five aptitude constructs have all been shown to play a role in certain aspects of L2 acquisition, but only two of them have been previously studied in relation to awareness. In the present study, it is hypothesised that higher levels of awareness (awareness at the level of understanding) will be associated with participants with high scores on the grammatical sensitivity and inductive language learning ability tests.

In conclusion, the present study will investigate the effects of awareness on the subsequent learning of French grammatical gender, and the role of aptitude on different awareness levels.

Chapter 2: Awareness, Aptitude, and French Grammatical Gender: An Overview

The purpose of the present study is to further investigate the role of awareness on the subsequent processing of a targeted linguistic feature, in this case French grammatical gender, and to investigate how five aptitude constructs may contribute to learner awareness: attention control, phonemic coding ability, working memory, inductive language learning ability, and analytic ability. As such, this chapter will discuss four SLA research areas: awareness, aptitude, awareness and aptitude, and French grammatical gender.

2.1 Awareness

What is awareness? The SLA literature appears to have embraced Tomlin and Villa's (1994) definition of awareness: "a particular state of mind in which an individual has undergone a specific subjective experience of some cognitive content or external stimulus" (p. 193) as can be seen by its use in the awareness literature (e.g. Leow, 1997, 2000; Leow & Bowles, 2005; Rosa & O'Neill, 1999). Methodologically, the above-mentioned studies have generally followed Allport's (1988) three criteria as a guide to determine whether a participant in SLA awareness research is aware or not: (a) show some behavioural or cognitive change due to the experience, for example, change a determiner that he/she has previously written or uttered as masculine to feminine due to becoming aware, (b) report that he/she is aware of the experience, for example, say that a word should be feminine, and/or (c) describe the subjective experience, for example, say that a word should be feminine because all words that end in *elle* in the target language

are feminine. Even though Allport's criteria have been used, some research has collapsed (a) and (b) so that awareness is measured as either be a cognitive/behavioural change and a report of the experience, or a description of the subjective experience (Rosa & O'Neill, 1999).

Awareness research in SLA has addressed certain issues that need to be discussed in order to understand the aims of the present study. To this end, three important areas of research in awareness will be discussed: the essentialness of awareness, the level of awareness, and how best to measure awareness. Following this overview, the issue arising from the findings on which this study will be based is introduced.

2.1.1 Is Awareness Essential for Input to Become Intake?

The essentialness of awareness has been discussed frequently in the literature with researchers often either believing awareness is essential (Leow, 1997; Robinson, 1995; Schmidt, 1990, 1995) or not (Tomlin & Villa, 1994; Curran & Keele, 1994). Two researchers that have addressed these issues with differing conclusions are Leow (2000) and Williams (2005). Their studies will be presented in more depth in order to demonstrate the difficulties involved in addressing the issue of the essentialness of awareness.

Leow (2000) investigated the performance of aware versus unaware learners. Participants were required to complete a crossword that tested their knowledge of Spanish inflectional morphology of the preterite (e.g. mentir [to lie] becomes mentí [I lied], mentiste [you lied], mintió [he/she/it lied] etc.). Simultaneously, some learners became aware of an arbitrary vowel spelling change in the stem of certain Spanish

preterite verbs (e.g. the spelling of the verb mentir [to lie] changes in the third-person preterite from m*e*ntir to m*i*ntió [he/she/it lied] and m*i*ntieron [they/you lied]). Awareness was measured via a think-aloud protocol and two probe questions. A probe question is asked to a participant after exposure to the input to help ascertain whether he/she has become aware of a linguistic feature. Leow asked one probe question after the exposure task and one after the posttest. Importantly, the participants had no reason to interact with the spelling change morpheme of the verb as this had already been written in the crossword grid. Participants were grouped as either being aware or unaware depending on their comments during the think-aloud protocol and their responses to the probe questions. The results showed that the aware learners improved significantly from pretest to posttest whilst the unaware learners did not. Additionally, the results indicated that 75% of the variance in performance between the two groups was due to some of the learners becoming aware of the form during exposure. Even though these results appear to suggest the essentialness of awareness to learning, it is still not possible to say with absolute certainty that the unaware learners were indeed unaware because the awareness measures used may not have measured awareness accurately enough (as will be further discussed below).

Williams (2005) investigated the possibility of implicit learning (i.e. learning without awareness) by exposing participants to a miniature noun class system in an artificial language created specifically for the study. Participants were informed that the choice of determiner depended on the proximity of the object to the subject in the sentence. However, the animacy of the noun also informed the choice. The participants that did not become aware of the importance of animacy during exposure still performed

at above-chance levels on the generalisation test phase. The generalisation test phase occurred after participants had been exposed to the miniature noun class system. It presented participants with new noun phrases. Each noun phrase was presented in two forms, one which violated the animacy rule, and one which was correct. The participants had to select the noun phrase they believed to be correct. This phase also included items that the participants had seen during exposure. The above-chance-level results on the generalisation test phase were interpreted as evidence of implicit learning, i.e. awareness is not essential. Nevertheless, it is important to bear in mind that participants that came from a language background that assigns grammatical gender, e.g. German, out-performed participants that came from a language background that does not assign gender. As such, the results found may be a factor of the participants' home languages. A learner from a language background that assigns gender to nouns may have remained unaware of the importance of animacy during exposure, but may have been more sensitive to categorising nouns during testing than a learner that speaks a language with no grammatical gender.

The above two studies set out to address the issue of the essentialness of awareness. The results are not conclusive, but in both studies, the participants that were labelled aware out-performed participants that were labelled unaware. Therefore, at this stage in research on awareness, it is perhaps more pertinent to discuss awareness in terms of its facilitatory effects rather than essentialness to learning. Does more learning occur when there is awareness than when there is none (i.e. are participants that become aware during exposure more accurate with the linguistic feature on a posttest than participants that appear to remain unaware)? Leow (2000) and Williams (2005) both addressed this

issue indirectly. However, there is a growing body of research in this area and, in order to highlight this, two more studies that addressed the issue of learning and awareness directly shall be introduced.

One study that addressed this issue is Rosa and O'Neill (1999). They investigated whether aware learners improved more than unaware learners after different types of exposure to Spanish contrary-to-fact conditional sentences. The results showed that aware learners out-performed unaware learners on a multiple-choice posttest, which suggests that awareness is more efficient than no awareness to the learning of a specific linguistic feature.

Rosa & Leow (2004) also investigated the effects of type of exposure on awareness and intake. However, they included a delayed posttest to address whether any differences found on a posttest would remain after three weeks. Participants were exposed to Spanish past conditional sentences in a computerised task with one of five types of exposure, varying in degrees of explicitness. The results concur with Rosa & O'Neill (1999) in that aware learners out-performed unaware learners on a posttest. In addition, a delayed posttest also found that aware participants out-performed unaware participants. Both of these findings add further evidence for the efficiency of awareness as the aware learners were more accurate with the linguistic feature on (a) post-test(s) than the unaware learners. Furthermore, the finding that the gains for the aware group remained on a delayed posttest suggests that learning due to awareness may not be temporary.

Previous research into awareness and its essentialness has not been conclusive; however, overall, the findings appear to support the efficiency of awareness when

compared to no awareness as aware learners have significantly out-performed unaware learners on posttests (e.g. Leow, 1997; 2000; Rosa & Leow, 2004; Rosa & O'Neill, 1999). As suggested by Rosa & Leow, future research is needed using a variety of languages and linguistic features in order to ensure that the previous positive findings for awareness are not a factor of the linguistic features tested and/or the L1 backgrounds involved.

2.1.2 What Level of Awareness?

In both SLA theory and research, awareness has not been treated as a unitary concept. From a theoretical perspective, Schmidt (1990) discussed three levels of awareness when introducing his Noticing Hypothesis: perception, noticing, and understanding, with noticing being the level of awareness that "is the necessary and sufficient condition for converting input to intake" (Schmidt, 1990, p. 129).

The majority of research into awareness has discussed different levels of awareness and has found that they may have an impact on the type of processing (Leow, 1997), the quantity of learning (Robinson, 1997; Rosa & O'Neill, 1999), and the type of learning (Rosa & Leow, 2004) that occurs.

Leow (1997) investigated Schmidt's Noticing Hypothesis by exposing English-speaking beginner-level learners of Spanish to an arbitrary spelling change in the stem of certain Spanish preterite verbs. He asked how different levels of awareness of the target structure gained from exposure to a problem-solving task would influence learners' mental representations and consequent recognition and accurate written production of the form. The qualitative analysis showed that there appeared to be three levels of awareness that he interpreted according to Allport's (1988) suggestion, at the level of: a behavioural

change, meta-awareness, and rule formation. For the purpose of Leow's research, a behavioural change was considered present if a participant produced the verb with the stem change either verbally or in writing. Meta-awareness consisted of a report of being aware of this experience, and rule formation consisted of forming a metalinguistic description of the underlying rule. The qualitative analysis also showed that learners who appeared to be aware at the level of meta-awareness or higher (i.e. with or without rule formation) employed processing strategies such as hypothesis testing and rule formation whereas these processing strategies were not evident in those learners who showed no signs of meta-awareness. The quantitative analysis showed that the different levels of awareness also appeared to be important for what was taken in for further processing with learners that showed the greatest awareness (rule formation) performing significantly better than those with lower levels of awareness.

Robinson's (1997) research on different types of learning (implicit, incidental, explicit, rule-search), and the aptitude factors of grammatical sensitivity and memory, discussed awareness at three levels: looking for rules, noticing rules, and being able to verbalise rules. The results showed that learners in the implicit learning condition that looked for rules had superior learning. Additionally, learners in the implicit condition and the rule-search condition that could verbalise rules had superior learning. These findings show that awareness at the level of noticing rules may not lead to superior learning and that awareness is only useful with certain types of exposure. However, the participants in this study were assigned to a level of awareness via an off-line questionnaire, which, as will be further discussed below, may not be the most methodologically sound way to measure awareness.

Rosa and O'Neill (1999), as previously discussed, investigated different levels of awareness, explicitness of exposure, and intake. Participants were exposed to Spanish contrary-to-fact conditionals in one of four groups: ±formal instruction, ±directions to search for rules. Levels of awareness were assessed by a think-aloud protocol and participants were grouped into one of three levels: no report of awareness or no verbal report, awareness at the level of noticing (a verbal reference to the target structure), and awareness at the level of understanding (an explicit formulation of the rule underlying the target structure). This categorisation of awareness differs from Leow's (1997) in that awareness at the level of a cognitive or behavioural change was not measured. This is likely due to the difficulty of creating a task in which this change can be shown without drawing participants' attention to the linguistic feature being tested. The results showed that the higher the level of awareness, the greater the intake as measured on a multiple-choice posttest, which suggests that different levels of awareness lead to different levels of learning.

Rosa and Leow (2004) investigated different levels of awareness and the type of learning that takes place at each level. As previously mentioned, Schmidt (1990) suggested that there were two levels of conscious awareness: noticing and understanding. It was suggested that awareness at the level of noticing led to item learning, whereas awareness at the level of understanding led to system learning. Rosa and Leow investigated this by asking whether different levels of awareness led to differing abilities to generalise as measured by both recognition and production tasks. The results showed that awareness at the level of understanding did lead to significantly better scores on new exemplars (i.e., evidence of system learning) compared to awareness at the level of

noticing. In addition, participants at the level of noticing also achieved significantly better scores on new exemplars compared to learners that reported no awareness, thus suggesting that awareness at the level of noticing may result in some system learning as well as item learning.

The results from these studies suggest that awareness is not unitary. They also highlight differences amongst learners whose level of awareness varied even when being given explicit exposure to the linguistic feature (Robinson, 1997; Rosa & O'Neill, 1999). Research that addresses possible reasons for why learners do not all reach the same level of awareness is warranted. This type of research may suggest a learner profile at each level of awareness and, in turn, give possible insights into what type of instruction may be useful in creating awareness.

2.1.3 How Should Awareness Be Measured?

Awareness is a learner-internal process and, as such, its measurement is problematic (Leow & Bowles, 2005). Prior to 1997, artificial language studies frequently asked probe questions concerning structural patterns to assess participants' ability to verbalise a rule (e.g. Dulaney, Carlson, & Dewey, 1984; Reber, 1967, 1976). For example, Reber and Lewis (1977) asked learners after completion of all tasks to introspect and write freely about the experiment they had completed. In order to focus the responses, participants were asked to provide as much detail as possible concerning the areas in which the researchers were interested. Natural language studies frequently used an off-line questionnaire (e.g. Carr & Curran, 1994, Robinson, 1997). For example, Robinson asked learners in an off-line written questionnaire whether they had looked for

rules, whether they had noticed any rules, and whether they were able to describe any of the rules. These methods of probing awareness have been criticised for a number of reasons: asking probe questions that attempt to elicit a pattern may not allow researchers to observe incorrect rules participants may have formed (Robinson, 1995); participants that may have some low level of awareness may have been labelled as unaware (Schmidt, 1995); participants may have had epiphenomenal awareness that can not be reported off-line (Leow & Bowles, 2005), and what participants report having become aware of and what they did actually become aware of may differ (Leow, 1997).

Since Leow (1997), the majority of studies investigating awareness have used on-line measures such as uptake charts (Mackey, McDonough, Fujii, & Tatsumi, 2001) or note-taking during the reading of an L2 text (Izumi, 2002). Uptake charts were developed by Allwright (1984) as a means for learners to benefit as much as possible from the language class and to identify factors that motivate learners. An uptake chart asks a learner to reflect on what he/she has learnt in the classroom. However, the most popular method appears to be think-aloud protocols (Leow, 1997, 1998, 2000; Rosa & Leow, 2004; Rosa & O'Neil, 1999), which, according to Schmidt (2001), is the best method for measuring awareness to date as it allows for more extensive verbal reports of the contents of conscious on-line perceptions. Despite Schmidt's support, think-aloud protocols have been criticised for potentially adding an additional processing load (Jourdenais, 2001). Nevertheless, studies that have actually investigated this claim appear to show that non-metalinguistic verbal reports do not significantly affect comprehension or written production of the target structure, but metalinguistic verbal reports do (Bowles & Leow, 2005).

Despite the criticisms of think-aloud protocols, they still appear to be the most methodologically sound measure of awareness. However, a possibly superior way of measuring awareness is to use both an on-line and off-line measure. Leow (2000) asked participants to think-aloud whilst completing a crossword that exposed them to an arbitrary spelling change in the stem of certain Spanish preterite verbs. As soon as the crossword was completed, each participant was asked to write what they thought the purpose of the crossword had been. Additionally, after completion of the posttest, they were asked if they had noticed anything interesting about the verbs that they had just been working with. Leow found that the first probe question did not elicit an aware response from any participant, even those that had become aware during the think-aloud protocol. However, the more focused second probe question was successful at identifying both aware and unaware participants.

2.1.4 Future Directions

To date, research has shown the utility of awareness to SLA (e.g. Leow, 2000; Robinson, 1995; Rosa & O'Neill, 1999), although whether it is necessary is still contested (e.g. Leow & Bowles, 2005; Tomlin & Villa, 1994). Research on awareness has tended to focus on its role in the learning of an L2, i.e. the consequences of awareness (e.g. Leow, 1997, 2000; Robinson, 1995, 1996, 1997; Rosa & Leow, 2004; Rosa & O'Neill, 1999). However, possible factors that drive awareness do not appear to have been addressed. Studies that have compared instructional treatments (e.g. Ellis, 1993; Fotos, 1993; VanPatten & Wong, 2004) could be interpreted as comparing two methods of creating awareness i.e. does more awareness occur when learners are given an explicit

rule or an input flood? Nevertheless, these studies did not set out to address awareness, but instructional treatments. As such, awareness was not measured and the results can only give an indication of treatments that possibly create awareness.

The first purpose of the present study is to continue research into the effects of awareness, or lack thereof, on the subsequent L2 learning of French grammatical gender. French grammatical gender has been chosen as the linguistic feature for a number of reasons that shall be further discussed below. In addition, the present study aims to investigate possible reasons for why awareness research has found different levels of awareness. In order to do this, five cognitive factors, which are part of language learning aptitude, will be addressed to see whether they may contribute to learner awareness when a learner is exposed to the reliably masculine noun ending *eau* and the reliably feminine noun ending *elle* in French via a meaning-focused crossword. The five cognitive factors chosen are part of language learning aptitude (Dörnyei and Skehan's 2003): attention control, phonemic coding ability, working memory, inductive language learning ability, and analytic ability.

2.2 Aptitude

The choice of aptitude was prompted by three factors. Firstly, as learners differ in their levels of awareness (Leow, 2000) i.e. there are differences between individuals, addressing an area of cognition that is known to be different amongst individuals seems to be a logical first step in trying to understand the variance in learners' awareness levels. Secondly, Robinson (1997)[1] partly addressed this issue by investigating whether grammatical sensitivity and/or memory (two aptitude constructs) played a role in learner

[1] This study will be further discussed on page 32.

awareness levels. Finally, it permits the investigation of Dörnyei and Skehan's (2003) model of aptitude constructs[2] that are potentially important at different stages of input processing:

Table 2.1
Dörnyei and Skehan's (2003) Model of Aptitude Constructs and Different Stages of Input Processing

SLA Stage	Aptitude Factor
Input Processing Strategies	Attention control
	Working Memory
Noticing	Phonemic Coding Ability
	Working Memory
Pattern Identification	Phonemic Coding Ability
	Working Memory
	Grammatical Sensitivity
	Inductive Language Learning Ability

The above table is not a complete reproduction of Dörnyei and Skehan's (2003) model as only the part of the model pertinent to the initial stages of processing new input has been included as these initial processing stages are where awareness could play an important role.

Dörnyei and Skehan's (2003) framework is theoretical in nature and, as such, empirical evidence is needed to investigate its utility to the field of SLA. Nevertheless, before introducing a possible explanation for why each aptitude construct has been

[2] Skehan (2002) introduces the model, but it is further developed in Dörnyei & Skehan (2003).

included at each stage, it is necessary to understand the concept of aptitude in SLA and to discuss each aptitude construct from a theoretical and empirical perspective.

2.2.1 Defining Aptitude

Aptitude was defined by Carroll in 1974 as "a concept referring to some constellation of conditions, presumably residing in the individual, that predispose him to either success or failure (or some point along the continuum between these poles) in some future activity, in particular some activity requiring new learning" (p. 286). According to Carroll (1964), aptitude testing first began in the early twentieth century (Carroll, 1964). Since this time, a number of test batteries have been created. According to Skehan (2002), the two most well-known and most widely-used aptitude tests are Carroll and Sapon's (1957, as cited in Skehan, 1989) Modern Language Aptitude Test (MLAT) and the Pimsleur Language Aptitude Battery (PLAB) (Pimsleur, 1968).

Carroll (1964) explained that the MLAT was created in the 1950s after Carroll and Sapon asked a number of foreign language learners to take a variety of tests that Carroll and Sapon suggested could predict foreign language learning. The results from these tests were then correlated with each participant's achievement in the foreign language to find the tests that best predicted foreign language learning. Additionally, correlations for each test were done so that similar tests could be identified and subsequently collapsed into one test. The final outcome of this research was the MLAT, which consists of five sections: Number Learning, Phonetic Script, Spelling Clues, Words in Sentences, and Paired Associates. The aim of each section is to tap into the four different abilities that were identified as being of importance to foreign language

learning: phonetic coding ability, grammatical sensitivity, rote learning ability for foreign language materials, and inductive language learning ability. Phonetic coding ability was defined by Carroll (1981) as the ability to identify distinct sounds and to form associations between those sounds and the symbols. Grammatical sensitivity is the ability to recognise the grammatical functions of words (or phrases) within sentences. Rote learning ability for foreign language materials refers to the ability to learn and retain the associations between sounds and meanings both quickly and efficiently. Inductive language learning ability refers to the ability to infer or induce the rules present in a set of language materials. According to Carroll (1981), Number Learning taps into rote learning ability and possibly inductive language learning ability. Phonetic Script taps into phonetic coding ability. Spelling Clues measures phonetic coding ability and L1 vocabulary knowledge. Words in Sentences addresses grammatical sensitivity. Finally, Paired Associates addresses rote learning ability. As is evident, there is no actual test of inductive language learning ability even though Carroll (1964) discussed its importance in foreign language learning.

According to Dörnyei & Skehan, the only other commercially available aptitude test is the PLAB, which was created for high-school students (Skehan, 2002). Similar to the MLAT, this test battery was created by testing a variety of factors that were thought to contribute to foreign language learning success. The results found four significant factors: grade point average, motivation, verbal ability, and auditory ability (Pimsleur, Reed, & Stansfield, 2004 edition). From these results, the PLAB was created to consist of six parts:

1) Grade point average in all subjects except foreign language learning.

2) Interest in learning a foreign language.

3) Vocabulary word knowledge in English (the L1).

4) Language analysis – logical reasoning in terms of a foreign language

5) Sound discrimination – ability to learn new phonetic distinctions and to recognise them in different contexts

6) Sound – Symbol association – an association of sounds with their written symbols.

Since the MLAT's and PLAB's conception, the definition of aptitude does not appear to have changed. Carroll's definition is still widely used or referred to in the aptitude literature (e.g. Dörnyei & Skehan, 2003, Sawyer & Ranta, 2001, Robinson, 1997, Skehan, 2002). However, the constructs within aptitude that Carroll (1964) and Pimsleur (1968) isolated have been discussed and, to some extent, challenged (see Sawyer & Ranta for further discussion). Perhaps the most common aptitude components now discussed come from Skehan (1986). After reporting on a large-scale aptitude study commonly known as the Bristol Project, he concluded that there are three components to aptitude: working memory ability, analytic ability, and phonemic encoding ability (Skehan, 1998). In this conception, Skehan collapsed Carroll's grammatical sensitivity and inductive language learning ability into one component: analytic ability. Additionally, Skehan suggested that analytic ability was the most central component of aptitude. This seems to fit in with research into aptitude in SLA, which appears to focus most consistently on analytic ability as can be seen in the frequent use of MLAT IV Words in Sentences in research (DeKeyser, 2000; Robinson, 1997; Trofimovich, Ammar, & Gatbonton, 2007) and the creation of aptitude tasks aimed at assessing analytic aptitude (Ranta, 2000).

Nevertheless, this understanding of aptitude may be changing to give a more central role to working memory. Indeed, Miyake and Friedman (1998) suggested that "working memory for language may be one (if not the) central component of this language aptitude" (p. 339). In addition, this further compounds the notion that aptitude can not be seen as a unitary construct, rather a concept that consists of many different aspects. These changes in the perception of aptitude and the role that aspects of aptitude play to SLA are still very much under discussion. At this time, using Dörnyei and Skehan's (2003) framework allows the testing of a variety of aptitude factors to further understanding of what factors may be contributing to learner awareness, and possibly learning.

2.2.1.1 Attention Control

Attention control is a learner's ability to allocate attention amongst different cognitive processing tasks or different aspects of language (Trofimovich et al., 2007). According to Dörnyei and Skehan (2003), attention control could be a beneficial aptitude component at a beginning stage of input processing where the learner needs to effectively handle the input so that it can become available for analysis. Eviatar (1998) suggested that attention control could enhance the processing of linguistic stimuli that are relevant to the task whilst inhibiting the processing of those linguistic stimuli that are irrelevant to the task. Contrarily, Talmy (1996) suggested that attention control could refer to an individual's ability to switch attention efficiently amongst different linguistic relationships.

Research investigating attention control has focused on areas of SLA such as L2 proficiency, recasts, and metalinguistic awareness.

Segalowitz and Frenkiel-Fishman (2005) investigated whether there is a link between attention control in the L2 and L2 proficiency of Anglophones with varying degrees of proficiency in their L2, French. The results showed that the participants' ability to efficiently allocate attention between two sets of L2 language features (temporal versus causal) explained 32% of the unique variance in their L2 proficiency (measured by lexical access). This finding not only suggests the importance of attention control to L2 proficiency, but also its potential importance for other aspects of language learning.

Trofimovich et al. (2007) investigated the contribution of attention control, phonological memory, working memory, and analytic ability to the noticing of recasts (a correctly formed reformulation of a learner's non-target utterance) by adult Francophones learning English. The results found no relationship between the four factors and recasts. However, they did account significantly for the improved performance on the posttest. More specifically, attention control accounted for between 14% and 23% of the unique variance in production accuracy on the posttest for the grammar (English possessive determiners) and mixed target (English possessive determiners and intransitive verbs), but not the lexical target (English intransitive verbs). Trofimovich et al. suggest that this could be due to attention control's apparent importance to L2 proficiency in relational aspects (grammaticised) of language rather than non-relational (lexical) aspects (Taube-Schiff & Segalowitz, 2005). These findings again may suggest the importance of attention control to L2 proficiency, but it is important to remember that the four factors correlated with accuracy on the posttest only; none of the four correlated with proficiency

scores. Further research into this complex relationship may help us understand when attention control (and the other three factors) are helping and on what types of task.

White, Horst, and Bell (paper presented at the Second Language Research Forum [SLRF], 2007, October) investigated the importance of attention control, phonological memory, working memory, analytic ability, and L2 proficiency to young (9-10 years old) Franchophones' meta-linguistic awareness. Meta-linguistic awareness was measured by asking learners to reflect on aspects of language through responding to questions in reflective journals. The findings showed that 43% of the variance amongst participants in meta-linguistic awareness could be accounted for by attention control and analytic ability as measured, with 13% being accounted for by attention control alone. This result suggests that attention control may be an important factor in a young learner's ability to treat language as an object.

Attention control appears to be a potentially important factor in SLA. However, the exact nature of its role is still very much undefined. It seems that it is important for L2 proficiency of relational aspects of the L2, and accurate production of grammatical and mixed grammatical and lexical linguistic features, but not solely lexical features. Additionally, it seems to help learners see language as a tool. Therefore, further research that investigates possible aspects of language learning that may benefit from good attention control can help inform the field of SLA as to attention control's role.

2.2.1.2 Working Memory

Working Memory (WM) is assumed to be a limited capacity system that supports human thought processes by providing an interface between perception, long-term

memory, and action by temporarily maintaining and storing information (Baddeley, 2003, p. 829). The term WM was adopted by Baddeley and Hitch (1974) to emphasise the differences between their model of WM and earlier unitary models of short-term memory (STM). Sawyer and Ranta (2001) suggested that WM differs from STM in two ways: WM as opposed to STM is viewed as an independent workspace used for "sequential cognitive processes, such as the comprehension and production of language" (p.340), rather than a way station to long-term memory. Secondly, WM includes both temporary storage and ongoing processing as opposed to STM that is seen as being for storage only. As previously suggested, WM is not a unitary construct (Palladino & Cornoldi, 2004). Baddeley and Hitch proposed a WM model that consists of three components: a phonological loop, a central executive, and a visuospatial sketchpad. This three-component model seems to have been supported via research (Engle, Kane & Tuholski, 1999; Kane & Engle, 2002; Miyake, Friedman, Rettinger, Shah, & Heggarty, 2001) that used factor analysis and latent variable analysis (Baddeley, 2003).

Research on WM and SLA has addressed its relationship to learners' performance on tests of L2 reading, vocabulary, grammar, oral ability, uptake of recasts, and meta-linguistic awareness.

Harrington and Sawyer (1992) examined the sensitivity of L2 WM capacity to differences in reading skills amongst Japanese advanced L2 learners of English. The findings showed that subjects with larger L2 working memory capacities scored higher on measures of L2 reading skills, but no correlation was found between reading and passive short-term memory capacity.

Geva and Ryan (1993) investigated the relationship between WM capacity, and L2 reading and oral proficiency in children that spoke English and Hebrew. They found that WM can help explain performance on these two tasks that are classified as linguistically demanding, which led to the suggestion that WM is of more importance in linguistically demanding tasks.

Trofimovich et al. (2007) investigated whether WM capacity was related to the ability of foreign-language learners to notice recasts of both grammatical and lexical features. The results showed that WM was not related to the noticing of recasts, nor the accuracy on a posttest unlike the other cognitive factors tested (analytic ability, phonological memory, and attention control), which all accounted for a significant amount of variance on posttest accuracy.

White et al. (2007, October) asked whether WM could account for some of the variance amongst Francophone children's meta-linguistic awareness. The results showed that WM was not related to their meta-linguistic awareness as measured by reflective journals.

Thus, the role of WM in SLA is not clear. It seems to be important for certain aspects of the L2, such as reading (Harrington & Sawyer, 1992), but possibly not for all aspects, e.g. the noticing of recasts (Trofimovich et al., 2007). Nevertheless, these results need to be interpreted with caution as research into WM has not used the same measures. Research by Harrington and Sawyer, and Geva and Ryan (1993) used a reading span test to measure WM whilst Trofimovich et al. and White et al. (2007, October) used an auditory measure of WM. Therefore, it could be that the results are a factor of the measure used. Due to these conflicting findings and possible explanation in how WM

was measured, further research is warranted into the role of WM in SLA, particularly in light of its hypothesized importance to L2 learning (Miyake & Friedman, 1999).

2.2.1.3 Phonemic Coding Ability[3]

Phonological memory (PM) is a person's capacity to keep verbalised material temporarily in a short-term memory store. These stored representations decay with time unless they are rehearsed sub-vocally (Gathercole and Baddeley, 1993). In other words, words that are heard enter into a phonological short-term store. These words may then be rehearsed sub-vocally in order to keep them in the phonological store for a longer period of time. PM tasks differ from WM tasks as they only ask for the storage of material and not storage and processing. However, as both PM and WM have a storage component, but WM also has a processing component, PM is a subset of WM (Baddeley, Gathercole, & Papagno, 1998). Contrary to what the name of the construct suggests, PM can play a role in textual input as text can be recoded internally into a phonological code via the rehearsal process (sub-vocal rehearsal), which can then be held in the phonological store (Gathercole and Baddeley). This has been found to occur even when the textual input consists of unknown vocabulary (Baddeley, Gathercole, & Papagno).

Research on PM and SLA has investigated its importance for vocabulary, grammar learning, uptake of recasts, and ability to treat language as a system.

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[3] The aptitude component of phonemic coding ability is actually a test of phonological memory as it is defined as "the capacity to code unfamiliar sound so that it can be retained over more than a few seconds and subsequently retrieved or recognised" (Dörnyei & Skehan, 2003, p. 592). Subsequently, the two terms will be used interchangeably.

French and O'Brien (2008) investigated the role of PM in L2 grammar learning in a group of Francophone children learning English. They found that PM accounted for 27.9% of the variance in grammar development of this group.

Gathercole and Adams (1993) investigated the importance of PM to vocabulary knowledge in children aged two and three. They found a positive relationship between PM capacity and vocabulary knowledge. This finding has been found in other older populations (e.g. Atkins & Baddeley, 1998; Service & Kohonen, 1995).

Trofimovich et al. (2007) investigated whether PM could help explain the noticing of recasts in an L2. They found that it did not, but that it did account for some of the improved performance with the morpho-syntactic linguistic feature (the English possessive determiners his and her) as measured by the posttest. The same improved performance was not found for the lexical feature (English intransitive verbs).

French (2006) found conflicting results to Trofimovich et al. (2007) when investigating the importance of PM to the improvement in accuracy of vocabulary and grammar in pre-adolescents completing an intensive ESL programme in Quebec. He found that PM predicted vocabulary gains, but not grammatical gains.

White et al. (2007, October) investigated whether differences amongst learners' PM could help explain differences in levels of meta-linguistic awareness. The results showed that there was no relationship between the two. Perhaps these findings could be explained by the written nature of the meta-linguistic awareness tasks as compared to the mainly aural nature of PM.

An important role for PM in SLA has been found in a number of studies, but results have not always been conclusive and it could be that it is helping certain aspects

more than others or it could be related to the age of the learner. Further research is needed to understand its role in other areas of SLA and the role it plays in non-aural input.

2.2.1.4 Inductive Language Learning Ability

Inductive language learning ability can be defined as the ability to identify syntactic and morphological patterns from a provided language corpus and extrapolate from the identified patterns to new situations (Dörnyei & Skehan, 2003). Its possible importance as a factor of learning language aptitude was first suggested by Carroll (1964). Much of the research on aptitude has not used a pure measure of inductive language learning, perhaps due to Skehan (1989) combining grammatical sensitivity and inductive language learning ability under the one heading of analytic ability, or due to Carroll and Sapon's MLAT not having an individual test of this ability. Nevertheless, some research has included a measure of inductive language learning ability.

Alderson, Clapham, and Steel (1997) investigated metalinguistic knowledge, language aptitude, and language proficiency in order to address the perceived problem of declining standards in the knowledge about language and accuracy in the target language of incoming undergraduates in the United Kingdom. Aptitude was operationalised as grammatical sensitivity and inductive language learning ability. The results showed that the relationships between aptitude and language proficiency, and aptitude and metalinguistic knowledge were not significant.

Harley and Hart (1997) investigated the relationship between language aptitude and L2 proficiency in classroom learners of different starting ages. They tested for aptitude using one memory measure (part V of the MLAT) and one analytic measure, as

per Skehan (1989): subtest IV from the Pimsleur Language Aptitude Battery, which measures inductive language learning ability. They found that there was a positive relationship for learners that began at an earlier age (grade 1, approximately age 6-7) between L2 proficiency and memory ability. Contrarily, there was a positive relationship between L2 proficiency and analytic ability for learners that began at a later age (grade 7; age 12-13).

There does not appear to be a lot of research on the role of inductive language learning ability to SLA. Therefore, it is difficult to understand the relationship of inductive language learning ability to aspects of SLA. Nevertheless, after having collapsed inductive language learning ability and grammatical sensitivity into analytic ability (Skehan, 1989), Skehan has recently begun to refer to both of these aptitude constructs separately again (2002); thus suggesting that inductive language learning ability may have a role in language learning success in its own right. Further research that investigates it shall improve understanding of its utility.

2.2.1.5 Grammatical Sensitivity

Grammatical sensitivity is perhaps the individual difference factor that has been most widely used to investigate aptitude in relation to L2 learning and proficiency. As previously discussed, Skehan's (1989) collapsing of grammatical sensitivity and inductive language learning ability may have led researchers (DeKeyser, 2000; Ranta, 2002, Robinson, 1997; Trofimovich et al., 2007) to test for analytic aptitude and/or aptitude in general via tests that, in one way or another, tap into the grammatical

functions of words in sentences, which fits Dörnyei and Skehan's (2003) definition of grammatical sensitivity only.

DeKeyser (2000) replicated Johnson and Newport's (1989) study that investigated whether there was a critical period in SLA via testing learners on a variety of grammatical structures in the L2. They found that age of arrival to the United States strongly correlated with ultimate attainment for participants under the age of 17, but not for participants over the age of 17, which led them to suggest that a critical period for SLA does indeed exist. DeKeyser added the Words in Sentences subtest from the MLAT to his study in order to address the role of foreign language learning aptitude on ultimate attainment. DeKeyser's hypothesis that analytic ability would be of importance to older learners, but not younger learners, with regards to ultimate attainment was borne out.

Ranta (2002) investigated the importance of analytic ability for young learners of French in a communicative language learning setting. Her test of analytic ability was created specifically for the learners as existing tests were either not in French or for older learners than the learners that she tested (aged 11-13). However, the aim of the test was to "reflect differing abilities to attend to the syntactic and morphological form of sentences" (p. 170), which was argued to be testing language analytic ability. Ranta found that analytic aptitude was associated with strong performance for the most successful learners and weak performance for the least successful learners, which led to the suggestion that communicative language teaching can not remove the effects of aptitude differences amongst learners.

Both of these studies show that grammatical sensitivity may play a role in L2 proficiency, but there are conflicting results as to whether it is age-dependent (DeKeyser,

2000) or not (Ranta, 2002). Further research into the role of grammatical sensitivity is warranted as it appears to be playing a role in SLA, but the exact nature of this role is still largely unknown.

2.2.2 Dörnyei and Skehan's (2003) Model

It is now possible to return to Dörnyei and Skehan's (2003) model in order to discuss why these five aptitude constructs have been suggested at each of the three stages of input processing where awareness could arise: input processing strategies, noticing, and pattern identification.

According to Dörnyei and Skehan (2003), input processing strategies is the first stage of processing in SLA. This stage requires effective segmentation of the input stream so that it can be subsequently analysed. The aptitude constructs suggested as being relevant at this stage are attention control, WM, and phonemic coding ability[4]. It seems logical that attention control may be of importance here as the learners need to control their attention to segment what they perceive as important and unimportant for the task at hand, and possibly switch their attention amongst multiple important features in the input. Additionally, WM could be important as the ability to segment may depend on the quantity of information that can be processed and stored simultaneously. It does not seem controversial to suggest that learners with a relatively low WM capacity may find segmenting more challenging and time-consuming as not as much information can be held whilst determining how the segmentation should take place. As phonemic coding

[4] Dörnyei & Skehan's (2003) table on p.597 does not include phonemic coding ability. However, on p.598, it is stated that "phonemic coding ability (..), is the ability to code unfamiliar sound in such a way that it can be retained for more than a few seconds. This seems very close to the imposition of structure on the incoming speech stream that input processing strategies themselves are concerned with".

ability is defined as the ability to code unfamiliar sound in a way that allows it to be retained for more than a few seconds, this appears to fit with keeping the segmented information for further analysis.

The second input processing stage, noticing, is well-documented in the SLA literature (Fotos, 1993; Leow, 1997, 2000; Schmidt, 1990, 2001). It has also been suggested that the ability to notice relevant aspects of input may be a factor of learner individual differences (Sawyer & Ranta, 2001). The aptitude constructs that Dörnyei and Skehan (2003) mention here are phonemic coding ability and WM, but they do not see this as a finite list, rather one that needs to be adjusted as research into aptitude continues[5]. Phonemic coding ability could be important as learners who can store the input for relatively long periods of time are more likely to notice this input. Learners with relatively low phonemic coding ability are likely to have more difficulty noticing important features in the input as they have less time available before the stored information is lost. WM appears to be of potential importance for the same reasons: learners with low working memory capacity have additional time constraints, which may hinder noticing.

The final stage of input processing that may be important to awareness is pattern identification, the understanding of the stimuli. At this point, phonemic coding ability, WM, grammatical sensitivity, and inductive language learning ability are all suggested to be relevant (Dörnyei & Skehan, 2003). Again, the importance of phonemic coding ability and WM may stem from added time constraints for learners with low coding and memory capacity, thus making the identification of patterns more challenging. Grammatical sensitivity could be important here as the ability to identify the grammatical

[5] Indeed as this framework is theoretical in nature, this applies for each stage in the model.

functions that words/phrases play in a sentence may lead to the identification of patterns within and amongst linguistic features. Inductive language learning ability could be useful as it may allow the noticing of one exemplar to be extrapolated to other exemplars and other situations.

Dörnyei and Skehan's (2003) framework and the above discussion introduced possible aptitude factors that may be of importance at different stages of input processing. This framework is to be used in the current research to investigate whether the suggested aptitude constructs play a role in learners' awareness differences. As previously mentioned, this question has already been partially addressed by Robinson (1997).

2.3 Aptitude and Awareness

Robinson (1997) investigated the importance of consciousness to SLA by creating four training conditions (incidental, implicit, rule-search, and instructed) in order to address differing opinions on the necessity of consciousness (Schmidt, 1990) or lack thereof (Krashen, 1982). Two aptitude measures of grammatical sensitivity (MLAT test IV) and memory (MLAT test V) were included for two reasons. Firstly, to address Krashen's claim that individual difference measures are only related to conscious learning and, as such, are of no use to unconscious acquisition, and secondly, to address whether aptitude is related to levels of awareness in each training condition. For the purposes of his research, awareness was measured via an off-line questionnaire after exposure to a set of materials that contained two English structures, one that was deemed to be easy and one hard. Three questions were used to ascertain three different levels of awareness (Robinson, p.63: "did you notice any rules of English underlying the sentences

you saw in the training session?" (noticing), "were you looking for rules of English grammar when you saw the sentences during training?" (looking for), and "can you describe what the rules were that were illustrated by the sentences you saw during training?" (verbalisation). The analysis showed that the individual difference measures did affect learning in all but the incidental condition. Robinson interpreted these results for learning to support Krashen's (1982) claim that incidental learning is not affected by individual differences. With regards to the finding that implicit learning was affected by individual difference scores, Robinson suggests that the participants' background in ESL classrooms may have led them to analyse the input to look for patterns in the sentences. The fact that it was the test of grammatical sensitivity and not the memory test that affected the learning supports this suggestion.

The analysis of the results vis-à-vis the role of aptitude (grammatical sensitivity and/or awareness) to awareness level are reported in table 2.2. The results vis-à-vis awareness were interpreted as supporting the claim that awareness is triggered by individual differences in three out of the four conditions. Participants in the incidental condition did have varying degrees of awareness, but this did not appear to be related to aptitude, which Robinson (1997) suggests could be due to their awareness being more semantic and lexical in nature rather than structural.

Table 2.2
Level of Awareness, the Aptitude Tests, and Condition in Which Significant Differences Were Found (Based on Level of Awareness and Aptitude Test)

Level of Awareness	Aptitude Test	Condition
Noticing	Grammatical Sensitivity	Rule-Search
Noticing	Memory	Instructed
Rule-Search	Grammatical Sensitivity	Implicit
Rule-Search	Memory	-
Rule Verbalisation	Grammatical Sensitivity	Implicit
Rule Verbalisation	Memory	-

Robinson's (1997) findings suggest that aptitude and awareness are linked. Nevertheless, the exact nature of this relationship is difficult to comprehend. It seems that learning under an incidental condition does not create the type of awareness needed (i.e. awareness of the linguistic features to be tested) and perhaps due to this, there is no relationship between awareness and aptitude in incidental learning. However, additional research is needed to further understand this relationship as the results may be a product of the operationalisation of awareness or the exposure task.

2.3.1 The Role of Aptitude on Awareness

From the above discussion, it is evident that aptitude research has addressed a variety of issues, but results have varied and the importance of all the aptitude constructs to all areas of L2 learning still need investigation. To this end, the five aptitude constructs isolated by Dörnyei and Skehan (2003) will be investigated to see whether

they are playing a role in the different awareness levels attained by learners during a task that exposes them to French grammatical gender.

2.4 Linguistic Feature

Research on awareness needs to include a specific linguistic feature. So far, much research has focused on the Spanish preterite (Leow, 1997, 2000) and the Spanish contrary-to-fact conditional (Rosa & O'Neill, 1999; Rosa & Leow, 2004). When choosing a linguistic feature in an awareness study that aims at dividing learners into one of three different levels of awareness, there are a number of factors that need to be taken into account. Firstly, it is important that the participants have not already been taught a rule for this linguistic feature and that the participants are not already able to use this feature accurately. Secondly, the complexity of the rule and the feature need to be taken into account. Thirdly, as one aim of this study is to investigate possible differences in type of learning based on awareness level, it is useful to have prior research on how learners react to this feature in terms of learning it as an item (i.e. memorising each exemplar) or as a system (i.e. knowing the rule and applying it in new contexts). Finally, from a pedagogical perspective, Hulstijn (1995) suggests teaching rules that are reliable. To this end, the linguistic feature for the purpose of this study is French grammatical gender, and more specifically, the reliably masculine noun ending *eau* (e.g. *le* cout*eau*, *le* chap*eau*), and the reliably feminine noun ending *elle* (e.g. *la* rond*elle*, *la* hirond*elle*).

2.4.1 Participant's Ability to Use French Grammatical Gender

French grammatical gender is consistently considered to be a linguistic feature that is challenging to acquire for non-native speakers of French (Carroll, 1989; Harley, 1979, 1994). In addition, this feature may be especially difficult for learners whose L1 does not have grammatical gender (Harley, 1998). Therefore, further research that informs us on the acquisition of French grammatical gender is useful for both theoretical and pedagogical reasons.

Furthermore, how French grammatical gender is taught in French as a Second Language (FSL) classrooms may depend on each individual teacher due to disagreements amongst French grammarians (e.g. Bosquart, 1998) on whether French grammatical gender is regular or arbitrary (Lyster, 2004). In fact, FSL teaching materials vary in whether they discuss French grammatical gender in relation to noun ending clues (e.g. Grégoire & Thiévenaz, 1995 does, but Capelle & Menand, 2006 does not). For these reasons, it is possible that learners at any level may not have been formally exposed to these noun ending clues.

2.4.2 Degree of Complexity

In order to measure awareness, the participants in this study will verbally report what they are noticing. For this reason, it is essential to have a linguistic feature with a rule that is easy to report. The rule for French grammatical gender has a low degree of complexity (DeKeyser, 1998) as it can be reported without using metalanguage, for example, "*if a word has eau at the end, we use le, and if a word has elle at the end, we use la.*"

2.4.3 Item versus System Learning

Item versus system learning is important for the current research on awareness as it has been found that different levels of awareness lead to different types of processing (Leow, 1997) and, higher levels of awareness lead to superior learning, and greater hypothesis testing and rule formation (Rosa & O'Neill, 1999). Therefore, in order to further investigate these findings, we can ask whether awareness at the level of noticing leads to item learning whilst awareness at the level of understanding leads to system learning by creating a posttest that includes both items that have been encountered in exposure and items that have not. If the items contained in the exposure task are completed accurately on the posttest, this could act as evidence of item learning, but if the new items are also completed accurately, this could act as evidence of system learning. Additionally, Dörnyei & Skehan's (2003) framework divides noticing and pattern identification into two different stages in input processing. This division seems in-keeping with the concept of learning an item and learning a system as the item would be related to the input processing stage of noticing whilst the system would be related to the input processing stage of pattern identification. Therefore, item and system learning can address two research issues: are certain levels of awareness associated with certain types of learning, and, are these levels of awareness associated with the aptitude factors that Dörnyei and Skehan suggested?

Research that has investigated the issue of item versus system learning with regard to French grammatical gender has yielded contradictory results.

Harley (1998) investigated whether multiple focus-on-form tasks could promote child L2 acquisition of French grammatical gender via presenting the learners with

materials that focused on certain noun endings that were chosen due to their reliability in predicting gender. The findings showed that learners that received gender instruction outperformed learners that received no gender instruction. However, the learners were not able to generalise this knowledge to unfamiliar nouns. Harley concluded that this showed item rather than system learning.

Lyster (2004) investigated the differential effects of different feedback in form-focused instruction using French grammatical gender as the target feature. The results showed that all learners that received form-focused instruction improved in their ability to assign gender regardless of feedback. Furthermore, they were able to generalise their knowledge to unfamiliar nouns, which suggests system rather than item learning. Lyster hypothesised that the reason for this could be due to his learners being older than Harley's (1998), and, as such, having greater cognitive abilities.

Even though results from studies on French grammatical gender and type of learning are not conclusive, it is evident that this linguistic feature can be learnt both as an item and as a system.

Chapter 3: Research Questions and Hypotheses

The aim of this study is to address the following research questions (RQ) and hypotheses (H). Each research question will be followed by any pertinent hypotheses:

RQ1. Does the amount of learning depend on the level of awareness?

H1. Participants that become aware will learn the linguistic feature more successfully than participants that do not show any sign of awareness.

Previous research that has addressed level of awareness and quantity of learning has consistently shown that learners with awareness perform superiorly on a posttest to those that appear to be unaware (Leow, 1997, 2000; Rosa & O'Neill, 1999; Rosa & Leow, 2004; Williams, 2005).

H2. Participants that become aware at the level of understanding will learn the linguistic feature more successfully than all other participants.

Research that has divided aware learners into different categories depending on their ability or lack thereof to form a rule of the targeted linguistic feature has shown that learners that are able to formulate the rule after or during exposure out-perform other participants on a posttest (Leow, 2000; Rosa & O'Neill, 1999, Rosa & Leow, 2004).

RQ2. Does the type of learning (item versus system) depend on the level of awareness?

H3. Participants that become aware at the level of noticing will exhibit item learning.

Rosa and Leow (2004) found that learners that had been categorised as aware at the level of noticing performed significantly worse than learners that were aware at the level of understanding on new exemplars. However, they also found that these learners still performed significantly better than learners that reported no awareness, which led them to suggest that some system learning may take place at the level of noticing. Nevertheless, as there were significant differences between the noticing and understanding groups, and as Dörnyei and Skehan's (2003) input processing stage of noticing relates only to a specific item, it is hypothesised that learners aware at the level of noticing will only learn the item and not the system.

H4. Participants that become aware at the level of understanding will exhibit system learning.

Due to the previously mentioned findings from Rosa and Leow (2004) that learners aware at the level of understanding could generalise to new exemplars, and Dörnyei and Skehan's (2003) processing stage of pattern identification being related to understanding how a linguistic feature appears to work, it is hypothesised that if a learner understands how French words ending in *eau* and *elle* attribute gender, they will have learnt the system, not just an (some) item(s).

RQ3. Which aptitude factors predict awareness at the level of understanding?

H5. Participants that become aware at the level of understanding will have a higher than average grammatical sensitivity and inductive language learning ability.

From a theoretical perspective, the roles of grammatical sensitivity and inductive language learning ability are both related to being able to understand the mechanics of a language. As such, it is hypothesised that participants that are strong in this area will be more likely to see the patterns of language and thus, find a rule.

RQ4. Which aptitude factors predict awareness at the level of noticing?

Chapter 4: Methodology

In this chapter, the procedures followed to investigate the research questions presented in the previous chapter are described. The sections in this chapter discuss the participants, the linguistic feature, the exposure task, the assessment tasks, the questionnaire, the aptitude tests, the procedure, the operationalisation of awareness, and the operationalisation of learning.

4.1 Participants

The participants for this study were sixty Anglophones with low-level French and knowledge of no other languages. They were recruited from the Montreal area via adverts placed on Montreal-based internet sites (Craigslist, McGill Classifieds) and through personal contacts. As such, the participants did not form a homogenous group, but their knowledge of French was established as being similar based on a proficiency test (distractors from the posttest, described in more detail below). In addition, they were also screened for limited knowledge of the French noun ending clues being tested (le cout*eau* and la ru*elle*) via a pretest, and knowledge of gender in general via an interview question: "How do you decide whether to use un or une (le or la)?". The participants were tested if they met the following criteria: they did not discuss the potential utility of noun endings to deciding gender in their response to the interview question on gender determination, and they scored 50% or less on the pretest.

Biographical information was collected on each participant via a questionnaire that was given in the form of an interview. The majority of participants came from

outside Quebec: English-speaking Canada, the United States, Britain, and Oceania. The length of time that each participant had spent in Quebec varied, but due to the level of French spoken by all participants, all reported few interactions with Francophones (in stores, bars or Francophones with whom they spoke English). Most participants were either studying or looking for work. A few participants were either stay-at-home mothers or retirees. Their age varied, but all participants were over 20.

All participants were paid $10 for their time.

4.2 Linguistic Feature

The rationale for choosing French grammatical gender has already been discussed (in chapter two). However, the selection of the two noun endings *eau* and *elle* also needs to be considered. In order to choose two noun endings, a popular French as a Second Language grammar exercise book was consulted (Grégoire & Thiévenaz, 1995). This book, *Grammaire Progressive du Français niveau intermédiaire*, was chosen as it highlights the utility of noun endings to selecting gender, but it would be too high for the participants in this study to have used, thus further ensuring that the participants were not already able to correctly select words that are reliably masculine or feminine based on noun endings. The noun endings also needed to fit the following criteria: reliably masculine or feminine, occurring with a sufficient range of common words (sixteen of each *eau* and *elle*) so that the meaning would be transparent to low-level learners, and amenable to depiction for the exposure task (see below).

At first, the masculine noun ending *eau* and the feminine noun ending *ette* were chosen. However, *ette* is a diminutive suffix in English borrowed from French (Mostert,

1987) as can be seen in pairs of words such as kitchen/kitchenette. Additionally, it is also used as a feminine suffix (Holmes, 1993) in such words as lad/ladette (Oxford University Press, 2007). Secondly, the feminine noun ending *ade* was chosen. However, it proved difficult to find sufficient words ending in *ade* that were concrete and/or well-known cognates for low level learners (compare the utility/ease of comprehension of *ambassade* versus *tapenade/balustrade*). Finally, the feminine noun ending *elle* was chosen. This suffix did not feature in Grégoire and Thiévenaz, but it was included in Lyster's (2004) study as being a reliably feminine ending. Additionally, the Nancy University initiated search engine, *Analyse et Traitment Informatique de la Langue Française,* was used to verify whether the suffix *elle* consistently predicts femininity. This search engine generates all words terminating in *elle* by part of speech. This search showed that nouns terminating in *elle* are accurately feminine (over 99%) (as is masculine *eau).*

4.3 Exposure Task (appendix B)[6]

French grammatical gender was presented via a crossword for the following reasons. Firstly, Leow (1997, 2000) used a crossword in his awareness studies and it yielded learners at different levels of awareness. Secondly, it could allow for problem-solving if participants answered incorrectly, which Leow, and Rosa and O'Neill (1999) discussed as being a possible way to draw learner's attention to the linguistic feature. Thirdly, a crossword puzzle can be done whilst thinking aloud as, according to Wickens (1989), thinking aloud and problem-solving do not tap into the same attentional pool.

[6] For how the crossword was presented, please see the procedure section.

In order to create the crossword, three important factors needed to be taken into account: the purpose of the crossword, the necessity to have as little manipulation as possible of the targeted linguistic feature whilst still finding some aware learners, and the low level of the learners. In awareness studies, it is important that the learner does not know the true purpose of the crossword from the outset otherwise all learners are aware. In addition, it was decided not to focus on another grammatical form during the crossword so that participants would be completing the crossword for meaning rather than form. Coupled with this is a need for as little manipulation of the structure as possible so as to be confident that those learners that do not report awareness are indeed unlikely to have awareness. The level of manipulation contained in the crossword grew during pilot-testing as can be seen from table 4.1 below that shows the development of the exposure task and the changes that were made after each pilot testing. Furthermore, as the crossword was ostensibly a vocabulary task, but did actually act as input of masculine nouns ending in *eau* (eight) and feminine nouns ending in *elle* (eight), the vocabulary knowledge of the participants was problematic. The crossword needed to contain enough input, but it also needed to be achievable. Therefore, an answer sheet was created that contained pictures of the nouns with the French word plus article written below. This also meant that the nouns needed to be concrete so that they could be easily depicted.

Table 4.1
Steps Taken Through Pilot Testing to Create the Exposure Task

Pilot Test	How Linguistic Feature Presented	Outcome
1	Contained in crossword clues (e.g. 1. Quand on joue à ce sport, on utilise **une rondelle** [not in bold in test])	Tested on three people and no one became aware.
2	Contained in answer sheet with article. Participant entered into crossword without article (e.g. the clue read: *Quand on joue au hockey, on utilise un bâton et* ..... The answer key read *la rondelle* and the participant entered *rondelle* in the crossword)	Tested on four people and no one became aware.
3	Contained in answer sheet with article. Participant did as above, but was not guided by clue numbers, the idea being that greater time spent on the crossword and more problem solving may drive awareness (Rosa & O'Neill, 1999).	Tested on one person who did not become aware. This was not further tested as it took a very long time to be completed.
4	Contained in answer sheet with article. The *E* and the *A* from Le and La were also provided in the crossword. Participant entered the L from the article and the word into crossword.	Tested on three people. Feedback suggested that the inclusion of *E* or *A* encouraged learners to ignore the article.

Pilot Test	How Linguistic Feature Presented	Outcome
5	Contained in answer sheet. Participant had to include article in crossword and a black line was drawn between where the article and noun would go in the crossword.	Tested on four people and two became aware.

4.4 Assessment Tasks

This study followed a pretest posttest design. The tests were completed immediately prior to and after exposure. Both tests were multiple choice tests with three options: a correct option, an erroneous option, and a *Je ne sais pas* (I don't know) option. The pretest (appendix C) contained 48 items: 8 nouns ending in *eau*, 8 nouns ending in *elle*, and 32 distractors. The posttest (appendix D) contained 82 items: 16 nouns ending in *eau*, 16 nouns ending in *elle*, and 50 distractors. The nouns contained in the posttest included all the nouns from the crossword (i.e. nouns where correct input had been given) and all the nouns from the pretest (i.e. new nouns where no input had been given). This design meant that it was possible to see whether each participant had learnt only items from the crossword or whether they were able to generalise to new contexts (item versus system learning). The posttest distractors (see appendix E for a complete list of the distractors) also acted as a proficiency test. Therefore, the distractors were chosen to highlight five types of error (ten for each type) frequently made by learners of French (italicised examples are erroneous):

- verbs followed by à or de (e.g. je commence à travailler/*je commence de travailler*)
- adjective agreement (e.g. *un verre cassée*/un verre cassé)
- être or avoir (e.g. être intelligent/*avoir intelligent*)
- masculine and feminine (with other nouns) (e.g. un parapluie/*une parapluie*)
- grammatical homophones (e.g. *tu a des beaux yeux*/tu as des beaux yeux)

Proficiency was measured only to verify that the three groups, unaware, aware at the level of noticing, and aware at the level of understanding, were comparable at the outset.

4.5 Questionnaire (appendix F)

A questionnaire was used in this study to collect relevant personal data on the participants, including their knowledge of other L2s, and as another means of ensuring that they did not know the utility of noun endings to allocating gender. The questionnaire consisted of two parts. The first part asked participants for their age, sex, first language, any other languages they spoke, and how these languages had been learnt (type of instruction and context). The second part of the questionnaire asked five questions concerning French structure:

1. How do you decide whether to write/say *je suis* or *j'ai*?
2. How do you decide whether to write *je serai* or *je serais*?
3. How do you decide whether to write/say *un* or *une* (*le* or *la*)?
4. How do you decide whether to write/say *je sais* or *je connais*?
5. How do you decide whether to write/say *je suis allé(e)* or *j'allais*?

As previously mentioned, the questionnaire was given orally, but the participants were provided with a written sheet containing the five French structures above so as not to rely solely on aural comprehension.

4.6 Aptitude Tests

The five aptitude factors that were tested were attention control, working memory capacity, phonological memory capacity, grammatical sensitivity, and inductive language learning ability.

4.6.1 Attention Control

Attention control was measured by the Trail Making Test (appendix G), which formed part of the US Army Individual Test Battery (1944; as cited in Trofimovich et al., 2007). This test is given in two sections. Firstly, the participant is timed drawing a line from number one to twenty-three to give a base line (the speed with which he/she copes with one stimulus). Secondly, the participant is timed drawing a line between numbers in ascending order and letters in alphabetical order (1-A-2-B-3-C etc.). This time minus the base line time gives a time that signifies the ability to switch attention between two stimuli. According to Lee, Cheung, Chan, and Chan (2000; as cited in Trofimovich et al.), this test appears to provide a language-neutral estimate of an individual's ability to shift attention between two sets of stimuli. This is of potential importance to language learning as learners that are able to switch attention quickly may be better able than learners that can not switch attention quickly to focus on both meaning and form whilst processing the input. In addition, this is of particular importance in the present study as

the participants are focusing on the task for vocabulary reasons not for the linguistic feature that is being investigated. Therefore, participants that are able to switch attention more quickly may be more likely to notice the linguistic feature whilst simultaneously completing the task, as suggested by Talmy (1996).

4.6.2 Working Memory

Working memory (WM) capacity was measured by a reading span test (Daneman & Carpenter, 1980 [appendix H]). A reading span test requires a participant to maintain items in memory whilst performing processing tasks. For this test, participants read a sentence aloud and memorise the final word. As they finish reading the sentence aloud, a new sentence is presented. After two sentences, the participant is prompted to recall the two memorised words. After six two-sentence sets, the participant moves on to reading three sentences aloud before recall. The maximum quantity of words for recall is six. This test was administered on a personal computer using Power Point. A blank screen acted as the prompt for recall. Participants were also told when the set size got larger by a screen containing the number of sentences that would be presented before recall. The working memory test that was used in the present study has been widely used in its entirety or as a template in previous WM research (Friedman & Miyake, 2005; Juffs, 2005). Despite concerns in the literature about what this test, alongside other WM tests, is actually measuring (Miyake, 2001), this test was chosen as it would then be possible to compare results with results from other studies that have used the same test.

4.6.3 Phonological Memory

Phonological memory (PM) was tested by an Arabic repetition task based on French (2006) (appendix I). This task required participants to listen to an Arabic word and then repeat it. The participants did not know what language was being spoken until after completing the test. Each word was read by a native Arabic-speaking male from Algeria. Each syllable was pronounced for an equal amount of time. There were twenty-eight words in total, four words for each tested syllable length, from three to nine. As each word was recorded individually, the researcher played one word at a time.

The type of test used to measure PM has varied (French, in-press). Tests could be recognition tasks (Trofimovich et al., 2007), or repetition tasks (Masoura & Gathercole, 1999). A repetition task was chosen over the other type of task because it appears to be the purest measure of phonological memory. Recognition tasks have been criticised as requiring a different set of cognitive skills to the phonological loop as there is no articulatory component (French). When choosing a repetition task, it was necessary to take into account past research which has shown that a participant's prior language knowledge can affect the results if the task is done in a known language, for these participants English or French. Gathercole and Baddeley (1993) suggested that this type of task taps into long-term memory as well as the phonological loop. In addition, a non-word repetition task was not used as if this had followed the phonological structure of either English of French, it may have caused the results to be a factor of a participant's understanding of the phonotactic structure of the language (French). An Arabic repetition test was thought to be methodologically sound as participants were selected

based on their not being able to speak any other languages except English and some French. This test has also been used in previous PM research (French & O'Brien, 2008)

4.6.4 Inductive Language Learning Ability

Inductive language learning ability was tested using part IV of the PLAB (Pimsleur, Reed, & Stansfield, 2004 edition): Language Analysis (appendix K). This test introduces an invented language via translation of words and phrases of this language into English. The participant is then presented with an English sentence and given four possible options on how to say this sentence in the invented language. There is only one correct answer. The test consists of fifteen questions and the participants have a time limit of ten minutes. A time limit of ten minutes was given for two reasons. Firstly, when the PLAB is administered in its entirety, a time limit of forty minutes is given for completion of sections III to VI. Therefore, the time allocated was divided by four to give a ten minute time limit. Additionally, as this test asks participants to infer how a language works, participants that spend more time on the test may be advantaged and as this study is not addressing differences in learning strategy, the fact that one learner may take longer to complete a test (for whatever reason) was not important. The PLAB was created for high school students. Even though this study was carried out on adults, the PLAB was used as it was the only test that seemed to be a pure measure of inductive language learning ability that could be obtained[7], and it has also been used in past aptitude research (Harley & Hart, 1993).

[7] The inductive language learning ability test used by Alderson et al. (1996) could not be obtained.

4.6.5 Grammatical Sensitivity

Grammatical sensitivity was tested using part IV of the MLAT: Words in Sentences (appendix J). This test consists of forty-five questions. Each question contains two sentences. The first sentence includes an underlined word or phrase. The second sentence includes five underlined words or phrases. The participants have to choose which word in the second sentence has the same grammatical function as the underlined word in the first sentence. This test clearly assesses the ability of the learner to analyse the structural properties of the linguistic input (Sawyer & Ranta, 2001). Additionally, this test has been frequently used in aptitude research (e.g. DeKeyser, 2000; Robinson, 1997).

4.7 Procedure

Data collection lasted for between sixty to ninety minutes depending on the speed with which the tests were completed. Participants did the tests in succession and, as such, did not rest between each test for longer than 60 seconds. All data were collected at one of three places: a research office at Concordia University, the participant's house, or the researcher's house. The testing took place as follows:

1. Researcher welcomed participant and discussed the consent form. Participant asked any questions regarding confidentiality and purpose of testing. Consent form signed.
2. Participant completed pretest.
3. Researcher asked participant to put on microphone[8].

[8] An Olympus DS-2 Digital Voice Recorder plus a Sony ECM-T6 Electret Condenser Microphone were used for all recordings.

4. Researcher interviewed the participant using the questionnaire. The first half of the questionnaire was not recorded as it asked questions concerning age, sex, and language background. However, the second part asked five questions concerning knowledge of certain French structures, including gender. This part was recorded.
5. Researcher told participant that he/she would be completing a French crossword whilst saying every thought aloud. However, before doing this, it was necessary to practise thinking aloud so he/she would first complete a practice crossword (Appendix L) in English whilst thinking-aloud.
6. Researcher gave practice crossword and completed the first clue whilst thinking-aloud to provide an example.
7. Participant completed practice crossword with researcher prompting he/she to continue verbalising if necessary.
8. Researcher explained that participant would now be given an answer key for the French crossword that he/she could use whilst completing the crossword. The participant was also told that he/she could ask questions concerning the content of the answer key, but as soon as the crossword was given to him/her, the researcher would not talk.
9. The digital recorder was turned on and the participant was given the answer key.
10. After the participant had finished looking at the answer key (i.e. after had asked any questions on what the words/pictures signified), the researcher gave the crossword to the participant and told him/her to begin by reading the instructions aloud.
11. Participant completed the crossword.

12. The researcher took the answer key and the crossword, and asked the first probe question:

    "What do you think the linguistic purpose of the task was?"

13. After the first probe question was answered, the digital recorder was turned off.
14. The participant completed the posttest.
15. As soon as the posttest was completed, the researcher turned on the digital recorder and asked:

    "Now that you have finished all the tasks related to French, what do you think the linguistic purpose was?"

16. After the second probe question was answered, the digital recorder was turned off.
17. The participant now completed the five aptitude measures in the following order[9]:
    I. Inductive Language Learning Ability Test (PLAB Part IV [Pimsleur, Reed, & Stansfield, 2004 edition])
    II. Working Memory Test (Daneman & Carpenter's Reading Span Test, 1989)
    III. Attention Control Test (US Army Battery, 1949)
    IV. Phonological Memory[10] (Arabic Non-word Repetition, French, in-press)
    V. Grammatical Sensitivity Test (MLAT Part IV)

4.8 Operationalisation of Awareness

Awareness was operationalised following Allport (1988): a show of some behavioural or cognitive change due to the experience; a report of being aware of the experience; and a description of this subjective experience. However, as the exposure

[9] The order of the tests was chosen randomly as there did not appear to be any theoretical or research rationale for ordering them.
[10] This test was recorded.

task did not provide learners with an opportunity to show a behavioural change, the first and second criteria were combined as per Rosa and O'Neill (1999). This allowed for three levels of awareness: no awareness[11], at the level of noticing (behavioural or cognitive change and report that they are aware, i.e. have noticed something related to gender), and at the level of understanding (behavioural or cognitive change and a description of this subjective experience, i.e. have formulated a rule related to French noun endings' utility to gender determination). Awareness was measured via both a think-aloud protocol and two probe questions, one immediately after the task ("What do you think the linguistic purpose of the crossword was?") and one immediately after the posttest ("Now that you have finished all the tasks related to French, what do you think the linguistic purpose was?").

4.9 Operationalisation of Learning

The term learning has been used to refer solely to the ability to process L2 input and reproduce it correctly on an immediate posttest. Therefore, the term needs to be interpreted with caution. It is not suggested that this study allows for incorporation of what the participant has become aware of into the developing system (VanPatten, 1990). Furthermore, as the posttest was completed immediately after the exposure task, learning can only refer to the short-term.

As per Leow (1997), a multiple-choice recognition task was used to measure learning. Production was not tested as the participants had at no point been required to produce the linguistic feature during exposure without reference to the answer key that contained the correctly spelt words alongside the correct article.

[11] This category has been labelled as no awareness. In reality, this means no explicit verbal report.

As such, when the term learning is used to refer to the present study, it can only be interpreted as the task-specific learning that may take place based on the crossword that provides exposure to the reliably masculine and feminine French noun endings *eau* and *elle,* and as measured on the immediate multiple-choice recognition posttest.

Chapter 5: Analysis of the Results

This chapter presents the scoring procedures and results of the quantitative and qualitative analyses. The scoring procedure for each test will be followed immediately by the relevant analysis. To conclude the chapter, the findings will be summarised.

In order to present the results, it is necessary to understand how learners were divided into different awareness levels. The learners think-aloud protocols and two probe questions were analysed for evidence of awareness. This analysis led to the creation of only two awareness levels: aware and unaware; as the majority of learners that appeared to be aware did not formulate a rule, they only mentioned something related to gender. Therefore, learners that were grouped as aware could be so at the level of noticing ($n = 15$) or understanding ($n = 3$). A more in-depth discussion of this analysis is contained later in the chapter.

5.1 Pretest Results

The pretest, a multiple choice test consisting of 50 items, was scored by giving one point for a correct answer and zero for an incorrect answer. As the choice was always binary, a participant had a one out of two chance of being right. Therefore, a "*je ne sais pas*" (I don't know) option was included. This option was scored in the same way as an incorrect answer. Participants were encouraged to use this response instead of guessing. It was felt that this would result in a more accurate representation of the participants' actual knowledge. The pretest was scored out of 16 as there were 8 nouns ending in *eau* (masculine) and 8 nouns ending in *elle* (feminine). However, after scoring

the pretests, it was decided that only the masculine words ending in *eau* should be included for data analysis, rather than both masculine *eau* and feminine *elle*. This decision was made for three reasons. Firstly, even though grammatical gender is one linguistic feature, it became evident that it was actually two separate features for the purpose of this task as learners needed to notice two different clues: *eau* predicts masculinity and *elle* predicts femininity. Secondly, in the pretest, 12 out of the 36 participants scored over 50% accuracy with *elle* with 3 participants scoring all eight correct. It must be noted that these three people scored eight out of eight for *elle*, but zero out of eight for *eau* as they overgeneralised femininity to all nouns. Furthermore, after completion of testing, informal follow up questions concerning gender elicited that certain participants favoured feminine when the noun ended in *e*. However, as no mention had been made of this during testing or during the formal interview, these participants' results were still analysed as it was not possible to tell whether this strategy was formulated prior to, during, or after testing.

Due to the exclusion of all data on the reliably feminine noun ending *elle*, the pretest was then scored out of eight. It was decided that the cut off point for testing participants would be set at 50%. Participants that scored higher than 50% would not be retained as it was thought that above-chance accuracy may be indicative of an implicit rule. Participants that scored 50% or lower would be retained as sufficient errors were still being made with the targeted words to assume no complete implicit rule. In addition, improvements in attributing gender were still possible.

The results from the pretest can be seen in table 5.1. To ensure the two groups were behaving the same at the pretest, an independent t-test was performed on the pretest

raw scores. The alpha level was set at .10 to ensure that the two groups were behaving similarly. The results show that the two groups were not behaving differently

Table 5.1
Pretest Mean Scores and Standard Deviation

Group	**N**	**Mean**	**SD**
Aware	18	1.17	1.38
Unaware	18	0.61	1.20
Total	36	0.889	1.30

$t\,(34) = 1.29, p > .10$

5.2 Posttest Results

The posttest was scored by giving one point for a correct answer and zero for an incorrect answer. As in the pretest, a *"je ne sais pas"* (I don't know) option was included in order to gain the most accurate representation of the participants' knowledge. The maximum score was 16 for *eau,* 8 of which were the words contained in the exposure task and 8 were new words (from the pretest, but no input had been given on the gender of these words). As the posttest contained two different types of *eau* words (old and new), the results were treated as two separate posttests: posttest old and posttest new

The mean scores and standard deviation from posttest old and posttest new can be seen in table 5.2 and 5.3 respectively.

Table 5.2
Posttest Old Mean Scores and Standard Deviation

Group	N	Mean	SD
Aware	18	3.67	3.03
Unaware	18	2.28	2.19
Total	36	2.97	2.70

Table 5.3
Posttest New Mean Scores and Standard Deviation

Group	N	Mean	SD
Aware	18	1.94	2.60
Unaware	18	0.61	0.92
Total	36	1.28	2.04

RQs one and two asked:

1. Does the amount of learning depend on the level of awareness?
2. Does the type of learning (item versus system) depend on the level of awareness?

In order to address these questions, it was necessary to understand whether the participants were behaving differently based on awareness levels and whether participants were behaving differently amongst the three tests (pretest, posttest old, and posttest new). A two-way mixed Analysis of Variance (ANOVA) was carried out with group (unaware and aware) as the between-subject factor and the pretest *eau* words, posttest *eau* words old, and posttest *eau* words new as the within-subject factors (see table 5.4 below). The alpha level was set at .05 as this is considered to be an acceptable

level to ensure that the results did not occur by chance in social science research (Bennet, 1995).

Table 5.4
Two-way Mixed ANOVA for Pretest, Posttest Old, and Posttest New

Source	SS	*df*	MS	*F*	η_p^2
Between subjects					
Group	32.23	1	32.23	3.75	.1099
Error	292.54	34	8.60		
Within subjects					
Eau words	88.35	2	44.18	22.92*	.41
Eau words x group	3.91	2	1.95	1.01	.03
Error	131.07	68	1.93		

* $p < .01$

The results from the analysis reveal no significant difference for group and no interaction between group and the three tests. However, a significant difference was found between type of test. In order to locate the significant difference, a pairwise comparison was done (see table 5.5 below). The alpha level was set at .05 and a Bonferroni adjustment was made for multiple comparisons used.

Table 5.5
Pairwise Comparisons of Pretest and Posttest Measures

	M	Pretest	Posttest new	Posttest old
Pretest	.89			
Posttest new	1.28			
Posttest old	2.97	*	*	

* $p < .05$.

This comparison shows that there are two significant differences: one between the pretest and the posttest old items, and one between the posttest new and posttest old items. Thus, both groups were significantly more successful at correctly judging the gender of nouns ending in *eau* that had appeared on the crossword (posttest old) than the gender of nouns ending in *eau* that had appeared in both the pretest and posttest new.

5.3 Proficiency Test Results

The proficiency test consisted of distractors from the posttest. This method of controlling for proficiency was chosen as the participants were already being subjected to eight tests. Combining the proficiency test with the posttest helped to ensure that the participants did not suffer from test fatigue. The posttest distractors consisted of five French linguistic structures that offer binary choices:

- verbs followed by à or de (e.g. je commence à travailler/*je commence de travailler*)
- adjective agreement (e.g. *un verre cassée*/un verre cassé)
- être or avoir (e.g. être intellingent/*avoir intelligent*)

- masculine and feminine (with other nouns) (e.g. un parapluie/*une parapluie*)
- grammatical homophones (e.g. *tu a des beaux yeux*/tu as des beaux yeux)

These distractors were scored by giving one point for a correct answer and zero for an incorrect answer or a *"je ne sais pas"* (I don't know) answer. The maximum score was 50.

It was necessary to control for proficiency of the two groups (unaware and aware) as proficiency could be a factor affecting awareness. Therefore, an additional independent t-test was performed on the raw proficiency scores. The results (see table 5.6 below) show that the two groups were behaving similarly.

Table 5.6
Proficiency Mean Scores and Standard Deviation

Group	**N**	**Mean**	**SD**
Aware	18	18.56	10.06
Unaware	18	15.06	11.68

t (34) = .96, p > .10.

5.4 Think-Aloud Protocols and Probe Questions

In order to assign a level of awareness to each participant, the think-aloud protocols (TAPs) and probe questions (PQs) were analysed qualitatively for the presence or absence of explicit reports of awareness. The analyses were done by listening to the three recordings from each participant: TAP, PQ1, and PQ2. The TAP recording length varied greatly as this was done whilst completing the exposure task. The majority of participants took between 8 and 15 minutes to complete this section with the shortest time being 5.07 and the longest time being 26.51. Two raters, the researcher and a fellow MA

student in Applied Linguistics, independently classified the TAPs and the PQs. The inter-rater reliability was 91.6%. During the TAP, a participant was to be classified as aware if he/she mentioned French grammatical gender or stressed the article (*le* or *la*) and the final syllable of the word (e.g. *LE baTEAU*). A participant was to be classified as aware at the level of understanding if he/she formulated a rule concerning the utility of French noun endings to the attribution of gender. The criterion used for classification using the PQs required the participant to mention French grammatical gender in relation to the crossword. It is important to remember that it was not necessary for the participants to employ the term French grammatical gender, rather they could refer to, "the article", "feminine and/or masculine", "le or la", "un or une" etc.

The qualitative analysis of the TAPs revealed that no participant showed any sign of awareness at this stage. The majority of participants simply read out the clues and tried to find the answer. The following table (5.7) shows some typical examples of the TAP. The names contained in the table are pseudonyms. All words written in italics are French.

Table 5.7
Think-Aloud Protocol Examples

Participant	TAP
BG	"*Quand une femme se marie elle demande a ses meilleurs copines d'être quoi ?*, okay, when a girl or woman, young lady, I guess, marries, want her man I guess, *copines*, okay what have we got here (looks at answer sheet). I think I'm going to have to know more about, okay *un animal qui court très vite*, okay, 9, that could be *la gazelle* and, it doesn't fit, no that's

Participant	TAP
	2 vertical, it has to be 9 letters, yeah, there you go that's better, *la gazelle, la gazelle*, (whilst writing), *habitation des rois,* 9, *le habitation des rois*, royalty, yeah, it's royalty, home of royalty, alright so *le château"*
BR	"no 13 across for 9 letters *quelque choix que vous pouvez metre sur votre tete,* I'm going to say *le chapeau.* 16 across *quelque choix, chose que vous pouvez pendant l'hiver* is a, is a *manteau, le manteau*, okay vertical, 2 down"
AM	"2, the only animal here is a gazelle, 1-2-3-4-5-6-7-8-9, 1-2-3-4-5-6-7-8-9, so it fits, we'll put that in..... okay, we'll try 3 down cos I've got 2 letters for it, *l'habitation des rois*, it's 9 letters, ummmmm, oh, I think it's *le château*, it's got 9 letters, 1-2-3-4-5-6-7-8-9, 1-2-3-4-5-6-7-8-9, it's got a u at the end, okay it fits, *le château* (whilst writing), cool, okay, so we'll go back to 6 across cos I have a letter, oh wait I'll go 4 down *un type de dessert* a type of dessert, oh, *le gâteau,* I'm pretty sure that's it, 1-2-3-4-5-6-7-8, 1-2-3-4-5-6-7-8, okay that fits."
LW	"*Adam est un male, Eve* is a female, *la femelle, quelque chose qui peut vous aider si vous voulez manger devant la télévision*, what you use when you eat in front of the television, umm, oh the tray, *le plateau*, okay, 12 across, plateau (whilst writing) *quelque chose que vous pouvez mettre sur votre tête*, something on your head, oh, the hat, *le chapeau*, okay."

The PQs were administered immediately after the exposure task and after the posttest. Both PQ1 and PQ2 asked participants what they thought the linguistic purpose of the exposure task was. However, PQ2 was often answered with reference to all the French tasks and not just the exposure task. The qualitative analysis of PQ1 demonstrated that 10 people had shown awareness at the level of noticing and 1 person had shown awareness at the level of understanding. Table 5.8 shows some responses to PQ1 with the awareness level attributed to each participant.

Table 5.8
Probe Question 1 Responses

Participant	PQ1 response	Awareness level
NC	"The linguistic purpose, um, I would say part of it would just to be to learn new vocabulary and, um the linguistic purpose, probably reasoning out um what things could be based on the description and see if there's words that you recognise that you could match with the object, um, and also learning whether an object is feminine or masculine because we had to put le or la before it so that was included as well. I can't think of anything else so that'll be it."	Aware
NR	"I assume that I would know the words, I guess, I don't know, hopefully feminine and masculine of the words, of the answers."	Aware
PS	"The linguistic purpose, to see if I'm thinking in French or translating back and forth from English to French maybe,	Unaware

Participant	PQ1 response	Awareness level
	and then also to see uh whether I have a can come up with various ideas or whether I get stuck on the first thing and then don't, because I know that's what I do."	
BC	"Um well there was, because I could figure out what some words were by process of elimination and so but also if I wanted to I could go back to read it and maybe there could be things that I could identify in the sentence before that I hadn't you know, because I'd figured out what the word was and I could place the word and the picture to the sentence because it was a hint so there were things in it that I could pick up on."	Unaware

PQ2 responses were then coded. Eight more participants showed signs of awareness, one of these at the level of understanding. In addition, one of the participants that was aware at the level of noticing at PQ1 was coded as now being aware at the level of understanding. Furthermore, one participant that had been coded as aware at PQ1 did not show any signs of awareness at PQ2. However, her awareness level was not changed as she had still shown awareness at some point in the testing. The PQ2 responses from the unaware participants varied greatly vis-à-vis the linguistic purpose of the task. As can be seen from table 5.9 below, a variety of reasons was given ranging from studying techniques to memorisation to reading comprehension.

Table 5.9
PQ2 Responses from Unaware Participants

Participant	PQ2 response
NV	"Um, oh boy, I don't really know, um, I guess just the same as what I said before, how much French can be gleamed from knowing English and how much you really have to study, or at least how much you can pick up in daily life."
PS	"Uh there are certain things you have to just, you're going to find out if I remember things just by memory and what sounds good and whether I know grammar rules, and uh that's the two things that I can see in there, some things are just random things you have to remember that don't have a good rule like le and la and other things in there were grammar rules like verbs, but even with the verbs sometimes it's random."
MF	"Linguistic purpose was to see how much my reading comprehension of French is."

The responses from aware participants at PQ2 focused on French grammatical gender. For example:

GW: "uh, well after doing the crossword then doing that third test I recognised a lot of the words from the crossword in the third test and I probably should've been able to pick up whether they were une or un, but I don't know, I couldn't, but I think that was the purpose to recognise words and to be able to know how to use them in sentences and to see if they're masculine or feminine, associate le and la with un and une, but I wasn't very good at it."

AD: "after having done this test at the start and doing it now it almost seems that I'm supposed to remember how the crossword worded like masculine and feminine and things like that um so maybe some memory. It really kind of, the crossword just seemed to me like it was trying to get you to remember things."

Table 5.10 shows the quantity of participants that were unaware, aware at the level of noticing, and aware at the level of understanding at each measurement stage (TAP, PQ1, and PQ2).

Table 5.10
Summary of Awareness Levels

Awareness level	TAP	PQ1	PQ2
Unaware	36	25	18
Aware (noticing)	0	10	15
Aware (understanding)	0	1	3

Due to the lack of participants aware at the level of understanding, it was necessary to reduce the three awareness levels of unaware, aware at the level of noticing, and aware at the level of understanding to two awareness levels, unaware or aware. Therefore, aware learners were both those that noticed the linguistic feature and those that understood the linguistic feature.

After coding participants using the PQs, the TAPs were reanalysed to see whether it was possible to interpret differences between the unaware participants' TAPs and the aware participants' TAPs. This was not the case for all but one participant. CT, the only participant that was aware (understanding) at PQ1 (table 5.11 below) did appear to show signs of awareness during the TAP (table 5.12 below) as he commented, "I see a pattern

forming here". However, he was still not coded as aware during the TAP for two reasons. Firstly, even though it is likely that his comment was referring to the pattern of noun endings and articles, it is not certain, and secondly, the data were never to be analysed based on when participants were coded as aware. Therefore, it was decided to not code him as aware until PQ1.

Table 5.11
PQ1 Response of the One Participant that May Have Become Aware During the TAP

Participant	PQ1
CT	"Uh, ways to figure out masculine and feminine, the fact that if you've got eau you can see that it's masculine and if you've got elle it's feminine."

Table 5.12
TAP Response from the One Participant that May Have Become Aware During the TAP

Participant	TAP
CT	"umm, *le contenant ou on mets les déchets*, the cont., it's not continent, maybe it's, where we make the uuuh *déchets*, I have no idea what that means, move on *Adam est un male, Eve est une, femelle, la femelle*, it's *la femelle, la femelle*, 11, la *femelle*, **I see a pattern forming here**. *Quelque chose que peut vous aider si vous voulez manger devant la télévision*"

To summarise, each participant was coded as aware or unaware based on his/her TAP, response to PQ1, and response to PQ2. However, the TAPs did not actually yield any aware learners. In total, 18 learners were coded as unaware, and 18 learners were coded as aware.

5.5 Aptitude Test Results

In this study, aptitude was investigated to see whether it played a role in learner awareness levels. The five aptitude constructs that were investigated were attention control, working memory, phonological memory, inductive language learning ability, and grammatical sensitivity.

Four of the aptitude tests were scored following standard procedure as detailed below (table 5.13). However, the working memory test, Daneman and Carpenter's (1980) reading span, has been scored in a variety of ways in previous research. Friedman and Miyake (2005) compared four ways of scoring this reading span test and found that the most reliable ways were to either count the amount of words recalled or to average the proportion of words per set across all sets. Therefore, for the purpose of this study, the reading span test will be scored by counting the total amount of words recalled rather than by counting the amount of recalled sets or the highest set size recalled.

Table 5.13
Scoring Procedures for the Five Aptitude Tests

Test	Method used to score each test
Inductive Language Learning Ability	One point for a correct answer, zero for an incorrect answer, for a maximum total score of 15.
Working Memory	The number of correctly recalled words out of a possible eighty-eight.
Attention Switching	The difference between the time it took to complete a test containing one stimulus and the time it took to complete a test containing two stimuli (time from two stimuli test minus time from one stimuli test)
Phonological Memory	The number of correctly recalled words out of a possible twenty-eight.
Grammatical Sensitivity	One point for a correct answer, zero for an incorrect answer, for a maximum total score of 45.

The means and standard deviations for the five aptitude constructs divided by group (unaware and aware) are reported in table 5.14.

Table 5.14
Means and Standard Deviations for the Five Aptitude Factors by Group

Aptitude Test	Group	N	Mean	SD
Attention Control	Unaware	18	25.25	23.30
	Aware	18	16.29	12.94
Working Memory	Unaware	18	21.67	11.50
	Aware	18	23.50	10.97
Phonological Memory	Unaware	18	6.78	2.96
	Aware	18	7.94	3.24
Inductive Language Learning Ability	Unaware	18	6.78	4.08
	Aware	18	10.89	3.08
Grammatical Sensitivity	Unaware	18	18.67	5.37
	Aware	18	21.78	5.94

In order to address whether any of these aptitude factors were predicting membership to the unaware or aware group, a correlation was done to ensure that there was no collinearity. If multicollinearity exists at high levels, it will make it difficult to assess the individual importance of each of the five predictive variables. The correlation used for the present study was a point-biserial correlation as one of the variables being entered into the analysis was dichotomous (group – either aware or unaware). The results from the correlation could also act as an indicator of which of the independent variable(s) may be important in further analyses to understand the predictive strength of the independent variables.

Table 5.15
Point-Biserial Correlations of the Five Independent Variables and One Dependent Variable

Pearson Correlation	Group[12]	Attention Control	WM	PM	Inductive	Grammatical Sensitivity
Group	1.00	-.24	.08	.19	.51	.27
Attention	-.24	1.00	-.02	-.07	-.39	-.25
WM	.08	-.02	1.00	.35	.37	.16
PM	.19	-.07	.35	1.00	.49	.41
Inductive	.51	-.39	.37	.49	1.00	.35
Grammatical	.27	-.25	.16	.41	.35	1.00

Table 5.15 shows that there were no high correlations between the five independent variables. A stepwise sequential binary logistic regression analysis was then carried out. This analysis is used when trying to understand the relationship between one or more predictor variables and a categorical outcome. A stepwise regression was chosen as this research was exploratory in nature. Wright (1997) suggests using stepwise regression in these cases as there is not sufficient past research to decide the order in which the variables should be entered into the regression. This analysis can be used to address RQs three and four:

3. Which aptitude factors predict awareness at the level of understanding?

4. Which aptitude factors predict awareness at the level of noticing?

As a stepwise regression was used, the initial analysis investigated whether any of the five dependent variables were predicting awareness. The results from this analysis

[12] Group refers to awareness group: unaware or aware.

showed that only one variable was selected as predicting the independent variable: inductive language learning ability. Table 5.16 shows the logistic regression analysis of unaware and aware as a function of the one predictive variable, inductive language learning ability. The R^2 prediction level for the only significant variable, inductive, was .20. Therefore, 80% of the variance (in awareness behaviour) is still unaccounted for. Table 5.17 shows the four variables that the analysis did not include in the equation as their inclusion did not significantly help prediction of membership to either group.

Table 5.16
Logistic Regression Analysis of Unaware and Aware as a Function of Inductive Language Learning Ability

						95% CI for Exp(*b*)	
Included	*B*	*SE*	Wald	*df*	e^B	Lower	Upper
Inductive	.30**	.11	7.05	1	1.34	1.08	1.66
Constant	-2.73*	1.14	5.72	1	.07		

R^2 = .20 (Hosmer & Lemeshow)
Model $\chi^2(2) = 10.03, p < .01$; e^B = exponentiated *B* or odds ratio.
*$p < .05$, **$p < .01$.

Table 5.17
Four Variables that Did Not Predict Differences in Awareness Levels

			Score	*df*	Sig.
Step 1	Variables	Reading span	.73	1	.391
		Attention control	.05	1	.817
		Phonologic memory	.25	1	.617
		Grammatical sensitivity	.51	1	.477
	Overall statistics		1.59	4	.810

The actual predictive value of inductive language learning ability is 72.22%, which can be seen in table 5.18. For the aware group, it is possible to predict with an accuracy rate of 77.78% and for the unaware group, it is possible to predict with an accuracy rate of 66.67%

Table 5.18
Classification Table of Group Membership Based on Inductive Score

	Predicted group		
Actual group	Unaware	Aware	% correct
Unaware	12	6	66.67
Aware	4	14	77.78
Overall %			72.22

5.6 Summary of Results

On scoring the tests, two changes were made to the methodology. The proposed three levels of awareness were collapsed to two, aware or unaware. In addition, data collected on the reliably feminine noun ending *elle* were not analysed, for reasons explained above.

After exposure, participants were labelled as being either aware or unaware of the utility of the noun ending *eau* to marking masculine gender. The awareness levels were given based on each participant's TAP done during exposure to the input, participant responses to a PQ immediately after exposure and a PQ immediately after the posttest. The two-tailed t-test showed that the unaware and aware groups had similar levels of knowledge that the noun-ending cue *eau* indicates masculine gender before the exposure

task. The two-way mixed ANOVA showed that after the exposure task (the crossword puzzle), the unaware and aware groups were behaving in a similar way with respect to attributing gender to masculine nouns ending in *eau*. However, both groups were more accurate on the posttest old (eight words contained in the exposure task) than the pretest and the posttest new (eight words that they did not work with on the exposure task).

With regards to the possibility of predicting awareness based on language learning aptitude, the only factor that acted as a predictive variable was inductive language learning ability. The results from this test predicted membership to the unaware group at 66.67%, membership to the aware group at 77.78%, for an overall accuracy rate of 72.22%.

Chapter 6: Discussion

In this chapter, the results will be interpreted in light of the initial research questions (RQs) and hypotheses. Subsequent to this, the findings will be discussed in relation to previous research. Finally, the limitations of this study will be discussed.

6.1 Summary of RQs and Previous Findings

The aim of this study was to investigate two factors in awareness research. Firstly, it addressed the potential utility of awareness to the learning of French grammatical gender. Previous research has found that learners that became aware during an exposure task of a linguistic feature were better able to use that linguistic feature on a posttest when compared to learners that did not show any signs of awareness (e.g. Leow, 2000; Rosa & O'Neill, 1999). Secondly, it investigated whether certain aptitude constructs were playing a role in differences amongst learners' awareness levels. Previous research has found a tentative relationship between two aptitude constructs, grammatical sensitivity and memory, and learner awareness (Robinson, 1997). However, Robinson's findings were dependent on exposure in four different learning conditions, and, as such, the present study is the first to address aptitude and awareness under one learning condition.

6.2 Findings in Relation to each RQ and Hypothesis

RQ1. Does the amount of learning[13] depend on the level of awareness?

To address this question, learners were exposed to the reliably masculine noun ending *eau* in French via a crossword. The crossword focused on meaning and the participants' attention was never drawn to the feature being investigated. The feature was made available to the participants via an answer key. The feature was never manipulated, but the participant did have to copy it into the crossword. On completion of the crossword, participants were given a test that contained the same *eau* words as in the crossword plus eight new *eau* words. These new words were actually the same eight words contained in the pretest, thus allowing a pretest to posttest comparison. The participants completed a think-aloud protocol (TAP) whilst doing the crossword and answered one probe question (PQ) after completing the crossword ("What do you think the linguistic purpose of the task was?"), and one PQ after completing the posttest ("Now that you have finished all the tasks related to French, what do you think the linguistic purpose was?"). An awareness level was assigned to each participant based on his/her response during the TAP and the PQs. Due to prior research (e.g. Leow, 2000; Rosa & O'Neill, 1999), it was hypothesised that participants that became aware during the crossword task would show greater learning of the linguistic feature (measured by a post-task judgement task) than participants that did not show any sign of awareness. This hypothesis was not supported by the results. The aware group and the unaware group showed similar knowledge of the targeted linguistic feature on the pretest, posttest old, and posttest new items. That is, the amount of learning did not depend on the level of awareness.

[13] It is important to remember this learning is referring only to task-specific learning.

A second hypothesis predicted that participants that became aware at the level of understanding would learn the linguistic feature more successfully than all other participants. This hypothesis could not be supported or refuted as there were not sufficient learners aware at the level of understanding (n=3).

RQ2. Does the type of learning (item versus system) depend on the level of awareness?

To address this question, the posttest consisted of the eight *eau* words contained in the crossword (words that the learners had been exposed to alongside correct gender – considered to be item learning) and eight new *eau* words (words that the learners had not been exposed to with correct gender – considered to be system learning). It was hypothesised that participants that became aware at the level of noticing would exhibit item learning and that participants that became aware at the level of understanding would exhibit system learning. These hypotheses can not be supported or refuted as only two levels of awareness could be assigned, aware or unaware. However, the results showed that the aware group did not exhibit system learning as there were no significant differences between the posttest old and posttest new scores. As expected, the unaware group also did not exhibit system learning.

However, the results did indicate that both the unaware group and aware group were significantly more accurate at assigning gender to the old items in the posttest (from the crossword) than they were with the pretest items and the posttest new items (these two tests were testing the same words). That is, both groups appear to have exhibited item learning.

RQ3. Which aptitude factors predict awareness at the level of understanding?

To address this question, five aptitude tests were administered to the participants: attention control, working memory, phonological memory, inductive language learning ability, and grammatical sensitivity. It was hypothesised that participants that became aware at the level of understanding would have a higher than average grammatical sensitivity and inductive language learning ability. It was not possible to support or refute this hypothesis as too few learners became aware at the level of understanding.

RQ4. Which aptitude factors predict awareness at the level of noticing?

Again, to address this question, five aptitude tests were administered to the participants. The results indicated that the only aptitude factor that was helpful in predicting membership to the aware group (noticing and understanding combined) was inductive language learning ability. The four other factors did not predict. That is, the aptitude factor of inductive language learning ability predicted whether a person would become aware or remain unaware during the crossword exposure task at an accuracy rate of 72.22%.

6.3 Interpretation of Findings in Light of Previous Research

The findings of the present study will be discussed in three sections. These three sections indicate the contributions of this study to: awareness research, awareness and aptitude research, and aptitude research.

6.3.1 Awareness Research

There appear to be three important findings from the present study that inform awareness research. Firstly, the unaware and aware groups did not perform differently on the posttest, which runs contrary to previous awareness research in SLA (Leow, 1997, 2000; Rosa & Leow, 2004). Secondly, the unaware group did improve from pretest to posttest at assigning gender to nouns that had been contained in the exposure task, but not to the nouns that were contained in the pretest, which suggests unaware learners may be able to item learn. Finally, the qualitative analysis showed that the think-aloud protocols did not find any aware learners and that the two probe questions found aware learners to differing degrees, which raises questions concerning the measurement techniques used in awareness research.

The findings indicate that learners that became aware of the targeted linguistic feature, French nouns ending in *eau* are reliably masculine, were not able to take in and correctly identify any more of these nouns than the unaware group. This finding runs contrary to the majority of previous awareness studies in the field of SLA that have found an association between learning[14] and awareness (e.g. Leow, 1997, 2000; Robinson, 1997; Rosa & Leow, 2004; Rosa & O'Neill, 1999). As 15 out of the 18 participants were only aware at the level of noticing, at the level of reporting that they had noticed something related to gender, it can also be suggested that noticing a linguistic feature may not be sufficient for converting input into intake as suggested by Schmidt's Noticing Hypothesis (1990). On the other hand, contrary to the present findings, noticing may be sufficient to

[14] It is important to remember that the term learning here is referring only to the ability to process L2 input and reproduce it correctly on an immediate posttest.

convert input into intake, but it may be dependent on other factors such as the duration of exposure, the type of exposure, and/or the specific linguistic feature.

Indeed, there are many possible reasons for why these findings contradict both theory and research in SLA awareness literature; duration of exposure, number of test items, the linguistic feature, and/or the heterogeneity of the participants.

One reason that merits specific attention is the type of exposure task. Following Leow (1997, 2000), a crossword was used to give input of the reliably masculine noun ending *eau*. However, contrary to Leow, the crossword did not have an ostensible focus on a specific form. The crossword was designed in this way for two reasons. Firstly, so as to ensure that participants that did not report being aware were indeed unaware. Secondly, it was felt that a crossword that focused on meaning was more akin to pedagogical tasks found in the second language classroom when form is not being explicitly (inductively or deductively) addressed. Leow's crossword focused on Spanish preterite verb endings (learner purpose for crossword completion) whilst also giving input on a spelling change in the stem of certain Spanish preterite verbs (Leow's target linguistic feature for awareness research).

In the present study, the crossword was a vocabulary task with no common thread between the clues or answers. Therefore, not only was the task asking the participants to learn incidentally, but it was also focusing their attention on meaning whilst investigating whether they would become aware of a form. Previous research has shown that learners tend to pay attention to meaning before form (VanPatten, 1990). As there was no reason to pay attention to form to complete the crossword, it may be that learners' attention remained on meaning throughout the exposure task. In addition, for these low-level

learners of French, it may have been beyond their processing capacity (Scovel, 2005) to process for meaning and form. Leow's form-focused crossword may have decreased the processing load sufficiently for some of the learners to be able to focus on the form at hand and the other form contained in the crossword. Furthermore, other awareness studies in SLA that have found an association between learning and awareness have also exposed participants to the input via a form-focused task rather than a meaning-focused task (e.g. Rosa & Leow, 2004; Rosa & O'Neill, 1999).

The contradictory results found in the present study show that the utility of awareness may be dependent on the input being form-focused, which is an important contribution to awareness research as previous studies have not discussed the possible inutility of linguistic feature awareness during meaning-focused activities.

The results from the present study showed that there were no differences at the pretest or the posttest in ability between the unaware participants and aware participants at assigning masculine gender to French nouns ending in *eau*. However, the results did show that both groups were behaving significantly differently between the pretest and the posttest containing the words from the exposure task. These results appear to support theory and research in SLA that have suggested a possible dissociation between learning and awareness (Carr & Curran, 1994; Marcel, 1983; Tomlin & Villa, 1995) as the participants that were coded as unaware did seem to be exhibiting some learning. In addition, this appears to contradict the Noticing Hypothesis (Schmidt, 1990) that suggests that noticing a linguistic feature may be necessary for converting input into intake. Schmidt suggested that noticing a linguistic feature may lead to item learning, but in order to understand the system of a linguistic feature, it was necessary to understand the

linguistic feature. Indeed, the results from the present study appear to indicate that both the unaware and aware groups had item learnt. However, this finding needs to be interpreted with caution as the pretest and the posttest old items, where the significant difference was found, did not consist of the exact same eight words. Rather, the pretest and posttest new consisted of the same eight words. No significant differences were found between these two tests for the unaware and aware groups suggesting that no learning of the system had taken place as no positive evidence of the masculine gender of these words was given at any time during the testing. Nevertheless, the significant difference found between both groups on posttest old and posttest new also points towards possible item learning. Rosa and Leow (2004) found that participants who were aware at the level of understanding performed significantly better than learners aware at the level of noticing on new examples. However, they also found that learners aware at the level of noticing performed significantly better than unaware learners on new examples, leading to the suggestion that some system learning could take place for learners aware at the level of noticing. In the present study, this was not the case. In fact, nothing in the results suggest that the aware learners were processing the input in a different way to the unaware learners.

Both of these findings run contrary to previous research on awareness. The facilitative effects found in other studies were not found in this study. As discussed, these contradictory findings could be due to a number of reasons; the linguistic feature, the duration of exposure, and/or the heterogeneity of the group. However, the only reason that seems to partially explain the results based on previous research appears to be the type of exposure: meaning-focused rather than form-focused.

Another important finding from this study relates to the measurement of awareness. The comments during the think-aloud protocols (TAPs) did not show any signs of awareness. Previous awareness research that has used TAPs has not reported this problem (e.g. Leow, 1997, 2000; Rosa & Leow, 2004). Why this may be the case is not evident. In the present study, the participants were trained on how to do a TAP via a practice crossword and the majority of them vocalised their thoughts continuously whilst completing the exposure task crossword. In fact, a number of participants continued to vocalise whilst completing the posttest. There are two plausible explanations as to why the TAPs did not work in the present study. Firstly, it is possible that the learners did not become aware at this stage (but remember the qualitative analysis of CT's awareness at the level of understanding at probe question [PQ] one seemed to suggest that he may have actually become aware during the crossword). Secondly, it could be due to the type of exposure task. As the learners appeared to be completing the crossword for vocabulary reasons, despite understanding the nature of the TAP, it is possible that they only expressed thoughts that they felt were relevant to the completion of the crossword. This suppression may have been conscious or subconscious. Even though it is widely agreed that TAPs are not a perfect data elicitation method for awareness (Jourdenais, 2001; Leow & Bowles, 2005; Schmidt, 2001), they are frequently used in awareness research and have, prior to this study, been effective at distinguishing different levels of awareness (Leow, 2000; Rosa & O'Neill, 1999).

Another issue with regards to measuring awareness is in the use of off-line data elicitation procedures. Leow (2000) discussed the importance of using both an on-line and an off-line elicitation procedure when attempting to understand the internal processes

of participants. For that reason, two PQs were also used in the present study to elicit awareness, one immediately after the exposure task and one immediately after the post test. Learners that showed signs of awareness at any point were coded as aware. However, the use of a second PQ (where an additional seven participants, previously unaware, were coded as aware) after the posttest may actually be confounding the results. A participant may only have become aware of the linguistic feature during the posttest, in which case he/she has no positive evidence to use as the exposure task has already been taken away. It may be that with a larger group of participants there would be sufficient numbers of people who demonstrated awareness at the two different times (PQ1 and PQ2) to analyse possible differences between the posttest scores of those learners that became aware during the exposure task or at PQ1 with those scores from learners that became aware at PQ2.

6.3.2 Aptitude and Awareness Research

The finding that has implications for both aptitude and awareness research is that only one out of a possible five aptitude factors, inductive language learning ability, could predict with any accuracy whether a participant would become aware of the reliably masculine noun ending *eau* during the exposure task. Before discussing why this factor may have behaved as a possible predictor, it is necessary to discuss why the other four factors did not predict. In order to do this, possible arguments have been suggested for why each aptitude construct may not be important for awareness. Nevertheless, it is possible that some of these aptitude constructs do not play a part in a learner's ability to notice and/or understand French grammatical gender.

6.3.2.1 Attention Control

Attention Control tested the participants' ability to switch attention between two stimuli, numbers and letters. Talmy (1996) suggested that attention control could refer to an individual's ability to switch attention efficiently among different linguistic relationships.

Therefore, it was suggested that it could be of potential importance as learners with efficient attention control may be better able to switch their attention between completing the crossword (meaning) and noticing linguistic features (form). Contrary to Talmy, Eviatar (1998) suggested that attention control could enhance the processing of linguistic stimuli that are relevant to the task whilst inhibiting the processing of those linguistic stimuli that are irrelevant to the task. The results from the present study appear to be more in-line with Eviatar's explanation of attention control as attention control did not predict awareness. However, it is not possible to refute Talmy's claim as the learners may have been paying attention to linguistic features other than the target feature (such as the conjugation of a verb with the pronoun *vous* or the use of *de, des, d'* in possession) unbeknownst to the researcher.

Previous research that has tested for the importance of attention control has found a relationship between L1 attention control and improved performance on a posttest for the grammar target featured in the exposure task (English possessive determiners), and the mixed target (English possessive determiners and intransitive verbs), but not the lexical target (English intransitive verbs) in a group of adult Francophones (Trofimovich et al., 2007). White et al. (2007, October) also found a relationship between L1 attention control and meta-linguistic awareness in young Francophones. Both of these results

point towards the potential importance of attention control for grammatical linguistic features. However, its importance for lexical linguistic features in an L2 is less clear. The finding by Trofimovich et al. that attention control did not predict posttest accuracy for the lexical target (English intransitive verbs) suggests that attention control may be less important for lexical features. Furthermore, Taube-Schiff and Segalowitz (2005) found that learners had lower attention control in their L2 than their L1 when processing spatial prepositions (grammatical linguistic feature), but not when processing nouns (lexis). These findings suggest that good attention control may play a role in the acquisition of form, but not meaning.

These findings may also help to explain why attention control did not predict awareness in the present study. The exposure task consisted of a crossword, which was completed for meaning rather than form i.e. it was necessary to understand the words in order to complete the crossword, but it was not necessary to understand any form for successful completion. Additionally, French grammatical gender concerns nouns, which in English are lexical items, except when marking for plurality. Therefore, an Anglophone may be even more likely to treat the crossword as a lexical task than learners with a language background that marks nouns for gender. Indeed, previous research has shown that Anglophones perform worse on L2 gender-attribution tasks than learners from a gender-marking language background (Garavito-Bruhn, 1986 as cited in Harley, 1998; Marinova-Todd, 1994, as cited in Harley).

It is therefore possible that future research using a more form-focused exposure task may increase the predictive value of attention control.

6.3.2.2 Working Memory

Working Memory (WM) tested the participants' ability to both store and process input. This could play an important role in a learner's awareness because if a learner is able to store and process a relatively large quantity of input, there may be more examples of masculine French nouns ending in *eau* available for analysis.

The results from this study do not support a role for WM in understanding different awareness levels amongst L2 learners. Previous research has also found that WM may not play a role in the noticing of recasts or on performance on a posttest consisting of both grammatical and lexical stimuli (Trofimovich et al., 2007). In addition, White et al. (2007, October) found that WM did not play a role in explaining the variance amongst young Francophone's meta-linguistic awareness.

However, Harrington and Sawyer (1992) and Geva and Ryan (1993) both found WM to be positively related to L2 reading skills. Geva and Ryan also found WM to be positively related to L2 oral proficiency. They suggested that WM may be of more importance in linguistically demanding tasks. The reading task that they used was considered linguistically demanding as:

"the child had to ignore the semantically incongruent option, attend to grammatical well-formedness, and display comprehension of the logical interclause relationship, signalled by the conjunction" (p. 14).

The exposure task used in the present study contained an answer key, and, as such, the task did not ask learners to recall previously learnt words. Therefore, the task may not have been linguistically demanding enough to necessitate a reliance on WM capacity.

6.3.2.3 Phonemic Coding Ability

As the exposure task in this study was textual in nature, the potential importance of phonological memory (PM) to this task was based on Gathercole and Baddeley (1993), who argue that PM is not reserved solely for oral input, but it can also play a role in textual input as text can be recoded internally into a phonological code via accessing stored knowledge of its label. Additionally, it was felt that as the learners were completing a think-aloud protocol whilst doing the crossword, their vocalisation of the word could act as oral input, albeit sometimes erroneous.

The findings from this study suggest that PM is not important in predicting membership to one of two awareness levels: unaware and aware, with French grammatical gender. This could be due to the textual nature of the exposure task. This is supported by a similar finding by White et al. (2007, October), who tested meta-linguistic awareness via a written task: assessing student journals that had been written to answer specific questions concerning linguistic features in both the students' L1, French, and L2, English. Again, PM did not play a role in explaining the variance in observed levels of meta-linguistic awareness.

It is possible that PM was not important in the present study as the participants had become too familiar with the lexical items during exposure. Previous research has shown that the role of PM decreases as vocabulary proficiency increases (French, 2006).

As per attention control, it may be the case that PM is more important when tasks are grammatical in nature. French and O'Brien (2008) found a positive role for PM on grammatical development. Trofimovich et al. (2007) also found that PM was playing a role on morpho-syntactic accuracy on posttest performance, but they did not find that PM

was playing a role on lexical accuracy on posttest performance. Consequently, an exposure task that is more form-focused in nature may increase the predictive value of PM to learner awareness levels. On the other hand, previous research on young Quebec Francophone pre-adolescents following an intensive ESL programme found that PM predicted vocabulary gains, but not grammatical gains (French, 2006). It is also possible that the role of PM changes with age. Previous research has shown differing effects for PM on vocabulary development depending on age (Gathercole & Baddeley, 1989; Gathercole, 1995). Perhaps, PM is not as important for adult awareness as it may be for child awareness.

6.3.2.4 Grammatical Sensitivity

It was felt that grammatical sensitivity may predict different awareness levels as the more sensitive a person is to the patterns in his/her own language, the more sensitive he/she may be to noticing patterns in a new language.

The results showed that grammatical sensitivity was not a significant predictor of awareness. This finding runs contrary to previous research that has tested for grammatical sensitivity, which has tended to show a positive role for it in L2 learning (DeKeyser, 2001; Ranta, 2002; White, 2007, October). It could be that as the exposure task in the present study was not ostensibly grammatical in nature, the importance of grammatical sensitivity was low. However, Ranta found that grammatical sensitivity did predict language learning success in a communicative language learning setting, in which the primary focus of the teaching was on understanding and delivering meaningful messages, rather than on grammatical accuracy. Furthermore, the tests that Ranta used to

measure proficiency were not grammatical in nature, which further suggests that grammatical sensitivity is important to language learning.

It could be that grammatical sensitivity does play a role in L2 proficiency regardless of input. However, it does not play a role in the cognitive process of awareness. Robinson (1997) found that grammatical sensitivity, as measured by the MLAT, correlated with the noticing of linguistic features in a group of participants that had been told to look for rules. It also correlated with awareness at the levels of looking for rules and formulating rules in a group of participants that were told that they were performing a memory task (implicit condition). The participants from the present study do not fit with the implicit or the rule-search condition as they were neither told to look for rules nor memorise anything. This could account for the differing results. However, it may also be related to the measurement of awareness. Robinson used an off-line written questionnaire after the exposure task that included the following three questions:

1. Did you notice any rules of English underlying the sentences you saw in the training session?" (noticing)
2. "Were you looking for rules of English grammar when you saw the sentences during training?" (looking for)
3. "Can you describe what the rules were that were illustrated by the sentences you saw during training?" (verbalisation).

(Robinson, 1997, p. 63)

To questions one and two, the participant either answered yes or no. At this stage, it is not possible to know whether they were noticing the rules that were being tested or not. Only question three was coded based on which rules were mentioned. This means that

learners at the level of noticing and looking for rules may not have been aware of what was being tested. However, the third question did elicit aware learners. Therefore, it appears that grammatical sensitivity was playing an important role for the implicit condition at the level of verbalisation, but we can not be certain for the other two levels of awareness. Robinson's verbalisation level of awareness is the same as the understanding level of awareness in the present study. It is possible that if a more fine-grained analysis on the levels of awareness could have been done in the present study, grammatical sensitivity may have played an important role at this higher level of awareness.

6.3.2.5 Inductive Language Learning Ability

Previous research has tended to collapse the aptitude constructs of grammatical sensitivity and inductive language learning ability into a single trait (Skehan, 1998). However, it was decided that this test should be included as it would allow for the investigation of Dörnyei and Skehan's (2003) input processing model at the three SLA stages that were identified as being important for completion of the exposure task: input processing strategies, noticing, and pattern identification. Furthermore, as inductive language learning ability can be defined as the ability to extrapolate any identified patterns in a given corpus of language materials to new exemplars, it appeared to fit with the exposure task and the follow up posttest that included additional *eau* words that had not been in the input.

The findings from the present study suggest an important role for inductive language learning ability to a learner's capacity to become aware of linguistic features in

the input. In order to try and comprehend why this may be the case, it was necessary to look at previous research findings concerning inductive language learning ability. Alderson et al. (1996) did not find scores on an inductive language learning test to be significantly related to Anglophone adults' French (the L2) proficiency. Harley and Hart (1992) tested the inductive language learning ability of learners that had had begun studying an L2 at different ages (early and late). They found that the later learners with higher L2 proficiency also had relatively high scores on the inductive measure. The early learners with higher L2 proficiency had relatively high scores on a memory measure. Previous research does not appear to explain why inductive language learning ability may have played such an important role in this study. It is possible that learners that are inductive have a certain learning profile that may make them treat language learning as a pattern-making problem (Skehan, 1991). In order to succeed at the inductive test, it was necessary to identify four main patterns in the invented language when compared to English. If these patterns were correctly identified, completing the task was fairly simple as it was a multiple-choice task with only three options (the third option being an I don't know option). It was also possible to identify only some of the patterns and have partial success. In light of the present findings, it is suggested that learners who score relatively highly on the inductive test, that is, those learners who were better able to extract linguistic patterns, are more likely to become aware of French grammatical gender assignment patterns during a problem-solving meaning-based exposure task than learners with a relatively low inductive language learning score.

The results also showed that the inductive test scores more accurately predicted membership to the aware group (78% accuracy) than membership to the unaware group

(67% accuracy). This means that more participants in the unaware group were getting higher scores, typically associated with the aware group, than aware participants were getting lower scores, typically associated with the unaware group. It could be that these learners were coded as unaware, but they actually had awareness. As has been discussed in the awareness literature (Leow & Bowles, 2005), awareness is very difficult to measure and even using both on-line (TAP) and off-line (probe questions) measures does not ensure that all episodes of awareness are caught. Alternatively, it may be that it is necessary to use many more predictive variables in order to account for different levels of awareness. It could be that certain factors are more important for predicting aware membership whilst other factors are more important for predicting unaware membership. In other words, a high inductive language learning score is not sufficient to accurately predict awareness. It is necessary to have further information, presently unknown, to improve predictive accuracy.

6.3.3 Aptitude Research

The findings from this study make three contributions to aptitude research. The finding that inductive language learning ability can help predict awareness levels suggests that this aptitude construct may also be important for other areas of L2 acquisition. The finding that the test scores from the inductive language learning ability test and the grammatical sensitivity test did not correlate shows that these two tests may be tapping into very different aptitude constructs. Furthermore, the PLAB, a test created for high-school students (Skehan, 2002), did distinguish between participants' inductive

language learning ability, which suggests that this test may be equally useful in adult research.

The importance of inductive language learning ability to this study suggests that this aptitude factor may be playing an important role in other aspects of L2 learning. The majority of previous aptitude research has not included a test of inductive language learning ability, perhaps due to the MLAT not having a pure measure of this ability (Sawyer & Ranta, 2001). However, the present finding suggests that inductive language learning ability may be more important to L2 learning than previously thought. As mentioned above, previous research that has tested the importance of inductive language learning ability to proficiency has had mixed results. Alderson et al. (1996) did not find a positive relationship between inductive language learning ability and L2 proficiency, but Harley and Hart (1997) did, but only for learners that had begun learning English at 12-13 years old as opposed to learners that began at 6-7 years old. These contradictory results suggest that inductive language learning ability is important to certain aspects of L2 learning, possibly dependent on learning environment and age of acquisition. It is important that future research investigating the role of aptitude to different aspects of L2 acquisition test for inductive language learning ability so as to further understanding of when and how different aspects of aptitude can help learning.

Furthermore, both theory and research in the field of SLA has tended to collapse grammatical sensitivity and inductive language learning ability into one aptitude construct: analytic ability (Ranta, 2002; Skehan, 1998). The majority of research has tested for analytic ability using a measure of grammatical sensitivity rather than an inductive measure (e.g. DeKeyser, 2000; Ranta 2002, but see Harley & Hart, 1997).

Nevertheless, in the present study, both inductive language learning ability and grammatical sensitivity were tested separately. Interestingly, when a regression analysis was used to ensure that there was no multiple colinearity between the independent variables, inductive language learning ability and grammatical sensitivity correlated at .349. Inductive language learning ability correlated more highly with both the working memory and phonological memory measures than with grammatical sensitivity. This suggests that inductive language learning ability and grammatical sensitivity may benefit from being treated as two separate aptitude constructs. This has an important implication for future aptitude research, it may be that both of these factors need to be tested separately in order to understand a person's analytic ability. It could also be the case that in research that has only used a measure of grammatical sensitivity, results would have been different if inductive language learning had been taken into account. This could mean that the role of analytic ability in L2 learning is not a true representation of what it is supposed to be. Nevertheless, the present study only had 36 participants. As such, it is important for future research to further validate this finding.

One final contribution of this study to aptitude research concerns the measurement of inductive language learning ability. The PLAB was created for use with high-school students (Skehan, 2002). The present study included this test as it was the only inductive language test that could be obtained. However, the results suggest that this test can also distinguish amongst the inductive language learning ability of adult L2 learners.

6.4 Limitations of the Study

This study is limited by the relatively low number of participants ($N = 36$). For the purpose of investigating the role of awareness to further processing of the input, 36 participants means that the results found here are not generalisable to other linguistic features and exposure tasks. In order to investigate the role of the five aptitude measures on awareness, an n of 36 is low as it is necessary to divide the number of participants by the number of measures. The cell sizes in the present study were small (approximately seven participants) and, as such, the performance of one or two participants may have affected the results. In addition, if more participants had been tested, it may have been possible to analyse the data in respect of the three proposed awareness levels (unaware, aware noticing, and aware understanding) rather than the two levels that had to be used. Furthermore, this may also have allowed for the inclusion of only those participants that became aware before completing the posttest (at probe question 1). As has already been discussed, this may have led to a more accurate attribution of awareness as participants that became aware during the posttest did not have any positive evidence to use whilst completing the test.

In the present study, five tasks were used to tap into five different aptitude constructs. However, it is important to remember that theory and research is not always in agreement as to how these five aptitude constructs should be measured (e.g. Baddeley, Gathercole, & Papagno, 1998; French, in-press; Juffs, 2005). Therefore, all results concerning the aptitude constructs may be factors of the tasks used. As such, it is possible that if other tasks had been used, the results may have been different. In addition, scoring procedures for the same tasks have differed in the research (e.g. Friedman &

Miyake, 2005). The results reported here may be a factor of the scoring procedures used. In relation to the scoring of phonological memory, it may be that a finer-grained scoring procedure at the syllable rather than word level is needed.

In the present study, the exposure task only gave textual input. This was done on purpose so as not to confound textual and oral input with possibly important aptitude factors. This study can only claim the potential importance of inductive language learning ability to becoming aware when tasks are of a textual nature. It would be informative to see whether the same relationships are found when the exposure task is aural in nature, or both aural and textual.

It is possible that the linguistic feature chosen for this study, French grammatical gender, behaves in a different way to other linguistic features in a language. It seems evident from the data collected during the interview questionnaire that these participants believed French grammatical gender not to be rule-governed and that it has to be memorised alongside each word (see table 6.1 for some example responses to the question, "How do you decide whether to use *le* or *la*?"). The overall feeling that French grammatical gender is not rule-governed may have inadvertently led participants not to pay attention to any patterns with regards to gender, and, as such, the results from the present study may be a product of the linguistic feature. In addition, the below response from PS ("I'm usually wrong") highlights the potential affective nature of French grammatical gender for learners of French. This may be even greater for learners whose mother tongue does not assign grammatical gender.

Table 6.1
Participants' Views on French Grammatical Gender

Researcher:	"How do you decide whether to use *le* or *la*?"
AD	"I guess"
AMG	"It's pretty random, there's no method"
PS	"I don't know, that's a hard one for me. It's just on how it sounds and I'm usually wrong."
NR	"Just the words that I do know, like I know *la table, le chaise*"
MP	"Ah, good question. Someone said that if it's connected with the kitchen or the household it's usually une, but there are so many exceptions. I think you just have to memorise one at a time"
MC	"I have been told that there's no rules to it, it's generally arbitrary. Generally I'll stick to male things, but I understand that there are a lot of objects are female and places are male"

In regards to the measurement of awareness, both probe question one and two asked learners what they thought the linguistic purpose of the task was. The use of the term *linguistic purpose* caused some learners to ask for clarification on the meaning of the question. It is possible that if the question had been phrased less metalinguistically from the outset, the responses may have changed for certain participants.

A final limitation is that the learners may not have been cognitively able to attend to both form and meaning simultaneously during the exposure task. VanPatten (1990) suggested that low proficiency learners might find it impossible to do this as attention is a

limited resource. In this particular study, the TAPs did not show any aware learners, which suggests that the participants were not paying attention to both form and meaning.

Chapter 7: Conclusion

This final chapter will summarise the contribution of the findings and directions for future research.

7.1 Contributions and Implications for Future Research

This study has contributed to SLA research in a number of ways. With regards to the utility of awareness, this study has found contradictory results to the majority of previous awareness research (Leow, 1997, 2000; Rosa & O'Neill, 1999; but see Marcel, 1983) as there were no apparent facilitatory effects of awareness on ability to assign correct gender to French nouns ending in *eau*. Even though the present study had a relatively small *n* size (36) and only 16 posttest items, it contributes to our understanding of the role of awareness in L2 learning. Further research is needed with different linguistic features and different types of exposure to further understand how and when awareness can help in L2 learning.

The finding that unaware learners behaved significantly better on the posttest old (words contained in the exposure task) than the pretest and the posttest new (words from the pretest) suggests that these learners did exhibit some item learning. This finding appears to run contrary to previous awareness research that found that unaware learners did not behave significantly differently from pretest to posttest (Leow; Rosa & Leow, 2004; Rosa & O'Neill). Although the present study asked learners to write the words during the exposure task, and as such, item learning may be expected, it would still be interesting for future research to establish whether these gains remain on a delayed posttest. Furthermore, this item learning could be a product of the linguistic feature

(French nouns) and, as such, future research using a variety of linguistic features can inform the field as to whether this item learning is specific to gender or whether it is possible with other linguistic features.

In the present study, it was not possible to distinguish three separate levels of awareness. In previous awareness research this has not been the case (Leow, 2000; Robinson, 1997). This finding contributes to SLA research as it highlights that awareness may not be working at different levels on all linguistic features. Alternatively, this finding could be related to length of exposure time or the phrasing used in the probe question, which, as discussed in the limitations section (see page 100), may have been too metalinguistic in nature. Nevertheless, future research with both grammatical and lexical linguistic features could further our understanding of the existence of and the importance of different levels of awareness.

Related to the measurement of awareness is the timing of awareness. In the present study, 11 people were coded as being aware after probe question 1. Seven more people were added to the aware group after probe question two. As part of future research related to the methodological issues of measuring awareness, research that tests sufficient participants to analyse posttest scores depending on when awareness took place would be interesting.

The finding that inductive language learning ability can predict membership to the aware group at 77.78% accuracy and membership to the unaware group at 66.67% accuracy contributes to our understanding of learner differences in awareness levels. Due to a low *n* size (36) in the present study, further research is needed to validate this finding.

In addition, research that investigates the role of inductive language learning ability in other areas of L2 learning would further our understanding of this individual difference.

The finding that inductive language learning ability is the only aptitude factor to significantly predict membership to an awareness group also has an implication in the L2 classroom. As only one out of a possible five aptitude constructs appears to be playing a role, learners that come to the language classroom with relatively low abilities in the other aptitude constructs may not be disadvantaged in terms of awareness. Furthermore, with future research, it may be possible to understand how the disadvantage of a low inductive language learning ability can be overcome. In addition, further research may highlight other, less stable (Skehan, 1990), factors that are contributing to awareness levels.

In the present study, the scores from the inductive language learning ability test and the scores from the grammatical sensitivity test did not correlate. This finding indicates that these two aptitude constructs may be testing different underlying aptitude traits. Previous theorising and research has often claimed that both of these traits make up a person's analytic ability (Harley & Hart, 1997; Skehan, 1998). However, the present finding shows that a more fine-grained understanding of each of these constructs may be needed. Further research is needed to verify whether these two tests are tapping into different aptitude traits.

In conclusion, this study has found contrary results to previous awareness studies. It appears that awareness may not be necessary for the acquisition of certain linguistic features. Another interpretation is that awareness' utility may depend on the type of exposure; awareness may be less important when exposure is meaning-focused than

when it is form-focused. In addition, out of the five aptitude factors tested, only inductive language learning ability appears to be predicting differences in awareness levels amongst learners. In order to understand these findings more clearly, further research needs to focus on awareness and type of exposure (meaning-focused versus form-focused) with a variety of linguistic features. More research that isolates possible variables that play a role in awareness can also help explain differences in awareness levels amongst learners. Indeed, this further research can help in understanding how teachers can create a positive environment for learners to become aware and when teachers should try and create this positive environment as the findings show that not all types of exposure and not all linguistic features may benefit from awareness.

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APPENDIX A - CONSENT FORM

This is to state that I agree to participate in a program of research being conducted by Philippa Bell, supervised by Dr. Laura Collins of the Department of Education (TESL Centre) at Concordia University.
Contact Information :
E-mail :
Phone :

A. PURPOSE

I have been informed that the purpose of the research is to study aspects of the acquisition of French as a second language by native English speakers.

B. PROCEDURES

I have been informed that (1) this study will take place at Concordia University or at my home university/college; (2) that I will be asked to do a series of short written and auditory discrimination tasks, some in French, some in English; (3) one of the tasks will involve completing a crossword puzzle in French which will be audio-recorded; and (4) the total session will last approximately one hour.

C. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences.
- I understand that my participation in this study is CONFIDENTIAL (i.e. the researcher will know but will not disclose my identity).
- I understand that the data from this study may be published or presented at a scientific conference; data will be reported in a way that protects each participant's identity.
- I understand that I will receive a monetary compensation of $10.00 for participating in this study.
- I understand that if I request a copy of the final research report, one will be sent to me. I can make this request to Philippa Bell during this interview or later in writing.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT.
I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

RESEARCHERS/S SIGNATURE

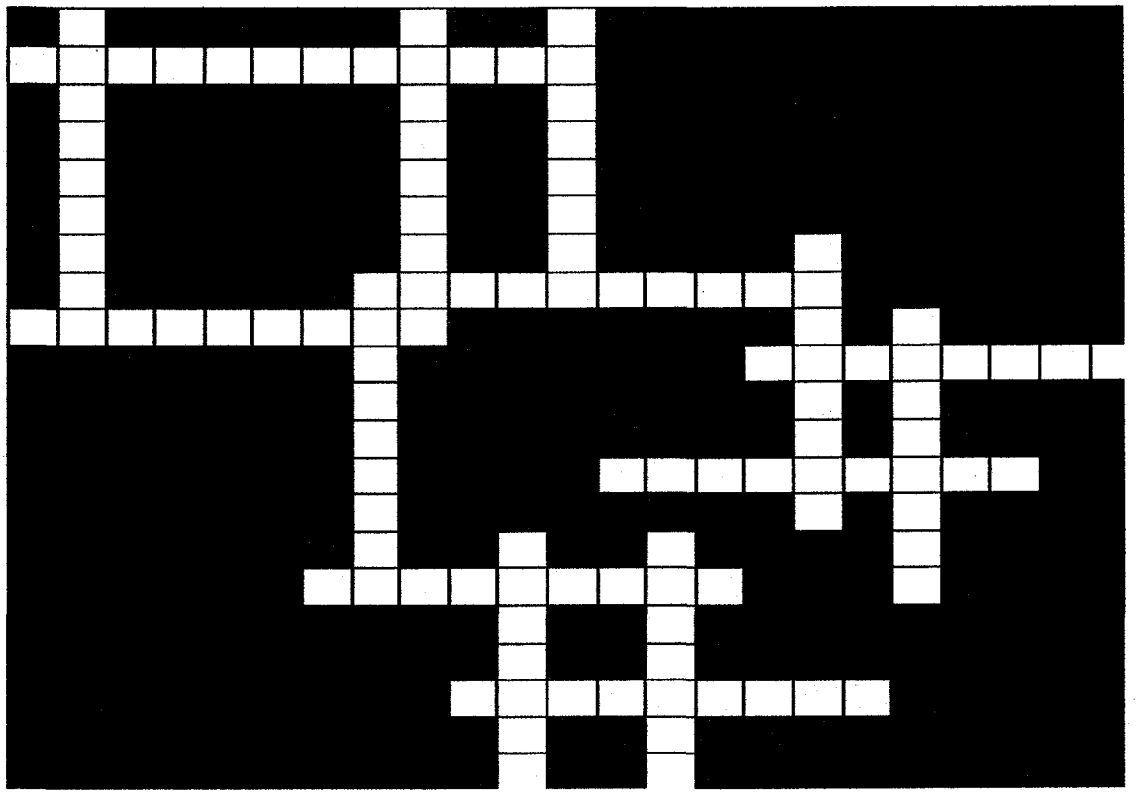
DATE

Would you like to be sent a copy of this consent form? _____ Yes _____ No

If at any time you have any questions about your rights as a research participant, please contact Adela Reid, Research Ethics and Compliance Officer, Concordia University, at (514) 848-2424 x7481 or by e-mail at areid@alcor.concordia.ca.

APPENDIX B - EXPOSURE TASK

Fill in the crossword using the clues below and the answer key. Every clue begins with either LE or LA so don't forget to include them. Remember to **say everything** that you are thinking out loud as you are doing the crossword. Good Luck!



HORIZONTALE

1 Quand une femme se marie, elle demande à ses meilleures copines d'être quoi ? (12)

5. Un ustensile que vous utilisez pour manger. (9)

6. Le contenant où on met les déchets. (10)

11. Adam est un mâle, Eve est une .... (9)

12. Quelque chose qui peut vous aider si vous voulez manger devant la télévision. (9)

13. Quelque chose que vous pouvez mettre sur votre tête. (9)

16. Quelque chose que vous pouvez porter pendant l'hiver. (9)

VERTICALE

2. Un animal qui court très vite. (9)

3. L'habitation des rois. (9)

4. Un type de dessert. (8)

7. Le dessous d'une chaussure. (9)

8. Un type de transport maritime. (8)

9. Pour monter sur le toit, on a besoin d'une ... (8)

10. Une table pour les étudiants. (8)

14. Une petite rue. (8)

15. Quand on joue au hockey, on utilise des bâtons et ? (10)

APPENDIX C – PRETEST

Name_____ Test 1

Underline the answer that you think is correct. If you don't know, underline "Je ne sais pas"

1. je me lave mes mains
   je me lave les mains
   Je ne sais pas

2. une citronnelle
   un citronnelle
   Je ne sais pas

3. j'en ai besoin
   j'y ai besoin
   Je ne sais pas

4. une agraffeuse
   une agrafeuse
   Je ne sais pas

5. une panneau
   un panneau
   Je ne sais pas

6. J'habite à Montréal
   J'habite en Montréal
   Je ne sais pas

7. J'ai 35 ans
   Je suis 35 ans
   Je ne sais pas

8. un ficelle
   une ficelle
   Je ne sais pas

9. Comment t'appelles tu ?
   Comment t'appeles tu ?
   Je ne sais pas

10. Une bouteille d'eau
    Une bouteille de l'eau
    Je ne sais pas

11. une prise électric
    une prise électrique
    Je ne sais pas

12. les État-Unis
    les États-Unis
    Je ne sais pas

13. J'apprend le français
    J'apprends le français
    Je ne sais pas

14. une bretelle
    un bretelle
    Je ne sais pas

15. un crayon à papier
    un crayon du papier
    Je ne sais pas

16. un drapeau
    une drapeau
    Je ne sais pas

17. un dictionaire
    un dictionnaire
    Je ne sais pas

18. une orange ligne
    une ligne orange
    Je ne sais pas

19. un nouvelle
    une nouvelle
    Je ne sais pas

20. Je travaille à la SPCA
    Je travaille au SPCA
    Je ne sais pas

21. Venez me voir
    Venez voir moi
    Je ne sais pas

22. un tableau
    une tableau
    Je ne sais pas

23. Je voudrait te parler
Je voudrais te parler
Je ne sais pas

24. un rideau
une rideau
Je ne sais pas

25. Il n'a pas des sœurs
Il n'a pas de sœurs
Je ne sais pas

26. un cellulaire de Rogers
un Rogers cellulaire
Je ne sais pas

27. un verre cassée
un verre cassé
Je ne sais pas

28. un membre de l'audience
un membre du audience
Je ne sais pas

29. Je vient du Canada
Je viens du Canada
Je ne sais pas

30. une cerveau
un cerveau
Je ne sais pas

31. Parle-tu français ?
Parles-tu français ?
Je ne sais pas

32. J'ai beaucoup de l'argent
J'ai beaucoup d'argent
Je ne sais pas

33. un gamelle
une gamelle
Je ne sais pas

34. Le devoir est difficile
Le devoir sont difficiles
Je ne sais pas

35. J'ai acheté des pneux
J'ai acheté des pneus
Je ne sais pas

36. un citadelle
une citadelle
Je ne sais pas

37. Ma grand-mère
Ma grande-mère
Je ne sais pas

38. une oiseau
un oiseau
Je ne sais pas

39. Je ne me suis pas brossé les dents
Je ne me suis pas brossé mes dents
Je ne sais pas

40. Il fait belle
Il fait beau
Je ne sais pas

41. une selle
un selle
Je ne sais pas

42. Un mot croisés
Un mot croisé
Je ne sais pas

43. un cadeau
une cadeau
Je ne sais pas

44. Je voudrai un thé
Je voudrait un thé
Je ne sais pas

45. Un teste de français
Un test de français
Je ne sais pas

46. Une boîte de lait
Une boîte du lait
Je ne sais pas

47. une agneau
un agneau
Je ne sais pas

48. C'est chaud
Ses chaud
Je ne sais pas

49. J'ai des dans blanches
J'ai des dents blanches
Je ne sais pas

50. un hirondelle
une hirondelle
Je ne sais pas

APPENDIX D – POSTTEST

Name : Test 2

Underline the answer that you think is correct. If you don't know, underline "Je ne sais pas"

1. je suis arrivé
   j'ai arrivé
   Je ne sais pas

2. une drapeau
   un drapeau
   Je ne sais pas

3. une gamelle
   un gamelle
   Je ne sais pas

4. une souris grise
   une souris gris
   Je ne sais pas

5. un femelle
   une femelle
   Je ne sais pas

6. une imprimante
   un imprimante
   Je ne sais pas

7. hésiter de faire quelque chose
   hésiter à faire quelque chose
   Je ne sais pas

8. une chapeau
   un chapeau
   Je ne sais pas

9. une baguette frais
   une baguette fraîche
   Je ne sais pas

10. être soif
    avoir soif
    Je ne sais pas

11. une demoiselle
    un demoiselle
    Je ne sais pas

12. un gâteau
    une gâteau
    Je ne sais pas

13. douter de quelque chose
    douter à quelque chose
    Je ne sais pas

14. être vieux
    avoir vieux
    Je ne sais pas

15. un nouvelle
    une nouvelle
    Je ne sais pas

16. une chemise blanche
    une chemise blanc
    Je ne sais pas

17. je suis venu
    j'ai venu
    Je ne sais pas

18. un échelle
    une échelle
    Je ne sais pas

19. un pays civilisé
    un pays civilisée
    Je ne sais pas

20. aider de faire quelque chose
    aider à faire quelque chose
    Je ne sais pas

21. une plateau
    un plateau
    Je ne sais pas

22. être malade
    avoir malade
    Je ne sais pas

23. commencer de fumer
commencer à fumer
Je ne sais pas

24. un jour
une jour
Je ne sais pas

25. être intelligent
avoir intelligent
Je ne sais pas

26. un poubelle
une poubelle
Je ne sais pas

27. un manteau
une manteau
Je ne sais pas

28. chercher de quelque chose
chercher à quelque chose
Je ne sais pas

29. une château
un château
Je ne sais pas

30. être content
avoir content
Je ne sais pas

31. une table
un table
Je ne sais pas

32. Il est impossible à dire
Il est impossible de dire
Je ne sais pas

33. une parapluie
un parapluie
Je ne sais pas

34. avoir besoin à faire quelque chose
avoir besoin de faire quelque chose
Je ne sais pas

35. une agneau
un agneau
Je ne sais pas

36. une ruelle
un ruelle
Je ne sais pas

37. être peur
avoir peur
Je ne sais pas

38. une train
un train
Je ne sais pas

39. Tu as des beaux yeux
Tu a des beaux yeux
Je ne sais pas

40. un repas chaud
un repas chaude
Je ne sais pas

41. un bretelle
une bretelle
Je ne sais pas

42. un ordinateur sophistiqué
un ordinateur sophistiquée
Je ne sais pas

43. un cerveau
une cerveau
Je ne sais pas

44. je suis volé
j'ai volé
Je ne sais pas

45. une gazelle
un gazelle
Je ne sais pas

46. un grand verre
un grande verre
Je ne sais pas

47. Il s'inscrit au cours
Il s'inscrit du cours
Je ne sais pas

48. une oiseau
un oiseau
Je ne sais pas

49. une chaise roulante
une chaise roulant
Je ne sais pas

50. Ses bottes sont jolies
C'est bottes sont jolies
Je ne sais pas

51. une bureau
un bureau
Je ne sais pas

52. un cellulaire
une cellulaire
Je ne sais pas

53. Je me mets à travailler
Je me mets de travailler
Je ne sais pas

54. une bâtiment
un bâtiment
Je ne sais pas

55. une petite maison
une petit maison
Je ne sais pas

56. Ou habites-tu ?
Où habites-tu ?
Je ne sais pas

57. une selle
un selle
Je ne sais pas

58. un maison
une maison
Je ne sais pas

59. Ces jeudi aujourd'hui
C'est jeudi aujourd'hui
Je ne sais pas

60. un panneau
une panneau
Je ne sais pas

61. une citadelle
un citadelle
Je ne sais pas

62. Elle est là-bas
Elle est la-bas
Je ne sais pas

63. une semelle
un semelle
Je ne sais pas

64. Quel honte !
Quelle honte !
Je ne sais pas

65. un tableau
une tableau
Je ne sais pas

66. J'aime ce paysage
J'aime se paysage
Je ne sais pas

67. un clé
une clé
Je ne sais pas

68. une citronnelle
un citronnelle
Je ne sais pas

69. Il c'est lavé les dents
Il s'est lavé les dents
Je ne sais pas

70. une cadeau
un cadeau
Je ne sais pas

71. un hirondelle
une hirondelle
Je ne sais pas

72. Quelle heure est-il ?
Quel heure est-il ?
Je ne sais pas

73. un bateau
une bateau
Je ne sais pas

74. J'ai pique-niqué
Je suis pique-niqué
Je ne sais pas

75. une couteau
un couteau
Je ne sais pas

76. Où se trouve se pays ?
Où se trouve ce pays ?
Je ne sais pas

77. un rondelle
une rondelle
Je ne sais pas

78. Je ne vois pas de loin
Je ne vois pas à loin
Je ne sais pas

79. un rideau
une rideau
Je ne sais pas

80. Ça nous fait du bien
Ça nous fait au bien
Je ne sais pas

81. une situation
un situation
Je ne sais pas

82. un ficelle
une ficelle
Je ne sais pas

APPENDIX E – PROFICIENCY TEST

Name : Proficiency Test

Underline the answer that you think is correct. If you don't know, underline "Je ne sais pas"

1. je suis arrivé
   j'ai arrivé
   Je ne sais pas

2. une souris grise
   une souris gris
   Je ne sais pas

3. une imprimante
   un imprimante
   Je ne sais pas

4. hésiter de faire quelque chose
   hésiter à faire quelque chose
   Je ne sais pas

5. une baguette frais
   une baguette fraîche
   Je ne sais pas

6. être soif
   avoir soif
   Je ne sais pas

7. douter de quelque chose
   douter à quelque chose
   Je ne sais pas

8. être vieux
   avoir vieux
   Je ne sais pas

9. une chemise blanche
   une chemise blanc
   Je ne sais pas

10. je suis venu
    j'ai venu
    Je ne sais pas

11. un pays civilisé
    un pays civilisée
    Je ne sais pas

12. aider de faire quelque chose
    aider à faire quelque chose
    Je ne sais pas

13. être malade
    avoir malade
    Je ne sais pas

14. commencer de fumer
    commencer à fumer
    Je ne sais pas

15. un jour
    une jour
    Je ne sais pas

16. être intelligent
    avoir intelligent
    Je ne sais pas

17. chercher de quelque chose
    chercher à quelque chose
    Je ne sais pas

18. être content
    avoir content
    Je ne sais pas

19. une table
    un table
    Je ne sais pas

20. Il est impossible à dire
    Il est impossible de dire
    Je ne sais pas

21. une parapluie
    un parapluie
    Je ne sais pas

22. avoir besoin à faire quelque chose
    avoir besoin de faire quelque chose
    Je ne sais pas

23. être peur
avoir peur
Je ne sais pas

24. une train
un train
Je ne sais pas

25. Tu as des beaux yeux
Tu a des beaux yeux
Je ne sais pas

26. un repas chaud
un repas chaude
Je ne sais pas

27. un ordinateur sophistiqué
un ordinateur sophistiquée
Je ne sais pas

28. je suis volé
j'ai volé
Je ne sais pas

29. un grand verre
un grande verre
Je ne sais pas

30. Il s'inscrit au cours
Il s'inscrit du cours
Je ne sais pas

31. une chaise roulante
une chaise roulant
Je ne sais pas

32. Ses bottes sont jolies
C'est bottes sont jolies
Je ne sais pas

33. un cellulaire
une cellulaire
Je ne sais pas

34. Je me mets à travailler
Je me mets de travailler
Je ne sais pas

35. une bâtiment
un bâtiment
Je ne sais pas

36. une petite maison
une petit maison
Je ne sais pas

37. Ou habites-tu ?
Où habites-tu ?
Je ne sais pas

38. un maison
une maison
Je ne sais pas

39. Ces jeudi aujourd'hui
C'est jeudi aujourd'hui
Je ne sais pas

40. Elle est là-bas
Elle est la-bas
Je ne sais pas

41. Quel honte !
Quelle honte !
Je ne sais pas

42. J'aime ce paysage
J'aime se paysage
Je ne sais pas

43. un clé
une clé
Je ne sais pas

44. Il c'est lavé les dents
Il s'est lavé les dents
Je ne sais pas

45. Quelle heure est-il ?
Quel heure est-il ?
Je ne sais pas

46. J'ai pique-niqué
Je suis pique-niqué
Je ne sais pas

47. Où se trouve se pays ?
Où se trouve ce pays ?
Je ne sais pas

48. Je ne vois pas de loin
Je ne vois pas à loin
Je ne sais pas

49. Ça nous fait du bien
Ça nous fait au bien
Je ne sais pas

50. une situation
un situation
Je ne sais pas

APPENDIX F - QUESTIONNAIRE

QUESTIONNAIRE

1. Age: 2. Sex (please circle): M F
3. First Language:

4. Other Languages & Level (please choose a level from below):
   1. Beginner
   2. Pre-Intermediate
   3. Intermediate
   4. Upper-Intermediate
   5. Advanced
   6. Fluent

French Other (please specify) Other (please specify)

5. How have you learned each language? (please choose any options that apply to you):
   1. Intensive
   2. Immersion (schooled in the language)
   3. School
   4. Home study
   5. With friends/neighbours/shop assistants

French Other (please specify) Other (please specify)

6. Where did you study each language? (please choose any options that apply to you):
   1. In a country where the language is spoken
   2. In a country where the language is NOT spoken
   3. In a country where the language is spoken, but I never really met any people that spoke the language
   4. In a country where the language is NOT spoken, but I had a lot of friends with whom I spoke that language)

French Other (please specify) Other (please specify)

The structure of French:

1. How do you decide whether to write/say "je suis" or "j'ai"?

2. How do you decide whether to write « je serais » or « je serai »?

3. How do you decide whether to use un or une (le or la)?

4. How do you decide whether to write/say « je sais » or « je connais »?

5. How do you decide whether to write/say « je suis allé(e) » or « j'allais »

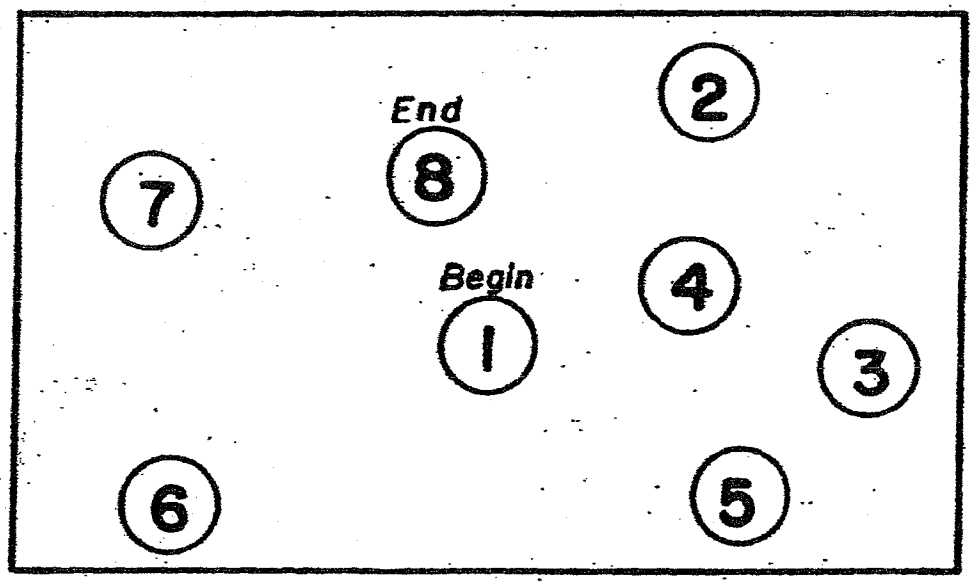
APPENDIX G – ATTENTION CONTROL TASK

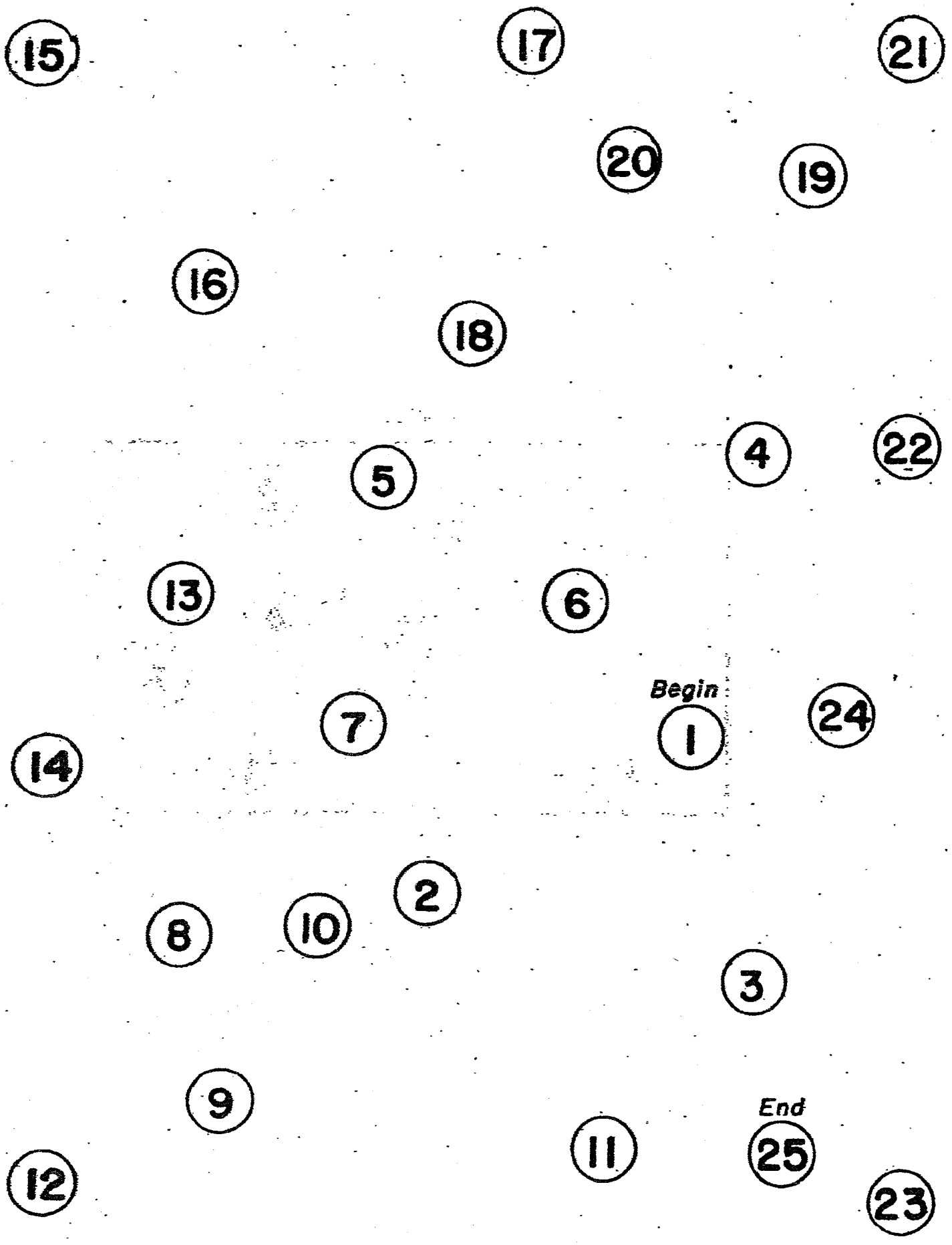
NAME:
DATE:

TRAIL MAKING

Part A TIME:

SAMPLE




15
17
21
20
19
16
18
4
22
5
13
6
Begin
24
7
1
14
2
8
10
3
9
End
11
25
12
23

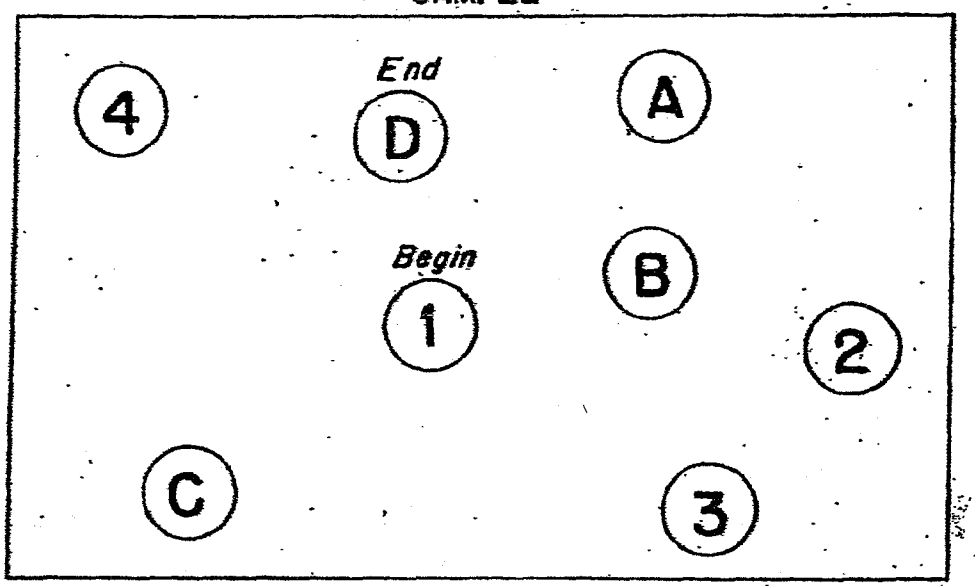
NAME:
DATE:

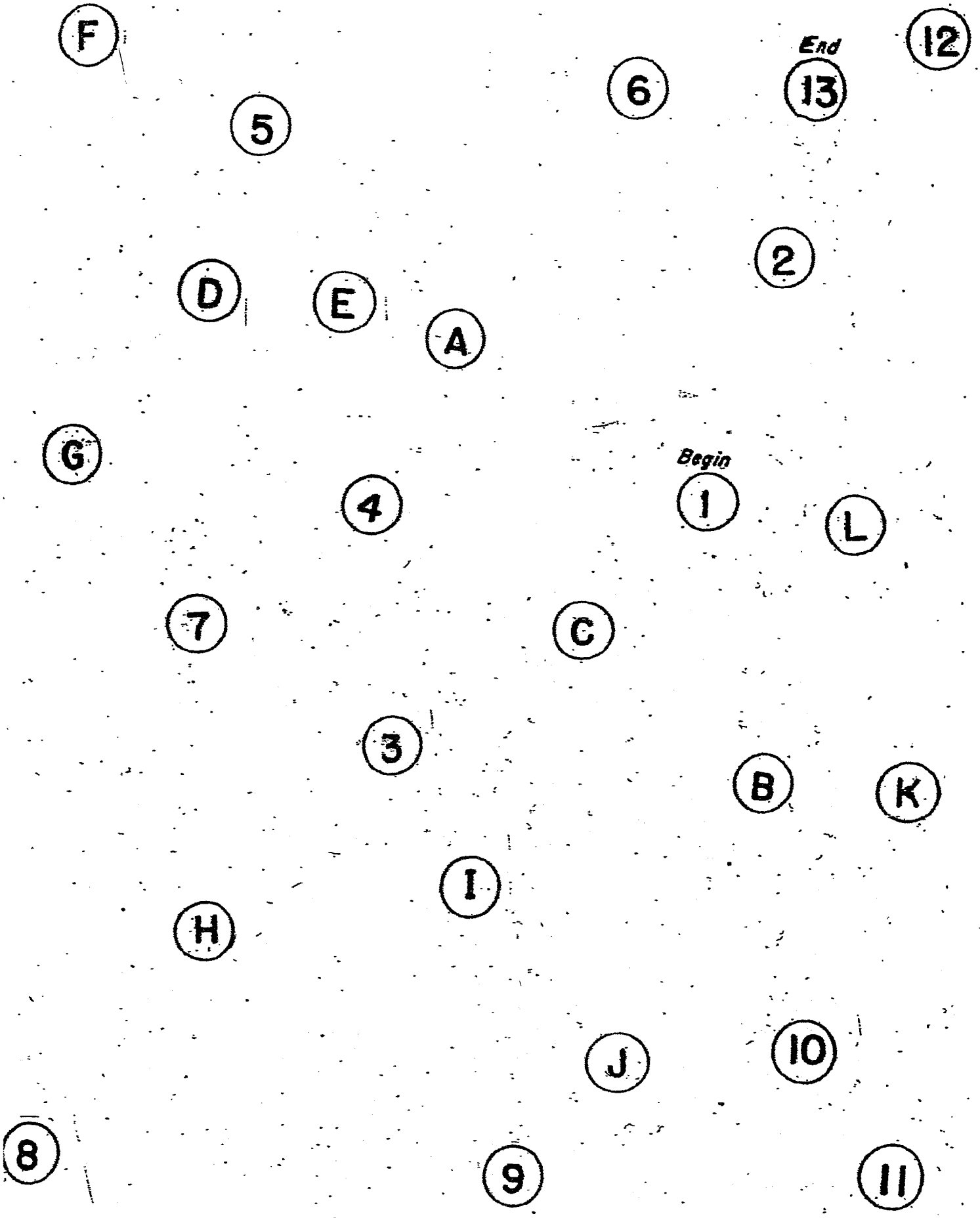
TRAIL MAKING

Part B

TIME:

SAMPLE




F
End
12
6
13
5
2
D
E
A
G
Begin
4
1
L
7
C
3
B
K
I
H
J
10
8
9
11

APPENDIX H – READING SPAN TEST

2 sentences

Due to his gross inadequacies, his position as director was terminated abruptly.

It is possible, of course, that life did not arise on the earth at all.

BLANK SCREEN

After all he had not gone far, and some of his walking had been circular.

The poor lady was thoroughly persuaded that she was not long to survive this vision.

BLANK SCREEN

Jane's relatives had decided that her gentleman friend was not one of high status.

Without any hesitation, he plunged into the difficult mathematics assignment blindly.

BLANK SCREEN

The entire town arrived to see the appearance of the controversial political candidate.

After passing all the exams, the class celebrated for an entire week without resting.

BLANK SCREEN

According to the results of the survey, Robert Redford is the most liked Hollywood star.

The weather was unpredictable that summer so no one made plans too far in advance.

BLANK SCREEN

3 sentences

The devastating effects of the flood were not realized until months later.

In a moment of complete spontaneity, she developed a thesis for her paper.

At the conclusion of the musicians' performance, the enthusiastic crowd applauded.

BLANK SCREEN

They attended the theater habitually except for circumstances beyond their control.

The lumbermen worked long hours in order to obtain the necessary amount of wood.

The old lady talked to her new neighbor on her weekly walks from church.

BLANK SCREEN

There are days when the city where I live wakes in the morning with a strange look.

We boys wanted to warn them, but we backed down when it came to the pinch.

With shocked amazement and appalled fascination Marion looked at the pictures.

BLANK SCREEN

What would come after this day would be inconceivably different, would be real life.

He stood there at the edge of the crowd while they were singing, and he looked bitter.

John became annoyed with Karen's bad habits of biting her nails and chewing gum.

BLANK SCREEN

Circumstantial evidence indicated that there was a conspiracy to eliminate him.

To determine the effects of the medication, the doctor hospitalized his patient.

Her mother nagged incessantly about her lack of concern for the welfare of the children.

BLANK SCREEN

4 sentences

I found the keynote speaker incredibly boring, inarticulate and not well read.

In order to postpone the business trip, he canceled his engagements for the week.

The incorrigible child was punished brutally for his lack of respect for his elders.

The brilliant trial attorney dazzled the jury with his astute knowledge of the case.

BLANK SCREEN

I imagine that you have a shrewd suspicion of the object of my earlier visit.

I turned my memories over at random like pictures in a photograph album.

I'm not certain what went wrong, but I think it was my cruel and bad temper.

Filled with these dreary forebodings, I fearfully opened the heavy wooden door.

BLANK SCREEN

Sometimes I get so tired of trying to convince him that I love him and shall forever.

When in trouble, children naturally hope for a miraculous intervention by a superhuman.

It was your belief in the significance of my suffering that kept me going.

The girl hesitated for a moment to taste the onions because her husband hated the smell.

BLANK SCREEN

The smokers were asked to refrain from their habit until the end of the production.

The young business executive was determined to develop his housing projects within the year.

Despite the unusually cold weather, the campers continued their canoe trip.

All students that passed the test were exempt from any further seminars that semester.

BLANK SCREEN

The entire construction crew decided to lengthen their work day in order to have lunch.

In comparison to his earlier works, the musician had developed a unique enthralling style.

The boisterous laughter of the children was disturbing to the aged in the building.

The sound of an approaching train woke him, and he started to his feet.

BLANK SCREEN

5 sentences

A small oil lamp burned on the floor and two men crouched against the wall, watching me.

The products of digital electronics will play an important role in your future.

One problem with this explanation is that there appears to be no defense against cheating.

Sometimes the scapegoat is an outsider who has been taken into the community.

I should not be able to make anyone understand how exciting it all was.

BLANK SCREEN

In a flash of fatigue and fantasy, he saw a fat Indian sitting beside a campfire.

The lieutenant sat beside the man with the walkie-talkie and stared at the muddy ground.

I will not shock my readers with a description of the cool-blooded butchery that followed.

The courses are designed as much for professional engineers as for amateur enthusiasts.

The taxi turned up Michigan Avenue, where they had a clear view of the lake.

BLANK SCREEN

The words of human love have been used by the saints to describe their vision of God.

It was shortly after this that an unusual pressure of business called me into town.

He pursued this theme, still pretending to seek for information to quiet his own doubts.

I was so surprised at this unaccountable apparition, that I was speechless for a while.

When at last his eyes opened, there was no gleam of triumph, no shade of anger.

BLANK SCREEN

He leaned on the parapet of the bridge and the two policeman watched him from a distance.

These splendid melancholy eyes were turned upon me from the mirror with a haughty stare.

He sometimes considered suicide but the thought was too oppressive to remain in his mind.

And now that a man had died, some unimaginably different state of affaires must come to be.

When I got to the big tobacco field I saw that it had not suffered much.

BLANK SCREEN

Here, as elsewhere, the empirical patterns are important and abundantly documented.

The intervals of silence grew progressively longer; the delays became very maddening.

Two or three substantial pieces of wood smoldered on the hearth, for the night was cold.

I imagined that he had been thinking things over while the secretary was with us.

There was still more than an hour before breakfast, and the house was silent and asleep.

6 sentences

The announcement of it would resound throughout the world, penetrate to the remotest land.

To do so in directions that are adaptive for mankind would be a realistic objective.

Slicing it out carefully with his knife, he folded it without creasing the face.

He laughed sarcastically and looked as if he could have poisoned me for my errors.

He tolerated another intrusion and thought himself a paragon of patience for doing so.

The reader may suppose that I had other motives, besides the desire to escape the law.

BLANK SCREEN

He listened carefully because he had the weird impression that he knew the voices.

The basic characteristic of the heroes in the preceding stories is their sensitivity.

His imagination had so abstracted him that his name was called twice before he answered.

He had an odd elongated skull which sat on his shoulders like a pear on a dish.

He stuffed his denim jacket into his pants and fastened the stiff, new snaps securely.

On the desk where she wrote her letters was a clutter of objects coated in dust.

BLANK SCREEN

He had patronized her when she was a schoolgirl and teased her when she was a student.

The rain and howling wind kept beating against the rattling window panes.

He covered his heart with both hands to keep anyone from hearing the noise it made.

The stories all deal with a middle-aged protagonist who attempts to withdraw from society.

Without tension there could be no balance either in nature or in mechanical design.

I wish there existed someone to whom I could say that I felt very sorry.

BLANK SCREEN

APPENDIX I – PHONOLOGICAL MEMORY TEST ITEMS

1.	samaka	3	
2.	rafahiya	4	
3.	imbraturiya	5	
4.	intisaratuhum	6	
5.	bunyatu al muhandas	7	
6.	alhayatu jamilatun	8	
7.	alsuwaru al hazinatu	9	
8.	huru:bu al mutasawili:na	9	
9.	sayara	3	
10.	alfatetuwesi:metun	8	
11.	muhejira	4	
12.	alzuhur al jamila	7	
13.	almudawala:t	5	
14.	istijwabatuhum	6	
15.	madrasetuhuna	6	
16.	ta:wila	3	
17.	sitata wa situna rajul	9	
18.	mudiratun	4	
19.	malebisu al rajuli	8	
20.	kelimetun	4	
21.	itisalen la: zimen	7	
22.	almutarjimun	5	
23.	mutama:siki:na	6	
24.	milafatu al mujrimi:na	9	
25.	infisa:l	3	
26.	tarbiyatu al kiba:ri	8	
27.	maka:tibuhum	5	
28.	jaziratun kabira	7	

APPENDIX J – INDUCTIVE LANGUAGE LEARNING ABILTIY TEST

Language Analysis, *continued*

LIST OF WORDS:

gade.....	..father, a father
shi.....	...horse, a horse
gade shir le.....	Father sees a horse.
gade shir la.....	Father saw a horse.
be.....	....carrrics

Using the above list, figure out how to say each of the statements below. As soon as you decide how to say a statement, look at the four answers given beneath it and choose the one which agrees with yours.

1 **Father carries a horse.**
[a] gade shir be [b] gade shir ba
[c] shi gader be [d] shi gader ba

2 **Father carried a horse.**
[e] gade shir be [f] gade shir ba
[g] shi gader be [h] shi gader ba

3 **A horse carried Father.**
[a] gade shir be [b] gade shir ba
[c] shi gader be [d] shi gader ba

4 **A horse carries Father.**
[e] gade shir be [f] gade shir ba
[g] shi gader be [h] shi gader ba

The list below contains the same words as the list above and some additional ones. Use this list in figuring out how to say the statements in problems 5 through 15.

gade.....father, a father	**so**.....I, me
shi.....horse, a horse	**wo**.....you
gade shir le.....Father sees a horse	**so shir le**.....I see a horse
gade shir la.....Father saw a horse	**sowle**.....I see you
be.....carrics	**so shir lem**.....I don't see a horse

5 **You carry me.**
[a] sowle [b] sowbe
[c] wosle [d] wosbe

6 **You saw Father.**
[e] wo gader le [f] so gader le
[g] so gader la [h] wo gader la

7 **I carried you.**
[a] wosba [b] sowbe
[c] sowba [d] sowla

8 **You carried Father.**
[e] wo gader ba [f] wo gader be
[g] wo gade ba [h] so gade be

9 **You saw me.**
[a] sowla [b] wosba
[c] wosla [d] wosle

10 **You don't carry a horse.**
[e] wo shir lem [f] wo shir bem
[g] wo shir bam [h] wo shi bem

11 **You don't see me.**
[a] sowlem [b] wosle
[c] wosolem [d] woslem

12 **I didn't carry Father.**
[e] so gader bam [f] so gade bam
[g] so gader bem [h] so gader lam

13 **You saw a horse.**
[a] wo shir le [b] wo shir la
[c] wo shir be [d] wo shir ba

14 **I didn't see you.**
[e] woslam [f] sowlam
[g] sowlem [h] woslem

15 **Father doesn't carry a horse.**
[a] gade shir bem [b] shir gader bem
[c] gade shi bem [d] gade shir bam

APPENDIX K – GRAMAMTICAL SENSITIVITY TEST

PART IV. WORDS IN SENTENCES (Continued)

1. Jill fell down AND Jack came tumbling after.

   Now, you may wait out there, or you may come back on Friday if you wish.
   A B C D E

2. I expect him to do good WORK.

   On his trip across the United States and up to Alaska, Fred expected to see many interesting things.
   A B C D E

3. John sold DICK his bicycle.

   If their work is up to standard, I will guarantee them a bonus at the end of the week.
   A B C D E

4. The school CLOSED for the summer.

   Despite the efforts we had made to reinforce the material, it tore easily under the slightest strain.
   A B C D E

5. HE was here.

   Because of the great demand for this product, the committee should ask for it now.
   A B C D E

6. Bill has gone TO make a telephone call.

   Two people are needed to carry this box to the car because it is too heavy for one.
   A B C D E

7. At midnight, the SCREAMING of sirens awakened me.

   Painting in oils is a comforting hobby for busy executives who need relaxation.
   A B C D E

8. The door OPENED quickly.

   Because she had tied the package securely, it arrived without any damage from its careless handling.
   A B C D E

9. The lake was dotted with SPEEDING boats.

   Sometimes the very best method for good learning is constant practice.
   A B C D E

10. The most influential WRITER of his day, he had but a modest pride of authorship.

    Gockel, a Swiss physicist, sent an electroscope up to a height of 13,000 feet in a balloon.
    A B C D E

11. They named him BILL.

    Because of his military success during the Civil War, the people made Grant president of the United States.
    A B C D E

12. The company owns every substantial PIECE of property in the town.

    Before the dawn of history, men were raising corn very much like what we grow today.
    A B C D E

13. It is not TO be passed over lightly.

    She talked to me about how I should try to make the horse work instead of letting her graze at will.
    A B C D E

PART IV. WORDS IN SENTENCES (Continued)

14. SEVERAL were absent from the meeting.
    In spite of the many proposals which were made, only one could be adopted.
    A B C D E

15. I told him to come BUT he refused.
    If tests are made, even when there seems to be no change this system will show an advan-
    A B C D
    tage, and our customers will be convinced.
    E

16. My finger became SWOLLEN from the infection.
    The child grew strong from the healing sunshine.
    A B
    The high wall was nearly hidden from view by the foliage.
    C D E

17. My FRIEND went home.
    Behind the house but near the forest stood a barn.
    A B C D E

18. That is the OLDEST house.
    It is farther from your hotel than the one we saw before, but it is the best example of earlier
    A B C
    dwellings constructed by our former inhabitants.
    D E

19. FEW come back.
    In the middle of the lake will be found a small island crowned with a single tree.
    A B C D E

20. He saw several fish SWIMMING slowly by.
    As he was walking down the lane, he found himself wondering who had been there before
    A B C D
    he arrived.
    E

21. THIS is my first trip.
    Even though these letters arrived before those, that has not been answered yet.
    A B C D E

22. The corn grew TALL during the summer.
    She raised yellow tulips in her small garden.
    A B C
    The storm proved worse as the wind became stronger.
    D E

23. TO TELL THE TRUTH, it's hard to say.
    To sum up, this product is as efficient as any.
    A B
    To be or not to be, that is the question.
    C D
    To start the engine, push this button.
    E

24. He drove FROM Boston to New York.
    To be safe, he decided to buy spare parts for any emergency.
    A B C D E

PART IV. WORDS IN SENTENCES (Continued)

25. He nailed the board TIGHT against the house.
    He always did the job well.
    A B C
    He poured the pail full.
    D E

26. Do AS I say.
    Although the weather report predicted clear skies for today, it rained all day.
    A B C D E

27. Is THAT your hat?
    This looks better on you even though those suits are better bargains than the ones on this
    A B C D E
    rack.

28. The weekly meeting, usually held on Friday night, is a fixed ACTIVITY of the Scout program.
    Washington was the first president of the United States; he refused the crown that some of
    A B C D
    his admirers wanted him to have.
    E

29. Put it WHERE it will do the most good.
    At the signal, proceed to mark it as you were instructed in your last lesson.
    A B C D E

30. NONE was more curious to solve the riddle than I.
    The government's first task was to check the prescriptions written by the doctors.
    A B C D E

31. Which one do YOU think it is?
    That one may belong to me.
    A B
    Please pay me before going on your trip.
    C D E

32. A CALCULATING machine is useful to mathematicians.
    Skiing is a fine sport during the winter months.
    A B C
    Seeing is believing.
    D E

33. As he sat down to rest, a FEELING of weariness came over him.
    Swimming is relaxing exercise for growing boys in training for wrestling.
    A B C D E

34. I will buy a car WHEN I get the money.
    After you left last night, most of the students remained until the end.
    A B C D E

35. She played the piano EXTREMELY well.
    Promptly on the dot of five, he came up the stairs, quite flushed with excitement and breath-
    A B C
    ing very heavily.
    D E

PART IV. WORDS IN SENTENCES (Continued)

36. A NUMBER of people applied for the position.
I find many candidates who cannot offer more than two years' experience.
A B C D E

37. His wife bought HERSELF a new hat.
Why won't you tell me more about yourself than you did yesterday?
A B C D E

38. WHAT is this?
I do not know what book you want.
A
To whom do these belong?
B
Which fellow is your brother?
C
Those are mine.
D E

39. Let's make this campaign a SUCCESS.
Some people believe that the world is wholly a figment of the imagination; philosophers call
A B
this theory a variety of solipsism.
C D E

40. Which color do YOU like best?
This one suits me better than the other.
A B C
It makes no difference to me.
D E

41. We plan to take IT today.
On the chance that he would see us, we took steps to put up a beacon.
A B C D E

42. They observed several artists PAINTING landscapes there.
While attempting to catch the ball, he found himself so blinded by the sun that he failed to
A B C D
notice the overhanging limb.
E

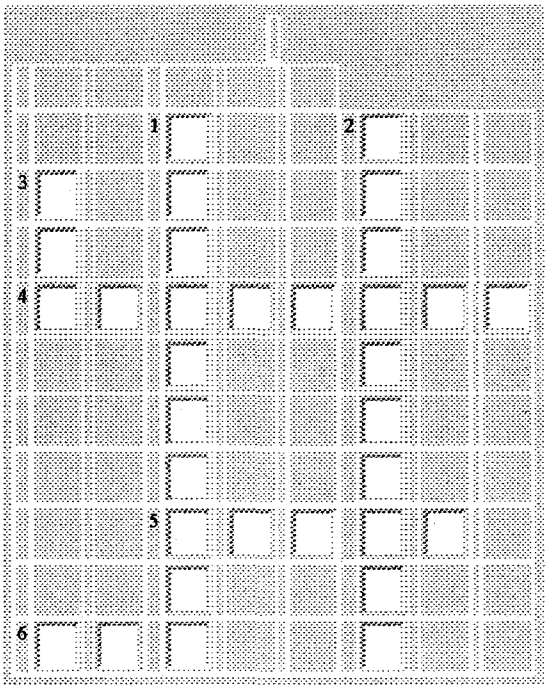
43. Some people enjoy EATING clams on the half-shell.
Hacking his way through the teeming jungle, he found abundant evidence of the vanished
A B C D E
civilization.

44. There is no POINT in going ahead.
When the light changed, he stopped the car.
A B
A river flows down to the sea.
C D E

45. The child hurt HIMSELF.
Although I myself would do that by myself, Mary gained herself the help of some of her
A B C D
classmates.
E

APPENDIX L – PRACTICE CROSSWORD

Complete this crossword whilst thinking-aloud. The aim of this crossword is to PRACTISE thinking-aloud so you may be prompted whilst doing it.



Crossword Puzzles for ESL Students is at http://www.aitech.ac.jp/~iteslj/cw/

Across

4. Takes you out on the water
5. Big and spacious to carry things
6. Most common vehicle on the road

Down

1. It's got blades to propel it
2. Rides on two wheels
3. Brings kids to school every day

APPENDIX M – PRACTICE READING SPAN TEST

2 sentences

I am happy.

I am sad.

BLANK SCREEN

I speak French and Spanish.

I live in Montreal, Quebec.

BLANK SCREEN

3 sentences

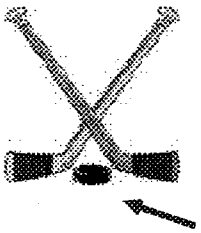
Drinking water is good for you.

Computers have changed the world.

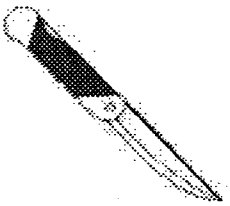
Reading books may help a person to learn how to spell.

BLANK SCREEN

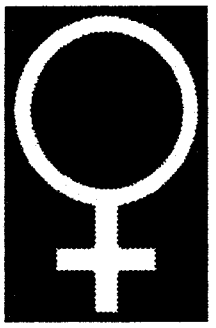
APPENDIX N – ANSWER KEY FOR EXPOSURE TASK



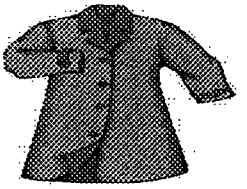
la rondelle



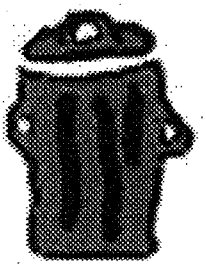
le couteau



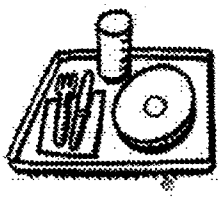
la femelle



le manteau



la poubelle



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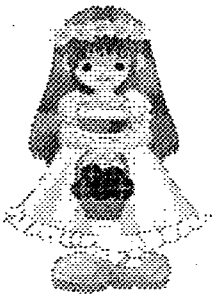

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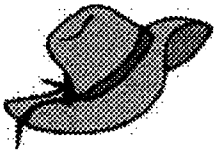

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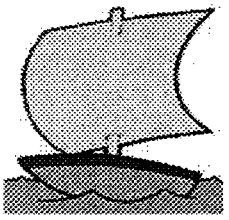

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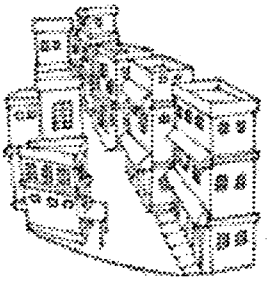

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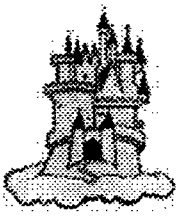

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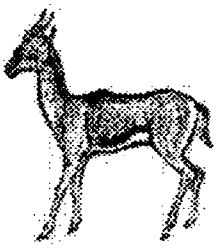
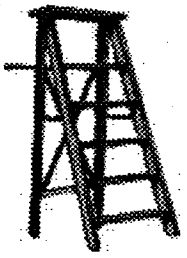
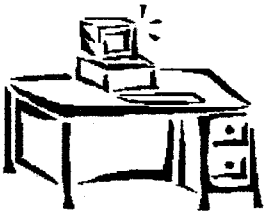


la gazelle

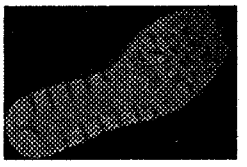
le gâteau



l'échelle



le bureau



la semelle