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EXAMINING THE COGNITIVE PROCESSES ENGAGED BY APTIS WRITING TASK 4 ON PAPER AND ON THE COMPUTER

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ABSTRACT

This study examined the cognitive validity of Aptis Writing Task 4 within Weir's (2005) socio-cognitive framework for test validation. Specifically, the study used retrospective stimulated recalls to:

(a) identify the cognitive processes engaged by Aptis Writing Task 4
(b) compare these processes across delivery modes, task parts, and candidate groups.

Examining test-taking processes can help establish whether the test activates the types of mental processes that theory views as essential elements of writing performance, and identify the effects of construct-relevant and construct-irrelevant factors on candidate writing performance.

Each of 16 candidates, with different levels of English language proficiency (low vs. high) and computer ability (low vs. high), responded to two forms of Aptis Writing Task 4, one on the computer and one on paper. Each participant then watched a video of their writing session immediately after completing each writing task and provided stimulated recalls about their writing processes. The stimulated recalls were coded in terms of the cognitive processes that the participants reported and then the results were compared across delivery modes, task parts and candidate groups.

The findings indicated that the participants engaged in a wide range of cognitive processes, including macro-planning, organisation, micro-planning, translation, execution, monitoring and revising, while responding to Aptis Writing Task 4. These processes are consistent with expectations regarding the processes that writers would engage in when writing in authentic settings. As expected, the cognitive processes reported by the participants varied significantly across task parts. Because Part B requires a higher level of formality, the participants tended to think more carefully about what and how to write when responding to Part B, than they did when responding to Part A.

Furthermore, writing mode, and to a lesser extent, English language proficiency and computer ability, affected the processes that the participants employed to some degree. The findings and their implications for Aptis Writing Task 4 and future research are discussed.

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This study aimed to describe the cognitive processes engaged by Aptis Writing Task 4 and to examine whether and how these processes vary depending on: delivery mode; task part; candidate English language proficiency (ELP); and candidate computer ability.

As Shaw and Weir (2007) have argued, examining test-taking processes can help establish whether a second-language (L2) test activates the types of mental processes that a theory of L2 knowledge and performance views as essential elements of L2 performance (cf. Chapelle, 2008; Cohen, 2012; Cohen & Upton, 2007; Weir, 2005). For example, writing theory and research show that writing involves various cognitive processes such as macro- and micro-planning, organisation, translation, monitoring, and revising, and that writers with different levels of writing expertise approach the writing task differently (Shaw & Weir, 2007).

Test validation studies need to examine whether candidates engage in construct-relevant cognitive processes when responding to L2 writing tests and whether these tests distinguish between proficient and less-proficient writers in terms of the quality of their final texts, as well as their writing processes. If a writing test engages the psycholinguistic knowledge, processes and strategies intended by test developers, then this lends support to the validity of score-based inferences about candidates' writing abilities (Chapelle, 2008; Weir, 2005).

Research on candidate writing processes can also help determine the extent to which candidate writing processes are influenced by construct-irrelevant factors such as computer ability and delivery mode.

1. BACKGROUND

1.1 Theoretical framework

Most research on the cognitive processes that L2 learners engage in when writing in L2 has built on theoretical models of first-language (L1) writing, particularly the Hayes and Flower (1980) model and Scardamalia and Bereiter (1987) model (Roca de Larios et al., 2002; Weigle, 2002).

Hayes and Flower proposed that writing consists of three major processes: (a) planning, which involves retrieving relevant information from long-term memory and converting the task situation (i.e., the writing task, the writer's motivation, and the text written so far) into goals that shape and guide subsequent processes; (b) translating, which consists in converting plans and ideas in the writer's memory into linguistic text; and (c) reviewing, which involves evaluating and improving the quality of the text produced. This process is not linear, however.

Scardamalia and Bereiter (1987) proposed two models to describe how unskilled and skilled writers write: knowledge-telling and knowledge-transforming. Unskilled writers tend to adopt a knowledge-telling approach whereby they generate text by locating topic and genre identifiers in the writing task, which then results in the retrieval of relevant and associated content. These writers tend to be occupied by "the activity of finding a next thing to say" (p. 145) rather than with the elaboration of an overall plan and specific goals or the application of pertinent strategies to solve problems. They manage to produce coherent text by retrieving a number of associated ideas that are already available in memory. Skilled writers, in contrast, use a knowledge-transforming approach to writing. This is a more cognitively complex and demanding approach that involves problem analysis and solving, goal setting, and consideration of content issues, rhetorical requirements, and the emerging text.

Recently, Field (2004), based on earlier models and research, proposed a model of the writing process that consists of seven components or stages: macro-planning, organisation, micro-planning, translation, execution, monitoring, and editing and revising. The following description of the seven stages in Field's model draws on Field (2004, pp. 329–331) and Shaw and Weir (2007, pp. 38–43).

1. **Macro-planning:** This stage involves the gathering of ideas and identification of major constraints imposed by the writing task. Specifically, the writer determines what is necessary for successful task completion such as the goal, the target readership, the genre, and the style (i.e., the level of formality required) of the piece of writing. The writer then generates ideas in response to the writing task by drawing upon content/world knowledge, while considering the relevance and adequacy of the generated ideas to the task, the appropriateness of the language used for the topic and readership, and the effect of the writing on the reader. Decisions made at this stage about readership, genre and goals will heavily constrain choices made at the micro-planning and translation stages, and will form the yardstick against which drafts are evaluated at the monitoring stage.

2. **Organisation:** This involves ordering the generated ideas, identifying relationships between them, and determining which ideas are central to the goals of the text and which are of secondary importance. The writer provisionally organises the ideas, still in abstract form, in relation to the text as a whole and in relation to each other. This may result in a set of rough notes.

3. **Micro-planning:** The focus at this stage is on the part of the text that is about to be produced. As Field (2004) explained, at this stage the planning takes place on at least two levels: (a) the goal of the paragraph itself aligned with the overall goal of the writing activity; and (b) within the paragraph, the immediate need to structure an upcoming sentence in terms of information. The output of micro-planning is stored in the mind in the form of abstract goals at paragraph and sentence level – the latter are ultimately translated into linguistic form (see next stage). During this stage, there is constant reference back to decisions made at earlier stages (e.g., macro-level decisions about readership, genre, overall goals and organisation) and the way in which the text has progressed so far (e.g., immediately preceding sentence or paragraph). Additionally, consideration is given by the writer to whether an individual piece of information is or is not shared with the reader either as a result of shared world knowledge or through information provided earlier in the text itself. The evolving textual output thus becomes part of the context itself.

4. **Translation:** It is at this stage that propositional content previously held in abstract form is converted to linguistic form. Sometimes, a fully formed sentence may be constructed, but at other times, the information is not yet fully accessed or formed. Drawing on their awareness of the target readership and the discourse and genre requirements of the writing context, writers make choices about language that is lexically, syntactically and functionally appropriate to both represent ideas identified during macro-planning and ensure that rhetorical demands are met. Writers also intentionally include some textual features to assist the reader in building an appropriate meaning representation (e.g., cohesion and coherence). At this stage, writers may avoid a topic, a grammatical structure, or a lexical item, or attempt to reach a linguistic goal by less direct methods such as employing general terms or simpler syntactic structures.

5. **Execution:** This stage involves the physical process of writing, either through handwriting or typing on a keyboard.

6. **Monitoring:** Monitoring may occur at different stages of the writing process (i.e., after writing a word, a sentence, a paragraph, or complete text) and may relate to different aspects of writing (e.g., spelling, punctuation, syntax, word choice, relevance and appropriateness of content and language for writing goals and reader, attainment of writing goals, development of discourse structure, impact of text on intended reader, cohesion and coherence, etc.). As Field (2004) noted, "because monitoring is so demanding, it is subject to attentional constraints" (p. 330).

7. **Editing and revising:** As a result of monitoring activities, a writer may return to those aspects of the text considered unsatisfactory and make corrections and adjustments. Revising can relate to different aspects of writing (e.g., lexis, grammar, rhetoric, degree of formality) and can occur after a sentence, after a paragraph, or after the whole text has been written. Monitoring, editing and revising are feed-back processes which can impact upon any of the previous stages, causing the writer to revise a macro-plan, to reword translated text, or to correct an error of execution (e.g., typos).

As Field (2004) noted, the writing process is not linear. The different stages above can occur in different orders and combinations as the writer juggles various constraints, draws on several sources of knowledge, and attends to several cognitive demands simultaneously while writing (cf. Hayes & Flower, 1980; Scardamalia & Bereiter, 1987; Shaw & Weir, 2007).

The models of writing described above, particularly those of Hayes and Flower (1980) and Scardamalia and Bereiter (1987), have been used extensively to frame research on L1 and L2 writing. These models also provide a framework for conceptualising and explaining performance on L2 writing tests. Shaw and Weir (2007), for example, used Field's (2004) model to discuss the cognitive validity of L2 writing tests, arguing that "from a cognitive perspective, a valid writing test would involve candidates engaging in all the processing components [in Field's model] as appropriate to the level of proficiency being assessed" (p. 43; cf. Chapelle, 2008; Cohen, 2012; Weir, 2005). They cautioned that "to the extent that a test does not result in appropriate cognitive processing as laid out [in Field's model] it might be considered deficient and raise concern about any attempt to generalise from the test task to the real-life language use" (p. 42). Shaw and Weir (2007) used Field's model to evaluate the cognitive validity of the writing tasks in the Cambridge Main Suite. The current study also uses Field's model to examine the cognitive processes that candidates engage in when responding to Aptis Writing Task 4. If Aptis Writing Task 4 engages the linguistic knowledge, processes and strategies (e.g., planning, translating, revising) expected by theory, then this lends support to the validity of inferences based on Task 4 scores about candidates' L2 writing abilities.

A second goal of this study is to examine whether and how the cognitive processes engaged by Aptis Writing Task 4 vary depending on delivery mode, task requirements, and candidate English language proficiency (ELP) and computer ability. Because Aptis is delivered on paper and on the computer, performance on Aptis writing tasks can be influenced by *both* the delivery mode *and* the computer skills required to write on the computer. L2 test performance is expected to vary solely as a function of candidates' L2 abilities. Consequently, variance in test performance due to delivery mode and/or candidate's lack of computer ability, rather than lack of English language proficiency, is construct-irrelevant (Wolfe & Manalo, 2005). Delivery mode effects weaken claims about form equivalence, while the effects of computer ability undermine the validity of score-based inferences about candidate writing ability.

Consequently, this study aimed not only to describe the cognitive processes engaged by Aptis Writing Task 4, but also to compare them across delivery modes, tasks and candidates with different levels of English language proficiency and computer ability. The following section reviews relevant research on the effects of the four variables (delivery mode, L2 proficiency, task, and computer ability) on L2 writing performance before describing the context, methods, and findings of the current study.

1.2 Previous research

1.2.1 Effects of L2 proficiency on L2 writing processes

There is ample evidence that writers with different levels of L2 proficiency differ considerably in terms of their writing processes (Barkaoui, 2015; Cohen, 1994; Cumming, 1989; Hall, 1991; Plakans, 2009; Raimes, 1987; Roca de Larios et al., 2008; Sasaki, 2000, 2002; Whalen & Ménard, 1995).

Raimes (1987), for example, found that high proficiency students engaged in more planning, rehearsing, rescanning, revising and editing than did less proficient students. Whalen and Ménard (1995) also found that L2 proficiency influenced the planning, evaluating and revising processes of L2 writers, while Roca de Larios et al. (2008) found that more proficient students devoted more time to planning, evaluating and revising their texts and less time to formulation. In a series of studies, Sasaki (2000, 2002) found that L2 proficiency influences L2 learners' writing processes significantly. For example, more proficient writers tend to spend more time planning before starting to write, to plan overall organisation in more detail, to write faster and more, to reread or refine their expressions more often, and to pause to think less frequently after making their global plans than did less proficient writers. Less proficient writers, in contrast, tended to make less detailed plans and to stop and plan what they were going to write every time they finished writing one semantically coherent chunk, suggesting that they were employing a "what next strategy". Additionally, as their L2 proficiency improved, students tended to do less local, online planning and more global, pre-writing planning and rereading of their texts (Sasaki, 2002).

In a recent study on the effects of English language proficiency and computer skills on the scores and writing processes of candidates when responding to TOEFL-iBT writing tasks on the computer, Barkaoui (2014, 2015) found that overall English language proficiency contributed substantially to variance in writing scores and that candidates with different levels of English language proficiency differed significantly in terms of the writing processes they employed. Overall, the findings suggested that responding to the writing tasks went more smoothly for the more proficient candidates who faced fewer writing difficulties, and often were able to address the difficulties they encountered.

One explanation for these findings is that low L2 proficiency can impose additional constraints on writers' writing processes in L2 (Broekkamp & van den Bergh, 1996; Chenoweth & Hayes, 2001; Whalen & Ménard, 1995). As Whalen and Ménard (1995) explained, low L2 proficiency can lead to more attention to the linguistic aspects of the text, which can impede attention to other textual aspects, idea generation and higher-level processing.

1.2.2 Effects of delivery mode on L2 writing processes

Since the early 1980s, several studies have examined the impact of the computer on L1 and L2 learners' writing processes and text quality, mostly in non-test settings. Shaw (2005) identified three main patterns in the findings of this line of research (cf. Lee, 2002; Pennington, 1996; Slattery & Kowalski, 1998). First, the findings are mixed, with some studies finding negative effects, others finding positive effects, and still others finding no effects of the computer on learners' writing processes or texts. Second, the computer seems to have different effects on L2 writers than on L1 writers. Finally, because most of this research has focused on the use of computers for teaching and learning purposes, their findings might have limited generalisability to assessment contexts. In particular, most of these studies aimed to improve the participants' writing performance and, as a result, allowed them more time and to use various writing and editing tools (e.g., spelling and grammar checkers, thesauruses), which are likely to influence learners' writing processes and texts, but are not usually available to candidates in computer-based (CB) writing tests.

Most studies that have examined the effects of the computer on writing test performance focused on comparing candidates' writing scores when writing on paper and on the computer (e.g., Blackhurst, 2005; Breland et al., 2004; Horkay et al., 2006; Green & Maycock, 2004; Russell & Haney, 1997; Weir, O'Sullivan & Jin, 2007; Wolfe & Manalo, 2005). The main question these studies aimed to answer was whether candidates' performance on CB tests reflected the same ability as that measured by paper-based (PB) tests which are assumed to be equivalent (Chapelle & Douglas, 2006). Shaw (2005) and Wolfe and Manalo (2005) provide detailed reviews of this research. One major finding emerging from these reviews is that, while theory suggests there are important differences between writing by hand and on the computer (e.g., Pennington, 1993), empirical research shows mixed findings concerning mode effects on candidates' test performance.

In a study comparing scores assigned to PB and CB TOEFL essays, Breland, Lee and Muraki (2004) found that although there was little observed difference in mean scores, when candidates were matched on English language ability, small differences were observed in effect sizes consistently favouring the PB test. Wolfe and Manalo (2005) examined whether the choice of writing mode has any effect on TOEFL writing scores for subgroups of TOEFL candidates. They found that various candidate demographic characteristics (e.g., gender, L1 script, L2 proficiency) influenced the likelihood that a candidate chooses one writing mode (PB vs. CB) over the other. Additionally, there was no difference between essay scores of candidates who chose to handwrite or word-process their essays. However, candidates with lower multiple-choice scores tended to have higher scores on the PB writing test than on the CB writing test, while candidates with higher multiple-choice scores tended to have similar scores in both modes.

Three studies have compared candidates' scores on CB and PB versions of the IELTS writing section. Green and Maycock (2004) found that candidates performed marginally better on the PB version than they did on the CB version, while Blackhurst (2005) and Weir, O'Sullivan and Jin (2007) found no significant differences across writing modes. Blackhurst, consequently, argued that the two versions of IELTS can be used interchangeably and that candidates, given adequate computer skills, will perform equally well on either version of the test.

Another set of studies has examined the effects of writing mode on the characteristics of candidates' texts. Wolfe et al. (1996), for example, found that CB essays were generally neater, longer, had a more formal tone, and a weaker voice than PB essays written by the same students, while Russell and Haney (1997) found that students who wrote their essays on the computer tended to write almost twice as much and were more apt to organise their responses into more paragraphs than those who wrote on paper. Chambers (2008) also found that texts produced in both modes showed differences in terms of lexical variation, number of sentences and paragraphs, and nature of lexical errors. Finally, Whithaus et al. (2008) found that the quality of writing and the types of errors produced by candidates varied in minor, but potentially significant, ways between keyboarded and handwritten essays.

Few studies aimed to determine to what extent the cognitive processing involved in responding to both CB and PB writing tasks is similar (e.g., Baker & Kinzer, 1998; Haas, 1989; Lee, 2002; Li, 2006; Van Waes & Schellens, 2003; Weir et al., 2007). Haas (1989), for example, compared the amounts and types of planning that experienced and novice L1 writers reported in their think-aloud protocols when writing on paper and on the computer. She found that there was significantly less planning, less planning before beginning to write, less conceptual or high-level planning, and more local or sequential planning when the participants wrote on the computer than when they wrote on paper. Hass explained that, when writing on the computer, writers may begin to write sooner and plan as they write more frequently because making changes is easier on the computer. Baker and Kinzer (1998) found that when students wrote on paper, the writing process was more linear, whereas when they wrote on the computer, the process of producing and revising text was more integrated. Specifically, when writing on paper, the students generally brainstormed, outlined their ideas, wrote a draft, revised the draft, produced a second draft, and then proof read the draft before producing the final version. When writing on computers, they appeared to critically examine and edit their text as ideas flowed from their mind to written form, rather than waiting until an entire draft of the text was produced before beginning the revision process.

Similarly, Van Waes and Schellens (2003) found that writing on the computer led to a more fragmented and recursive writing process than writing on paper. When writing on the computer, writers spent more time on the first draft and less on finalising the text, pursued a more fragmentary writing process, tended to revise more extensively at the beginning of the writing process and to revise in smaller units throughout the writing process, attended more to lower linguistic levels (letter, word) and formal properties of the text, and did not normally undertake any systematic revision of their work before finishing than they did when writing on paper. When writing on paper, writers tended to plan their text mentally, evaluate and revise it in advance, and only proceed to write it down after these phases have been completed. Van Waes and Schellens concluded that their findings indicate that "writing with the computer calls for a different distribution of conceptual planning effort in the writing process: rather than being concentrated at the beginning, it is spread more evenly over the writing process as a whole" (p. 849). Collier and Werier (1995), in contrast, found few differences in the writing processes of good writers across writing modes. They argued that "good writers are good writers no matter how they write – their processes and their products are only minimally tied to the mode of text production" (p. 56).

In L2 writing, Lee (2002) found that some L2 writers employed different processes and focused on different aspects of writing across writing modes. For example, while composing behaviours and strategies were generally similar across modes, the participants tended to compose their essays on the computer in a rough form first, then go back and expand it by adding sentences and paragraphs, which is impossible on paper. Additionally, the participants paused longer when writing on the computer, suggesting that they planned more with this mode. Lee concluded that the writing medium is likely to influence the composing process and that "the constructs measured in computer and paper modes are not the same" (p. 152). Li (2006) found that the computer led L2 writers to pre-plan less and to revise their texts more frequently at lower and higher levels than when writing on paper. The computer also seems to have helped the writers produce better texts and, as a result, receive higher scores. In contrast, using a theory-based questionnaire of writing processes, Weir, et al. (2007) found no significant differences in terms of scores and cognitive processes across writing modes.

Finally, several studies have examined the effects of the computer on writers' revision behaviours. The findings of these studies are mixed, with some studies indicating that the computer encourages writers to make more revisions than when writing on paper, while others finding no effects or negative effects on writers' revision behaviours (e.g., more cosmetic and low-level revisions with the computer) (Barkaoui, 2016; New, 1999; van Waes & Schellens, 2003).

There are several reasons for the mixed findings of previous studies concerning the effects of writing mode, including variation across studies in terms of participants' L2 proficiency and computer skills, task requirements, research contexts and procedures, variable definitions and measures, participants' motivation and attitudes to writing mode, and test administration conditions (e.g., timing, editing functions available to candidates) (Chambers, 2008; Lee, 2004; Pennington, 1993; Shaw, 2005). Another explanation may be the rapid changes in the availability of and access to computers, as well as familiarity with technology over the time period within which the studies above were conducted (the 1980s to the present). These rapid changes, particularly in the last two decades, make early research findings less relevant to current students.

Another limitation of previous studies on the effects of the computer on writing performance is that many did not consider writers' familiarity and experience with the computer, although there is evidence that the effects of the computer on writing performance depend on the writer's computer experience. For instance, it seems that candidates with high levels of computer experience receive higher scores on word-processed essays, while candidates with lower levels of computer experience receive higher scores on handwritten essays (Wolfe & Manalo, 2005).

The following section reviews research on the effects of computer ability on performance on CB writing tasks.

1.2.3 Effects of computer ability on L2 writing processes

A few studies have examined the relationship between computer ability and writing processes. In L1 writing, Wolfe et al. (1996) found that, while the writing mode did not make a difference for students with mid to high levels of experience writing with computers, students with low level of comfort and experience with computers scored almost one point lower and produced shorter essays and more simple sentences on the CB version than on the PB version of a writing test. Wolfe et al. explained that for students with low computer skills, writing on the computer seems to add "a physical and cognitive burden that interferes with [their] writing and cognitive processes" (p. 141). Alves et al. (2007) found that slow and fast typists employed different strategies when writing on the computer and that slow typists tended to produce shorter texts. Because they could not think and type at the same time, slow typists might be using a serial way of composing, whereby they devote pauses to high-level writing processes such as planning and revising, and execution periods to typing.

In a study comparing the revision processes of four advanced L2 writers when writing on computer and on paper, Phinney and Khouri (1993) found that experience with the computer was a stronger factor than writing proficiency in determining students' writing strategies. The less experienced computer users spent less time revising, made more surface changes, and used the computer functions less frequently than did the experienced computer users. The experienced users showed a greater concern for the content than did the less experienced users, who indicated apprehension about using the computer and were concerned with correctness. Writers with lower computer familiarity seemed to see the computer as a high-tech typewriter "good for producing a clean copy and making corrections, but they did not take advantage of its capabilities for extensive revision" (p. 270). Writers with more experience, in contrast, used the computer more effectively to revise their texts.

Barkaoui (2014) found that, compared to overall English language proficiency, computer skills had a significant, but weak, effect on scores on the TOEFL-iBT independent task, but not the integrated task. Barkaoui (2015) found that computer ability did not have a significant effect on the writing processes of candidates when responding to TOEFL-iBT writing tasks on the computer, but, there was an interaction effect of computer ability with task type. Specifically, candidates with low computer skills experienced significantly more writing difficulties with the independent task than they did with the integrated task, while candidates with high computer skills reported significantly more evaluating and revising activities with the independent task than they did with the integrated task. Overall, though small, the effects of computer skills were more apparent with the independent task which seemed to be more demanding than the integrated task as it required candidates not only to type their responses, but also to generate, plan, organise, and revise their own content and language. Consequently, participants with low computer skills experienced more writing difficulties, particularly in relation to finding ideas, and needed to use more writing strategies with the independent task, compared to both the integrated task and to participants with high computer skills.

As Barkaoui (2015) explained, cognitive models of writing (e.g., Fayol, 1999; Kellogg, 1996; McCutchen, 1996, 2000; Torrance & Galbraith, 2006) provide an explanation of how and why delivery mode and computer ability can affect writing performance. As Field's (2004) model of writing above shows, writing is a complex activity that requires the coordination of a variety of different cognitive processes that can compete for cognitive resources that are limited. With increasing demand by some processes, performance based on other processes, which rely on the same cognitive resources, may suffer. From this perspective, if low-level skills such as keyboarding and spelling are automated, they will not require any attentional resources and, consequently, will not constrain or influence the writing process and its outcomes. However, poor keyboarding skills may force writers to focus their attention and cognitive resources on motor activities (i.e., typing), which can inhibit attention to other processes and aspects of writing (e.g., planning, revising) (Alves et al., 2007).

Additionally, there is evidence that when instructed to write using an unfamiliar method (e.g., typing, writing in capital letters), L1 writers tend to pause more frequently and to write more slowly, indicating a trade-off between the formulation and execution systems (Olive & Kellog, 2002). These effects might be magnified for L2 writers with low computer ability when writing on the computer under test conditions (Wolfe & Manalo, 2005). As Wolfe and Manalo (2005) explained using a translation metaphor, L2 writers need to translate thought from their L1 to L2 and then from the L2 version of the thought into keyboard presses so that the words appear on the computer monitor. "The first translation is more difficult for examinees who have poorer [L2] skills, while the second translation is more difficult for examinees who have poorer computer skills" (p. 49).

One limitation of previous studies on the effects of writing mode and computer skills on writing performance is that they define and measure computer use and skills in different ways (Kirsch et al., 1998). Additionally, some studies defined computer skills broadly to include some aspects that are not relevant to performance on CB writing tests, such as knowledge of hardware and computer programming skills. A major limitation of previous research, however, is that most studies relied on self-report data, in the form of questionnaires and/or interview responses, as measures of computer use, familiarity and/or skills. However, perceived computer ability may be very different from actual ability. For example, in a study that compared self-report and objective measures of computer literacy among entry-level undergraduate accounting students, McCourt Larres et al. (2003) found significant differences in the students' perceived and actual computer literacy, with the vast majority overestimating their computer knowledge. McCourt Larres et al. concluded that self-assessment should be used as an adjunct to a more robust measure of computer skills.

Several other authors have recently argued that computer skills should be measured more directly such as via individual tests of typing speed and accuracy and editing skills (e.g., Burke & Cizek, 2006; Connelly et al., 2007; Horkay et al., 2006). As Horkay et al. (2006) have argued, typing speed and accuracy are needed to ensure that a complete and accurate response can be entered before the testing time elapses, while editing skills can help the writer to revise his/her text more effectively and quickly (p. 32). Direct measures of keyboarding skills, however, should be supplemented with measures of other aspects of computer use such as computer attitudes and anxiety (Burke & Cizek, 2006; Fulcher, 1999; McDonald, 2002; Weir et al., 2007; Wolfe & Manalo, 2005). McDonald (2002) emphasised that computer skill is multifaceted since it includes computer experience (i.e., the extent to which candidates have experience of using computers), computer anxiety (i.e., the fear experienced when interacting, or anticipating an interaction, with a computer), and computer attitudes. As Wolfe et al. (1996) noted, "a student might have high typing speed and yet feel completely ill-at-ease when asked to brainstorm, write, or revise on the computer" (p. 139). Consequently, the current study used three measures of computer ability: typing skills, computer familiarity, and computer attitudes and aversion (see below).

1.2.4 Effects of task requirements on L2 writing processes

Previous research shows that task factors, such as topic/subject, rhetorical context (i.e., audience and purpose), discourse mode (e.g., argumentative, narrative), genre (e.g., letter, essay), and input materials (e.g., reading), affect the processes that L2 learners employ when writing in L2 (e.g., Clachar, 1999; Cumming, 1989; Raimes, 1987; Roca De Larios et al., 2002). Comparing the performance of L2 students writing on a narrative task with clear audience and purpose and a standard argumentative task with no specific audience or purpose, Raimes (1987) found that the narrative task led to more planning, rehearsing, revising, and editing. The argumentative task, in contrast, elicited more rescanning and rereading of the assignment, which Raimes attributed to the difficulty of the task. The students, however, addressed the teacher as their audience in both essays.

Cumming (1989) also reported a significant effect of task mode and rhetorical requirements on the level of attention his 23 ESL Francophone participants paid to different aspects of writing (e.g., language, gist, discourse) and the range and type of problem-solving behaviours they used while composing in English. Cumming found that the more cognitively demanding tasks (an argumentative essay and a summary of a popular science booklet) elicited greater attention to the different aspects of writing and significantly more heuristic search strategies than did the less demanding task (an informal descriptive letter). Finally, Clachar (1999) showed how the degree of emotional involvement elicited by the prompt impacts writers' composing processes. Clachar found that emotional topics motivated L2 students to focus on the lower, lexicomorphosyntactic level of discourse processing in order to represent their intended meaning accurately and faithfully, while the non-emotional topics led students to focus on the elaboration of higher order goals and to allocate more attention to audience and text structure. As a result, the essays on the emotional topics in her study had fewer syntactic, morphological, and lexical errors than the non-emotional topics.

One distinguishing characteristic of Aptis Writing Task 4 is that it requires candidates to write two texts addressed to two different audiences (see below). As Grabe and Kaplan (1996) emphasised, "audience is essential to the creation of text and the generation of meaning" (p. 207). They also noted that variation in audience characteristics can influence the production of written text. As Nelson (1990) argued, writers' repertoires of writing strategies interact with their mental representations of the rhetorical purposes and audience expectations to shape their writing processes. Grabe and Kaplan (1996, pp. 207–208) identified five audience parameters that can influence the production of written text: (a) the number of persons who are expected to read the text; (b) the extent to which readers are known or unknown; (c) the status of the reader relative to the writer (high, equal, or low status); (d) the extent of shared background knowledge between the reader and the writer; and (e) the extent of shared specific topical knowledge between the reader and the writer. These parameters can affect the writing process and outcome. For example, the degree of familiarity can affect "the extent of interactional and involvement features which appear in the writing", while the extent of shared specific topical knowledge can affect "the extent and choice of detail, the need for defining ideas and assumptions, the use of common versus specialist terms, etc." (p. 208).

However, there is little to no research on the effects of audience parameters on L2 writing processes and products. In their synthesis of research on L2 writing processes, Leki et al. (2008) identified only a few studies that considered this question. These studies indicate that: (a) L2 writers have varying degrees of awareness of audience; (b) skilled writers tend to have better audience awareness and to make more reference to audience in terms of modifying their content and presenting stronger or weaker opinions, depending on the target reader, than unskilled writers; (c) perception of audience seems to determine purpose of text; and (d) audience seems to affect the writing strategies used by L2 writers such as taking fewer risks when writing to the teacher and more risks when writing for self (pp. 130–131).

Examination of writing processes prompted by different tasks can help determine whether these tasks tap the same construct (Barkaoui et al., 2013; Lee & Kantor, 2005). Such research also allows the examination of the effects of task factors, such as audience and purpose, on candidate performance. For example, Shaw and Weir (2007) noted that the purpose of the task can affect macro-planning and monitoring and that if the purpose of the task is not clear to the candidate, performance will suffer.

2. THE PRESENT STUDY

As noted above, this study aimed to describe the cognitive processes prompted by Aptis Writing Task 4 and to examine whether and to what extent these processes vary across delivery modes, task parts, and candidates with different levels of English language proficiency (ELP) and computer ability. The study addressed the following research questions:

1. What cognitive processes do candidates engage in when responding to Aptis Writing Task 4?
2. To what extent and how do these processes vary across Parts A and B of Aptis Writing Task 4?
3. To what extent and how do these processes vary across delivery modes?
4. To what extent and how do these processes vary depending on candidate English language proficiency (ELP) and computer ability?

2.1 Participants

To recruit participants for the study, flyers were distributed to two groups of students: (a) international students admitted to an English-medium university in southern Ontario; and (b) students enrolled in a pre-admission ESL program at the same university to invite them to participate in the study. More than 70 students expressed interest in participating in the study. Each student was asked to complete online questionnaires about their backgrounds and computer familiarity and two online typing tests (see below). Based on the results of the questionnaires and the typing tests, 19 students were selected to participate in the study. However, only 16 students provided complete data.

The 16 participants belonged to four groups as follows: (a) high English language proficiency (ELP) and high computer ability; (b) high ELP and low computer ability; (c) low ELP and low computer ability; and (d) low ELP and high computer ability (see Table 1). The high ELP groups included post-admissions students in their first or second year of university study. The low ELP groups included students who were enrolled in low- to high-intermediate ESL classes.

Computer ability was determined based on the results of the two typing tests (see below). The low computer ability groups included students with average net typing speed (that is, typing speed adjusted for typing accuracy) of 30 WPM (words per minute) or less, while the high computer ability groups included students with average net typing speed of 40 WPM or more.

	Computer ability level	
English Language Proficiency (ELP)	**Low (30WPM or less)**	**High (40WPM or more)**
Low ELP	4	4
High EL	4	4

Table 1: Number and distribution of participants

Participants were assigned codes that consist of two letters and a number and that reflect their ELP and computer ability level as follows. The first letter in each code refers to the participant's English language proficiency level (H= high, L= low), while the second letter refers to their computer ability level (H= high, L= low). A number from 1 to 4 was assigned to each participant in each group. For example, HL2 is participant 2 in the group with high ELP and low computer ability, while LH3 is participant 3 in the group with low ELP and high computer ability.

Table 2 provides the following information for each participant: gender, L1, age, program of study, whether s/he took an English proficiency test recently, name of proficiency test, date of proficiency test, and total score on English proficiency test. About two thirds of the participants (n=10) were males. They spoke 9 different first languages including Chinese, Mandarin or Cantonese (n= 6), Farsi (n= 3), and Spanish (n= 2). Their ages ranged between 18 and 26 years (*M*= 20.7, *SD*= 2.6). The majority (n=14) was in Canada for one year or less at the time of data collection. All the participants in the high ELP group were undergraduate students from various departments. Less than half the participants (n=7) reported that they had taken a writing test on the computer before.

Participant	Gender	L1	Age	Program of study	English proficiency test taken			Months in Canada
					Test	Date	Score	
High ELP, High computer ability								
HH1	M	Farsi	21	Physics	IELTS	Jun-11	6.5	36
HH2	F	Farsi	18	Biomedical science	TOEFL	May-13	101	4
HH3	M	Hindi	18	Engineering	IELTS	Jun-14	8	3
HH4	M	Cantonese	18	Computer science	TOEFL	Mar-13	100	12
High ELP, Low computer ability								
HL1	F	Farsi	25	Environmental studies	IELTS	Jul-14	6.5	24
HL2	M	Bengali	20	Administrative Studies	IELTS	Nov-13	7.5	9
HL3	M	Tamil	19	Economics	IELTS	Apr-14	6	3
HL4	M	Chinese	21	Human Resources Management	IELTS	Jan-14	6	4
Low ELP, High computer ability								
LH1	F	Spanish	19	ESL course	No			2
LH2	M	Italian	23	ESL course	No			2
LH3	M	Vietnamese	18	ESL course	No			12
LH4	F	Spanish	26	ESL course	No			12
Low ELP, Low computer ability								
LL1	M	Mandarin	24	ESL course	TOEFL	Jun-14	65	12
LL2	M	Chinese	18	ESL course	IELTS	May-13	4.5	4
LL3	F	Cantonese	21	ESL course	TOEFL	May-14	4.5	12
LL4	F	Chinese	22	ESL course	No			8

Table 2: Participants' demographics

2.2 Data collection

2.2.1 Data collection tools

The following tools were used for data collection.

2.2.1.1 Background and computer familiarity questionnaires

Volunteers who responded to the call for participants were asked to complete two online questionnaires about (a) their backgrounds (e.g., age, L1) and (b) computer familiarity and use (see Appendices A and B). The computer familiarity questionnaire, adopted from Stricker, Wilder and Rock (2004), consisted of 12 items concerning frequency of computer access and use (cf. Eignor et al., 1998; Russell, 1999; Taylor et al., 1999; Wolfe et al., 1996).

2.2.1.2 Online keyboarding skill tests

Volunteers who responded to the call for participants were asked to perform two 2-minute online keyboarding tests to assess their keyboarding speed and accuracy in English. Each typing test consisted of typing a 200-word passage, presented at the upper half of the computer screen, into a blank text box located at the lower half of the screen (www.assesstyping.com). Participants were instructed to type each text as quickly and as accurately as possible within two minutes. Participants did not have access to any editing functions when typing the texts, but they were instructed to do a practice test before doing the actual typing tests. The online test provided three measures of keyboarding skills:

- *Gross typing speed* is calculated by dividing the total number of keystrokes (i.e., characters, spaces and punctuation marks) by test duration (2 minutes) to obtain gross speed in keystrokes per minute (KPM). Gross speed in KPM is then divided by the standard word length (5 keystrokes/word) to get typing speed in words per minute (WPM; i.e., 5 KPM = 1 WPM). This measure is not adjusted for typing errors.
- *Net typing speed* is typing speed adjusted for typing accuracy. It is computed by (a) subtracting the number of incorrect words x word length (i.e., 5) from the total number of keystrokes to get the total net keystrokes for the whole test duration, and then (b) dividing the total net keystrokes by the test duration to get the net typing speed in KPM. This is then divided by the standard word length (i.e., 5 keystrokes) to obtain net typing speed in WPM.
- *Accuracy percentage* is calculated by computing the rate of net keystrokes to gross keystrokes. Five keystrokes are deducted for each mistyped word, regardless of the number of mistakes in it. The error penalty is the number of words typed incorrectly times the word length (i.e., 5). For example, 10 incorrectly typed words result in an error penalty of 50. An accuracy percentage of 75% means that three quarters of the words (that the student typed in two minutes) were typed correctly.

Based on the results of a large scale study (N = 15,000 candidates), TypingMaster.com recommends the use of a net typing speed of 40 WPM and an Accuracy Percentage of 95% as a cut-off score, with everyone typing above these cut scores being considered to have high typing speed and everyone below these cut scores being considered to have low typing speed. Following this recommendation, two cut scores were set for this study. First, to be classified into the high computer ability group, a student had to achieve a net typing speed (i.e., typing speed adjusted for typing accuracy) of 40 WPM or more. In order to distinguish computer ability groups, a decision was made to include in the low computer ability group only those volunteers with a net typing speed that was one *SD* below the cut score for the high skills group. Consequently, only volunteers with net typing speed of 30 WPM (i.e., 40 WPM – *SD* 10) or less were included in the low computer ability group (cf. Barkaoui, 2014, 2015).

2.2.1.3 Aptis Writing Task 4

Two different forms of Aptis Writing Task 4 were included in the study. Aptis is an English assessment system to assess the English language levels of adults (16+) from A1 to C on the Common European Framework of Reference for Languages (CEFR). Aptis consists of four sections: speaking, listening, reading and writing. The writing section includes four writing tasks; all tasks are related to the same purpose/activity, setting and topic, but they increase in complexity and length from single-word responses (Task 1) to multi-paragraph responses (Task 4). Task 1 involves completing a form by filling in some basic personal information in the form of single words (e.g., name, birthdate). Task 2 involves writing a short response (using sentence-level writing) to a question about personal information on the same form as Task 1. Task 3 involves responding to three separate questions, with each response requiring a short paragraph-level response. The questions in Task 3 are presented as if the candidate is writing on an internet forum or a social network site.

Aptis Writing Task 4 involves writing two emails in response to a short notice connected to the same setting used in Tasks 1, 2 and 3. The task consists of a short notice of 50 to 80 words that provides the background setting for the task (see Figure 1, e.g., *You are a member of a travel club. You receive this email from the club*) and presents a problem/issue/offer/opportunity which the candidate is expected to discuss in two different email responses, Part A and Part B, with the same purposes/functions (e.g., complaining, suggesting alternatives, giving advice), but different intended readers (e.g., friend vs. club secretary).

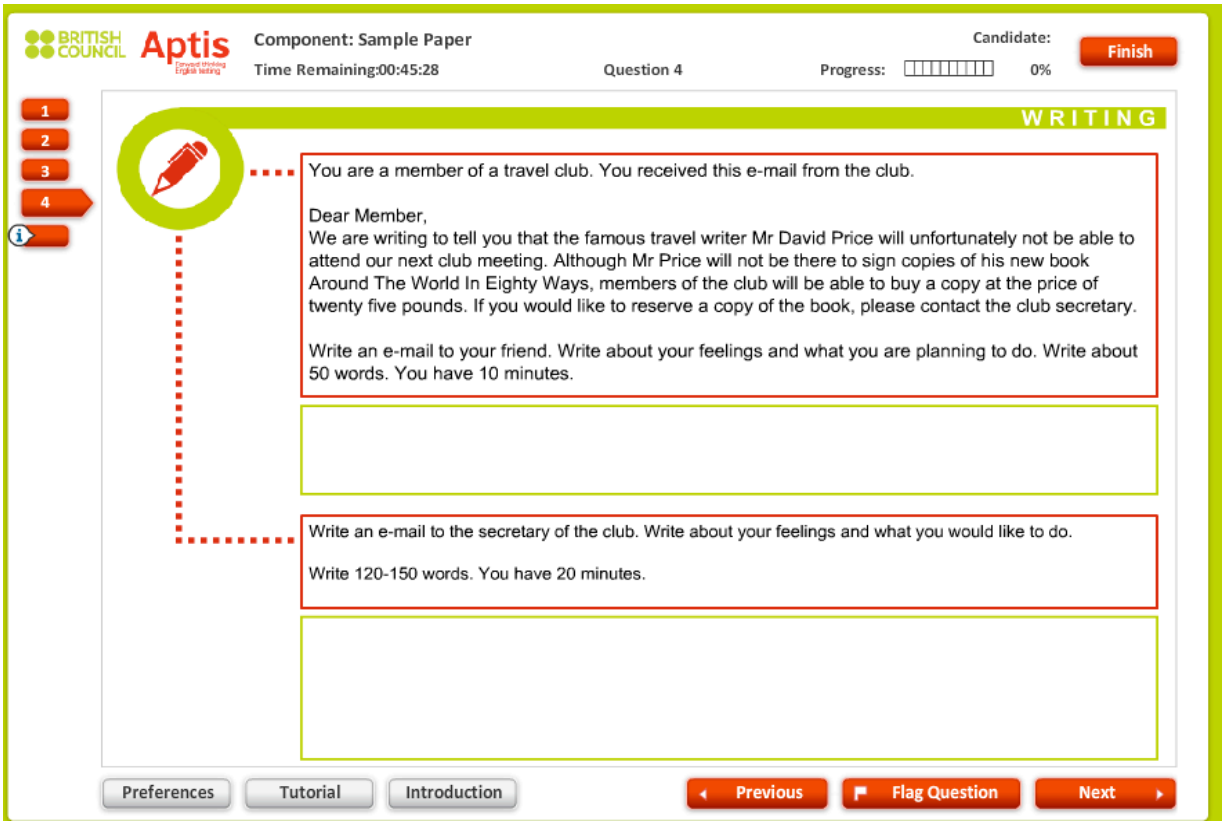

Figure 1: Screenshot of the practice version of Aptis Writing Task 4

In Part A, the candidate is to write an informal email (about 50 words) to a known reader (e.g., friend, colleague) regarding the information in the task prompt (e.g., *Write an email to your friend about your feelings and what you plan to do*). In Part B, the candidate is to write a formal email (120–150 words) to an unknown reader connected to the prompt (e.g., manager, customer services) (e.g., *Write an email to the secretary of the club. Write about your feelings and what you would like to do*).

The candidate has 30 minutes to respond to both parts of the task. Although no time limit is set for each part, the instructions recommend allocating 10 minutes for Part A and 20 minutes for Part B. Candidates are expected to use formal and informal register appropriately and a variety of language functions (e.g., expressing opinions, giving reasons and justifications, expressing certainty/probability/doubt, expressing reaction, complaining, expressing agreement/disagreement, suggesting).

Responses to both parts of Task 4 are evaluated holistically on a task-specific 7-point (0–6) rating scale (corresponding to levels A1 to C2 on CEFR) in terms of five main criteria: task fulfilment and register, grammatical range and accuracy, lexical range and accuracy, cohesion and coherence, and punctuation and spelling. A B2-level performance is required to achieve score bands 3–4. A score of 5 or 6 is awarded for performances beyond B2 level, with a 5 describing performance equivalent to a C1 level, and 6 for performances at a C2 level. Figure 1 above shows a screenshot of the practice version of Task 4 (see https://www.britishcouncil.org/aptis-practice-tests/AptisWritingPractice/).

Two forms of Aptis Writing Task 4 were included in the study. One form was administered on paper and one on the computer. Task forms were selected and assigned to each delivery mode and each participant randomly. A computer program was developed to administer the tasks on the computer. The program allowed students only 30 minutes to complete the task and gave them access only to those editing functions that are allowed in Aptis (e.g., cut, paste, copy).

2.2.1.4 Smartpen and screen-recording program

A Livescribe Echo Smartpen was used to unobtrusively record a video of the paper-based writing session for each participant. A smartpen is a high-tech writing tool that digitally records everything a user writes on special paper. A screen-recording program (BB FlashBack Express 5 Recorder, http://www.bbsoftware.co.uk/BBFlashBack_FreePlayer.aspx) unobtrusively recorded a video of the computer-based writing session for each participant.

2.2.1.5 Stimulated recalls

To collect information on the participants' cognitive processes while completing each writing task, each participant provided a stimulated recall of their writing sessions. This involved watching a playback of their writing session (from the smartpen or the screen-recording program) immediately after completing each writing session, and describing what they were thinking before, while, and after completing each task (e.g., during pauses, reasons for revisions). Most studies examining L2 writing processes tend to use concurrent think-aloud protocols (e.g., Cumming, 1989; Raimes, 1987; Roca de Larios et al., 1999, 2008). While this method can provide significant insights into the aspects of writing that writers attend to and the strategies and processes they employ when responding to writing tasks, it has its limitations. In particular, think-aloud protocols are difficult to administer and can alter the process being observed and/or its outcomes (Sasaki, 2000; Smagorinsky, 1994; Stratman & Hamp-Lyons, 1994). Think aloud protocols are difficult to administer because participants are often not used to verbalising their internal thoughts while completing a writing task (Smagorinsky, 1994). L2 learners, in particular, may find it difficult to think aloud while writing in their L2, particularly if they have to think aloud in L2 too (Bosher, 1998; Sasaki, 2000).

Stimulated recalls provide an alternative to concurrent think-aloud protocols (Bosher, 1998; Sasaki, 2000). Stimulated recalls ask participants to verbalise their internal thoughts after, rather than while, completing a writing task. Stimulated recalls are based on the assumption that replaying the writing session will stimulate recall of mental processes that occurred during writing (Bosher, 1998).

Because they take place after the writing task is completed, stimulated recalls do not interfere with the writing process, they allow the researcher to ask follow-up questions about the writing process, and may be easier for L2 learners, particularly if they have to verbalise their thoughts in L2 (Bosher, 1998; Sasaki, 2000). But, unlike interviews, which often provide generalised statements about processes, stimulated recalls allow the researcher to inspect specific occurrences of writing processes and strategies. Stimulated recalls have their limitations, however. For example, they can elicit only what the writer can recall or what s/he thinks s/he were thinking about at the point of time in question, but what the writer recalls may not be a faithful reproduction of what s/he was thinking about at that particular moment (Sasaki, 2000). Section 2.2.2 describes the stimulated recall instructions and procedures used in this study.

2.2.1.6 Follow-up Interview

At the end of the study, each participant was briefly interviewed about his/her perceptions of Aptis Writing Task 4, the writing modes, and stimulated recalls. See Appendix E for a copy of the follow-up interview questions.

2.2.1.7 Computer-attitudes questionnaire

An online questionnaire was administered to the participants to collect information on their computer attitudes and aversion (see Appendix C). The questionnaire included 10 questions about computer aversion and 10 questions about computer attitudes, adopted from Schulenberg and Melton's (2008) Computer Aversion, Attitudes and Familiarity Index (CAAFI). Schulenberg and Melton provide empirical evidence concerning the psychometric properties of the two scales in CAAFI, including factor structure and internal-consistency reliability.

Table 3 displays descriptive statistics for all the measures of computer ability included in this study for each group. It shows that, on average, groups with higher computer ability had higher scores than those with lower computer ability on the typing tests, measures of computer familiarity, attitudes and aversion, as well as self-assessments of computer use, comfort and typing skills. Higher scores on the aversion scale indicate *less* computer aversion.

ELP	**Low**				**High**			
Computer ability	**Low**		**High**		**Low**		**High**	
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Average of 2 typing tests								
Net speed (WPM)	23.25	4.57	43.50	4.20	24.50	4.04	52.00	8.49
Accuracy (%)	94.25	2.06	95.00	2.71	84.00	12.03	95.75	3.30
Gross speed (WPM)	24.50	4.95	45.38	3.82	28.75	3.18	54.25	8.18
Computer familiarity	18.25	3.86	18.00	2.71	12.75	2.06	16.50	2.38
Computer attitudes	13.50	5.07	18.75	6.08	11.50	13.30	23.00	3.56
Computer aversion	14.50	1.00	19.25	9.39	17.75	10.31	23.00	8.04
Comfort writing on computer	2.50	.58	3.50	1.00	2.25	1.26	3.75	.50
Years writing on computer in English	2.75	.50	5.25	4.99	2.50	3.00	5.50	2.65
Self-assessment of typing skills in English (out of 5)	1.75	.50	3.00	.82	1.75	.96	3.25	.96

Table 3: Descriptive statistics for measures of computer ability by group

2.2.2 Data collection procedures

At the beginning of the study, recruitment emails and flyers were sent to international post-admission and pre-admission (ESL) students. Students who responded to the recruitment emails and flyers were instructed to complete the online background and computer familiarity questionnaires and two online typing tests. Only students with a net typing speed of 40WPM or higher and those with a net typing speed of 30WPM or lower were invited to participate in the main study. To counterbalance the order of delivery mode and task forms, half the participants were randomly assigned to start with the paper-based version first and the other half to start with the computer-based version first, with half responding to form 1 of the task first and the other half responding to form 2 first.

Each participant met with the researchers twice. In the first session, the participant completed an Informed Consent Form and then received training on stimulated recall. Each participant was met individually in a quiet office to do the training, respond to the writing task, and provide stimulated recalls. During the training session, the participant first responded to a short writing task (10 minutes) on a general topic on paper (using a smartpen) or on the computer. Next, the participant was provided with written and oral instructions and explanations on how to perform the stimulated recall task (see Appendix D). The participant was instructed to watch the video of the writing session and say aloud what s/he was thinking at the time of the writing and to talk freely about his/her thoughts and actions as his/her text appears on the screen (see Appendix D for stimulated recall instructions). The participant then watched the recording of their writing session on the computer and described what s/he was thinking while completing the writing task. The participant was allowed to self-initiate replays, choose segments to comment on, and stop the replay if s/he needed time to talk about a specific writing event; the researcher prompted talk when necessary. Following Lindgren (2005), only open prompts were used, such as 'What are you doing now?' referring to a long pause or a revision in the text; or 'Can you talk about that revision?' If the participant could not recall the item at once, no further questions were asked (cf. Lindgren, 2005; see Appendix D). When it was felt that the student understood how to perform the stimulated recall task, the student took a short break.

Next, the participant responded to one randomly selected form of Aptis Writing Task 4 (both parts) either on paper or on the computer (30 minutes). For the paper-based task, the participant used a smartpen to write (and record their writing process). For the computer-based task, the screen-recording program was used to record the writing process. Immediately after completing both parts of the task, the participant watched a playback of the writing session (from the smartpen or the screen-recording program) on the computer and provided stimulated recall (i.e., described what she/he was thinking while completing each part of the task). At the beginning of the stimulated recall, the participant was asked how she/he interpreted or understood the writing task and each part of the task. At the end of the stimulated recall, the participant was asked about his/her thoughts about the writing task, differences between the two parts of the task, his/her approach to the writing task, and to evaluate his/her responses to the task (see Appendix D). The stimulated recall was video-recorded and all the materials that participants used or produced (e.g., notes, drafts) were collected.

In the second session, the participant received training on stimulated recall (using a different short writing task); responded to both parts of the second form of Aptis Writing Task 4 on paper or on the computer (30 minutes); and watched a playback of the second writing session and provided stimulated recall. The stimulated recall was video-recorded and all the materials that participants used or produced were collected. The participant then responded to the follow-up interview and completed the online computer attitudes questionnaire. Each participant was paid for participating in the study. All the participants' responses were rated by a trained Aptis rater on the 7-point holistic rating scale for Aptis Writing Task 4.

2.3 Data coding and analyses

2.3.1 Coding of stimulated recalls

Thirty-two (32) stimulated recalls were collected in this study (16 participants x 2 tasks). These stimulated recalls varied in length between 38 minutes and 72 minutes. First, the video of each stimulated recall was divided into two parts corresponding to Part A and Part B of the task. Next, the video of the stimulated recall was directly coded using *NVivo*. A decision was made to code the video, rather than a transcript, of the stimulated recall to save time and because the video provides a richer context for interpreting and coding the stimulated recalls than a transcript since the coder could simultaneously hear what the participant was saying and watch what the participant was seeing during the stimulated recall session. Each stimulated recall was segmented into idea units, with each unit being assigned one or more codes according to the predominant writing processes reported (cf. Sasaki, 2000).

The coding scheme built mainly on Field's (2004) model of writing processes, coding schemes in the literature (Barkaoui, 2015; Berkenkotter, 1981; Cumming, 1989; Sasaki, 2000), and preliminary analyses of data from this study (see Figure 2). Starting with Field's (2004) model as the organising principle, a list of writing processes reported in the literature was compiled under each of the seven stages of Field's model. Because a key distinguishing feature of the two parts of Aptis Writing Task 4 concerns audience, a sub-category concerning audience was included under each main category based on studies and models of writing that highlight the role of the audience (e.g., Berkenkotter, 1981; Flower & Hayes, 1980). For example, a category called 'considering audience when organising' was included under Organisation. Furthermore, because participants reported encountering different kinds of writing difficulties when completing the writing tasks, a subcategory called 'difficulty' was included under each main category (e.g., 'difficulty micro-planning' under Micro-planning). Some of the participants also reported using problem-solving strategies to address these difficulties. Consequently, a subcategory called 'problem-solving strategy' was also included under each main category (e.g., 'execution problem-solving strategy' under Execution). Next, based on preliminary examinations of the current data, some subcategories were added and others combined or deleted because they were reported less frequently or were not reported at all by the participants in this study. The final coding scheme consisted of 45 subcategories under seven main categories as listed in Figure 2 (see Appendix H and below for definitions and examples of codes).

A research assistant (RA) was trained before coding all the stimulated recalls. To achieve acceptable levels of inter-coder agreement, several rounds of discussion, training, coding, and checking were conducted. A first version of the coding scheme was discussed and piloted on one stimulated recall by the RA and the author. This led to some modifications in terms of the number and descriptions of the codes. After finalising the coding scheme, the RA independently coded all the stimulated recalls using *NVivo*. The author then coded a randomly selected sample of three stimulated recalls to estimate inter-coder agreement. The overall inter-coder agreement was 79%.

Appendix H and Section 3 include excerpts from the stimulated recalls to illustrate the writing processes listed in Figure 2. The following transcription conventions are used in these excerpts:

( ): uncertain transcription; x: incomprehensible word; comma: short pause;
CAPITAL LETTERS: Words that the student has written, was thinking of writing, or read directly from his/her text; [ ]: Procedural and other behaviours; ?: Questioning intonation;
[TEXT]: Text read from task (not included here for test security reasons).

Each excerpt is followed by information about its source as follows: participant code, writing mode (PB or CB), and task part (A, B or Both).

1. Macro-planning
- Reading the task
- Task conceptualisation
- Analysing or constructing audience
- Analysing or constructing situation
- Goal setting
- Difficulty with macro-planning
- Macro-planning problem-solving strategy

2. Organisation
- Organising message
- Considering audience when organising
- Difficulty organising
- Organising problem-solving strategy

3. Micro-planning
- Local planning
- Generating and retrieving
- Considering audience when micro-planning
- Difficulty micro-planning
- Micro-planning problem-solving strategy

4. Translation
- Planning or choosing how to write
- Considering audience when translating
- Difficulty translating
- Translating problem-solving strategy

5. Execution
- Controlling
- Making notes
- Difficulty typing or handwriting
- Execution problem-solving strategy

6. Monitoring
- Reading to monitor
- Evaluating global text
- Evaluating local text
- Evaluating content
- Evaluating language/form
- Evaluating organisation/rhetoric
- Evaluating balance
- Evaluating text length
- Reaction to own writing
- Considering audience when monitoring
- Checking the time
- Difficulty monitoring
- Monitoring problem-solving strategy

7. Editing and revising
- Review decision
- Content revision
- Language/form revision
- Rhetoric/organisation revision
- Balance revision
- Typography or spelling revision
- Difficulty revising
- Revision problem-solving strategy

Figure 2: Coding scheme for stimulated recalls

2.3.2 Statistical analyses

Coded data were tallied and percentages of reported processes were computed for each candidate for each task as follows: counts of coded writing processes (e.g., micro-planning) were summed for each participant for each writing task and then divided by the total number of instances of the processes reported by that particular participant for that particular task to obtain a percentage of times that that code (i.e., micro-planning) occurred. These percentages served as the data for comparison across candidate groups, writing modes, and Parts A and B. Percentages, rather than absolute frequencies, were used because of the variability in the number and type of processes reported across participants and tasks. This variability makes comparisons of reported processes across individuals, groups, writing modes, and task parts problematic (cf. Barkaoui, 2015).

Because the sample was small ($N = 16$; $n = 4$ per group) and because of the presence of many zeroes in the data, non-parametric tests were used to address the research questions of the study. To address research question 1, descriptive statistics were examined. To compare processes across Parts A and B, Wilcoxon Signed-Rank Tests were computed with Part as the independent variable and percentage of reported processes as the dependent variables. Wilcoxon Signed-Rank Tests were also used to compare reported writing processes across writing modes. To compare candidate groups, Kolmogorov-Smirnov two-sample tests were conducted, with candidate group (e.g., ELP group) as the independent variable and percentage of reported processes as the dependent variables. Because non-parametric statistical tests rely on ranks, rather than the value of scores and percentages, the following descriptive statistics are reported below: mean (*M*), median (*Mdn*) and the minimum (or lowest, *Min*) and maximum (or highest, *Max*) values for each main category.

Additionally, following Field (2009), *r* is used as a measure of effect size. This coefficient is constrained to lie between 0 (*no effect*) and 1 (*maximum effect*). Following Cohen (1988), Field (2009) suggested the following guidelines for interpreting effect sizes: small effect: $r \geq .10$, medium effect: $r \geq .30$, and large effect: $r \geq .50$ (p. 57).

3. FINDINGS

This section reports the results of the various analyses described above. Section 3.1 reports results concerning time on task, text length and writing scores. Section 3.2 describes the cognitive processes engaged by Aptis Writing Task 4. The following sections present findings concerning variability in cognitive processes across task parts, writing modes, and candidate groups. Section 4 summarises the key findings in relation to each research question.

3.1 Time on task, scores and text length

Table 4 reports descriptive statistics for time on task (in minutes) across task parts, writing modes, and candidate groups. The participants had 30 minutes to complete both parts of each task, but the writing sessions varied in length between 9 and 30 minutes (*M*= 24 mins; *Mdn*= 25 minutes, *SD*= 5.7). Responding to Part A required less time, on average, (*M*= 9mins, *Mdn*=8) than responding to Part B (*M*=15 mins, *Mdn*= 15) with both writing modes and for all groups. On average, the participants spent almost the same amount of time writing when responding on paper (*M*= 23.75 mins; *Mdn*= 23.5 minutes) as they did when responding on the computer (*M*= 24.56 mins; *Mdn*= 25.5), although, as Table 4 shows, participants with higher computer skills tended to spend more time on task, on average, when writing on paper than they did when writing on the computer, while participants with low computer skills spent the same amount of time or slightly more time on task, on average, when writing on the computer than they did when writing on paper.

ELP	Comp. ability		Paper-based task			Computer-based task		
			Part A	Part B	Total	Part A	Part B	Total
Low	Low	M	10.75	16.25	27.00	10.00	17.25	27.25
		SD	3.30	4.99	3.83	3.46	3.86	3.40
	High	M	8.75	13.50	22.25	10.00	11.75	21.75
		SD	5.68	4.20	6.13	6.16	3.77	6.65
	Total	M	9.75	14.88	24.63	10.00	14.50	24.50
		SD	4.43	4.52	5.37	4.63	4.60	5.71
High	Low	M	7.75	11.75	19.50	8.75	16.75	25.50
		SD	3.50	6.24	8.35	2.36	4.50	3.70
	High	M	10.00	16.25	26.25	6.50	17.25	23.75
		SD	3.37	4.57	4.79	2.52	7.63	7.76
	Total	M	8.88	14.00	22.88	7.62	17.00	24.63
		SD	3.40	5.61	7.26	2.56	5.81	5.71
Total	Low	M	9.25	14.00	23.25	9.38	17.00	26.38
		SD	3.54	5.76	7.23	2.83	3.89	3.42
	High	M	9.38	14.87	24.25	8.25	14.50	22.75
		SD	4.37	4.32	5.52	4.74	6.30	6.78
	Total	M	9.31	14.44	23.75	8.81	15.75	24.56
		SD	3.84	4.94	6.23	3.82	5.22	5.51

Table 4: Descriptive statistics for time on task (minutes) by task part, writing mode and group

Table 5 reports descriptive statistics for response length (number of words) by task part, writing mode, and candidate group. Repeated-measures ANOVA indicated that there were significant effects for writing mode (F[1, 12]= 6.05, p<.05, $\dot{\eta}^2$= .34) and ELP (F[1, 12]= 6.02, p<.05, $\dot{\eta}^2$= .33), but not computer ability (F[1, 12]= 3.28, p>.05) , on text length (of both parts combined). Overall, the participants wrote significantly longer responses (M= 259.94 words) when writing on the computer than they did when writing on paper (M= 237.63). However, for Part A, the participants wrote slightly longer responses on paper (M= 88.8) than they did on the computer (M= 83.5).

For Part B, the participants wrote longer responses on the computer (M= 176.4) than they did on paper (M=148.8). On average, Part B responses were longer than Part A responses regardless of writing mode and candidate group.

Generally, participants with high ELP wrote longer responses to both parts of the task with both writing modes, than did participants with low ELP. For the low-ELP group, participants with higher computer ability wrote more words, on average, than did those with low computer ability. For the high-ELP group, participants with high computer ability wrote more words for all parts and modes, except for Part A on paper, where participants with low computer ability wrote more words.

ELP	Comp. ability		Paper-based task			Computer-based task		
			Part A	Part B	Total	Part A	Part B	Total
Low	Low	M	66.50	127.25	193.75	57.25	132.75	190.00
		SD	19.19	24.81	29.41	22.90	43.13	40.43
	High	M	81.00	145.75	226.75	97.50	169.00	266.50
		SD	28.28	9.91	21.34	19.94	22.29	23.81
	Total	M	73.75	136.50	210.25	77.37	150.88	228.25
		SD	23.68	20.09	29.62	29.29	37.22	51.14
High	Low	M	113.00	142.00	255.00	82.75	186.50	269.25
		SD	74.33	20.67	86.33	26.47	49.60	74.15
	High	M	94.75	180.25	275.00	96.50	217.50	314.00
		SD	18.64	58.29	60.64	39.01	42.40	31.57
	Total	M	103.88	161.13	265.00	89.63	202.00	291.63
		SD	51.11	45.36	69.89	31.73	45.82	57.93
Total	Low	M	89.75	134.63	224.38	70.00	159.63	229.63
		SD	56.07	22.56	68.09	26.66	51.74	69.65
	High	M	87.88	163.00	250.87	97.00	193.25	290.25
		SD	23.36	42.88	49.36	28.69	40.69	36.26
	Total	M	88.81	148.81	237.63	83.50	176.44	259.94
		SD	41.50	36.20	59.06	30.17	48.20	62.11

Table 5: Descriptive statistics for text length by task part, writing mode and group

Table 6 reports descriptive statistics for participants' writing scores by writing mode and group. Repeated-measures ANOVA detected no significant effects for writing mode on scores (F[1, 12]= 0.27, p>.05), but there were significant main effects for ELP (F[1, 12]= 13.49, p<.05, $\dot{\eta}^2$= .53) and computer ability (F[1, 12]= 11.42, p<.05, $\dot{\eta}^2$= .49) as well as a significant interaction effect of writing mode by computer ability (F[1, 12]= 6.82, p<.05, $\dot{\eta}^2$= .36) on scores. On average, the participants obtained similar scores on the PB task (M= 3.88) as on the CB task (M= 3.81).

As expected, participants with higher ELP obtained significantly higher scores than did those with low ELP regardless of writing mode and computer ability. Participants with lower computer ability obtained lower scores, on average, than did participants with higher computer ability regardless of writing mode and ELP level. As for the interaction effect, surprisingly, as Table 6 shows, the average score difference between the two computer ability groups was actually larger for the paper-based task (by 1.75 points) than it was for the computer-based task (1.12 points).

ELP	Computer ability		Paper-based task	Computer-based task
Low	**Low**	M	2.25	2.25
		SD	.50	.50
	High	M	4.00	3.75
		SD	1.41	1.26
	Total	M	3.13	3.00
		SD	1.36	1.20
High	**Low**	M	3.75	4.25
		SD	.96	.96
	High	M	5.50	5.00
		SD	.58	.00
	Total	M	4.63	4.63
		SD	1.19	.74
Total	**Low**	M	3.00	3.25
		SD	1.07	1.28
	High	M	4.75	4.37
		SD	1.28	1.06
	Total	M	3.88	3.81
		SD	1.45	1.28

Table 6: Descriptive statistics for writing scores by writing mode and group

3.2 Cognitive processes engaged by Aptis Writing Task 4

The total number of coded cognitive processes reported in the 32 stimulated recalls was 4,517 codes (M= 141.2, Mdn= 140; Min = 74, Max = 235). Table 7 displays descriptive statistics for coded cognitive processes summed across writing modes, task parts, and candidate groups. The column labelled *N SRs* indicates the number of stimulated recalls (out of 32, that is 16 participants x 2 writing modes) in which a cognitive process was mentioned at least once. The column labelled *Total* under *Raw Frequency* lists the number of times each cognitive process was mentioned across all stimulated recalls (SRs). The columns labelled *Min* and *Max* under *Raw Frequency* indicate the minimum and maximum numbers of times a process was reported in any SR. The columns labelled *% out of total number of codes* indicate the mean, median, minimum, and maximum for the percentage of each process in relation to the total number of processes reported across all SRs (i.e., across all writing modes, task parts, and participants).

	N SRs	Raw frequency			% out of total number of codes			
		Total	Min	Max	M	Mdn	Min	Max
Macro-planning	**32**	**864**	**8**	**89**	**18.72**	**18.17**	**6.06**	**38.53**
Reading task	32	115	1	15	2.59	2.04	.00	10.42
Task conceptualisation	30	112	0	10	2.50	1.98	.00	8.93
Construct audience	25	66	0	8	1.40	.90	.00	4.35
Construct situation	30	183	0	19	3.93	3.19	.00	8.23
Goal setting	29	314	0	43	6.45	4.34	.00	18.30
Audience/reader	22	52	0	6	1.15	.91	.00	5.00
Persona/self	19	49	0	5	1.05	.71	.00	3.75
Meaning/content	22	82	0	12	1.67	1.16	.00	5.77
Text/form	27	131	0	22	2.57	1.83	.00	9.36
Difficulty macro-planning	17	62	0	18	1.55	.60	.00	16.07
Macro-planning PS strategy	8	12	0	4	.29	.00	.00	2.14
Organisation	**26**	**113**	**0**	**12**	**2.44**	**2.03**	**.00**	**8.16**
Organising message	25	95	0	11	2.07	1.70	.00	7.48
Organise-audience	11	15	0	3	.30	.00	.00	1.59
Difficulty organising	2	2	0	1	.05	.00	.00	1.01
Organising PS strategy	1	1	0	1	.02	.00	.00	.72
Micro-planning	**32**	**855**	**6**	**77**	**19.40**	**16.30**	**5.53**	**61.11**
Local planning	32	319	2	23	7.35	6.94	1.79	18.25
Generating and retrieving	32	282	2	23	6.26	5.06	1.70	18.25
Self-based generating	29	196	0	23	4.29	3.63	.00	18.25
Text-based generating	11	19	0	3	.46	.00	.00	3.03
Task-based generating	21	58	0	8	1.25	.76	.00	5.00
Translating or L1 use	6	9	0	3	.25	.00	.00	3.03
Micro-planning audience	31	185	0	23	4.17	2.97	.00	18.25
Difficulty micro-planning	15	40	0	9	.94	.00	.00	6.52
Micro-planning PS strategy	13	29	0	9	.69	.00	.00	6.52
Translation	**30**	**996**	**0**	**85**	**21.72**	**22.88**	**.00**	**39.45**
How to write	30	600	0	43	13.17	14.21	.00	28.44
Language	30	309	0	25	7.12	6.89	.00	18.35
Balance	23	207	0	21	4.35	4.96	.00	9.45
Coherence/cohesion	21	63	0	8	1.31	1.02	.00	4.71
Layout	10	21	0	5	.39	.00	.00	2.94
Translation audience	26	164	0	23	3.28	3.16	.00	9.79
Difficulty translating	28	142	0	12	3.24	2.72	.00	11.11
Translating PS strategy	27	90	0	8	2.03	1.78	.00	6.06
Execution	**25**	**144**	**0**	**18**	**3.13**	**1.68**	**.00**	**17.50**
Controlling	20	58	0	10	1.19	.91	.00	5.35
Making notes	13	69	0	13	1.58	.00	.00	15.00
Difficulty typing / handwriting	9	15	0	4	.33	.00	.00	2.70
Execution PS strategy	2	2	0	1	.04	.00	.00	.72

Monitoring	**32**	**1140**	**17**	**64**		**25.62**	**26.07**	**15.22**	**44.29**
Re-read to monitor	21	92	0	12		1.89	1.41	.00	6.94
Global text	20	43	0	6		.88	.76	.00	2.96
Local text	32	322	3	25		7.48	7.72	1.30	16.43
Content	18	31	0	5		.70	.56	.00	3.17
Language	32	286	3	25		6.70	7.29	1.30	14.12
Rhetoric/organisation	14	28	0	9		.52	.00	.00	4.43
Balance	26	58	0	11		1.32	.95	.00	7.86
Text length	19	70	0	9		1.60	1.32	.00	5.05
Reacting to own writing	24	80	0	10		1.73	1.44	.00	5.35
Monitoring-audience	20	75	.00	12		1.51	.97	.00	5.19
Checking the time	20	34	0	8		.78	.62	.00	4.28
Difficulty monitoring	11	13	0	2		.32	.00	.00	2.02
Monitoring PS strategy	8	8	0	1		.18	.00	.00	1.01
Editing and revising	**32**	**405**	**2**	**40**		**8.98**	**7.06**	**.85**	**23.12**
Review decision	15	39	0	6		.84	.00	.00	4.35
Content revision	23	81	0	10		1.84	.95	.00	6.29
Language revision	29	144	0	17		3.28	2.75	.00	9.83
Organisation revision	5	8	0	3		.15	.00	.00	1.57
Balance revision	15	40	0	6		.85	.00	.00	3.57
Typography/ spelling revision	27	79	0	10		1.72	1.41	.00	6.21
Difficulty revising	8	8	0	1		.17	.00	.00	.93
Revision PS strategy	6	6	0	1		.13	.00	.00	.93
Grand total		**4,517**	**74**	**235**					

Table 7: Descriptive statistics for writing processes across 32 stimulated recalls

Table 7 shows that the most frequently reported process is monitoring (*Mdn*= 26.07%), followed by translation (21.72%), micro-planning (19.40%), macro-planning (18.72%), editing and revising (8.98%), execution (3.13%), and organisation (2.44%).

In terms of sub-categories of cognitive processes, the processes with medians above 2% were: planning or choosing how to write (under translation, *Mdn*= 14.21%), monitoring local text (under monitoring, 7.72%), monitoring language (under monitoring, 7.29%), local planning (under micro-planning, 6.94%), generating and retrieving (under micro-planning, 5.06%), goal setting (under macro-planning, 4.34%), constructing or analysing the situation (under macro-planning, 3.19%), considering audience when translating (under translation, 3.16%), considering audience when micro-planning (under micro-planning, 2.97%), revising language (under editing and revising, 2.75%), difficulty translating (under translation, 2.72%), and reading the task (under macro-planning, 2.04%). Each of these processes was mentioned at least once in 26 SRs or more.

The following processes were reported least frequently (i.e., in less than 16 out of 32 SRs, *Mdn*= 0%): difficulty typing or handwriting, making notes, considering audience when organising message, monitoring rhetoric or organisation, review decision, revising organisation, revising balance, difficulty monitoring, difficulty revising, difficulty organising, and problem-solving strategy use for all main categories, except for translation. For example, revising organisation was mentioned in only 5 SRs, while the use of execution problem-solving strategy was reported in only 2 SRs (out of 32 SRs).

The following subsections describe the cognitive processes engaged by Aptis Writing Task 4 and illustrate them with excerpts from the SRs collected in this study.

3.2.1 Macro-planning

As noted above, macro-planning involves the gathering of ideas and identification of major constraints imposed by the writing task (i.e., the goal, the target readership, the genre, and the style of the piece of writing) (Field, 2004). Decisions made at this stage about readership, genre and goals will heavily constrain choices made at the micro-planning and translation stages and will form the yardstick against which drafts are evaluated at the monitoring stage (Field, 2004). As shown in Figure 2, macro-planning includes seven subcategories: reading the task; task conceptualisation; analysing or constructing the audience; analysing or constructing the situation; goal setting; difficulty with macro-planning; and using macro-planning problem-solving strategy.

Goal setting was the most frequently reported macro-planning process (*f*= 314, *Mdn*= 4.34%), followed by analysing or constructing the situation (*f*= 183, *Mdn*= 3.19%), reading the task (*f*= 115, *Mdn*= 2.4%), task conceptualisation (*f*= 112, *Mdn*= 1.98%), analysing or constructing the audience (*f*= 66, *Mdn*= 0.90%), and difficulty with macro-planning (*f*= 62, *Mdn*= 0.60%).

Reading the task

As Table 7 shows, reading the task or parts of the task was reported 115 times; each of the participants reported reading the task or parts of it at least once in each stimulated recall. In addition to reading the task at the beginning of the writing session to identify task requirements (e.g., Excerpts 1 and 2), participants reread the task or parts of it to comprehend it (e.g., Excerpt 3). For example, LL2 spent the first four minutes reading the task and taking notes in order to understand the task requirements (Excerpt 3). Participants also read the task to check whether their response addressed all task requirements. For example, participant HL1 read the task, wrote her response to Part B, and then reread the task again. Originally, HL1 did not plan to include suggestions in her response, but after rereading the task she decided to propose some suggestions (Excerpt 4). Finally, after responding to both parts of the task on paper, HH1 reread the task to make sure that he addressed all task requirements (Excerpt 5).

> Excerpt 1: I first like skimmed through it [the task], I was planning to reread through it again that's why I kept reading over and over again. (HH1, CB, A)
>
> Excerpt 2: I I was reading a question and says 'write your feeling about the notice and suggest possible alternatives', so I at this point I was thinking like positive alternatives would be uh, to tell my friend that [TEXT]. (HH4, PB, A)
>
> Excerpt 3: I'm still try to get the point and uh, yea, and then I start to take some notes... Well the main thing is that something cancelled, that's the main point… and then uh and then we know we got a new one... Uh, just looking for the details anywhere, yeah just looking for the details (LL2, PB, A)
>
> Excerpt 4: Here I thought uh in the question uh it says any suggestions or alternatives I thought maybe I should say any- something about that. (HL1, CB, B)
>
> Excerpt 5: I read the email which I got from the club. Just to make sure that I cover everything I just kept reading over and over. (HH1, PB, Both)

Task conceptualisation:

Task conceptualisation refers to the analysis and evaluation of the task. As Table 7 shows, task conceptualisation was reported 112 times in 30 SRs. The participants reported reflecting on, evaluating, and/or checking their comprehension of the writing task. Some participants analysed the writing task in terms of its parameters, requirements and constraints such as time, text length, purpose, audience, content, and structure of the writing (Excerpts 6–8).

For instance, HH1 considered the length requirement of the task before planning his response (Excerpt 6), while LL2 and LL1 engaged in analysing the details of the situation described in the task (Excerpts 7 and 8).

> Excerpt 6: Um I first read this, this first sentence [of Part B] and then I uh looked at how long it should be and planned in my head like how I should begin it, how I should end it and how I should conclude. (HH1, CB, B)

> Excerpt 7: Uh after I read here [the task], after I read read here I'm thinking about the relationship between, between y'know between uh like cancel between the activity has has been has cancelled and and uh and uh the information he told me next. Like like uh like [TEXT]. So so this this two sentence (must be) have a relations relationship. Uh anyway, they cancelled the activity but we got a new one, so I I just think about this. (LL2, PB, A)

> Excerpt 8: Yeah, so at that time I I take notes what's going on x email respond. And the trip has been cancelled because lack of interest, so they will give me a refund but it's not, this refund not include the entrance ticket. Yeah I write, yeah notes, short notes. (LL1, PB, A)

The participants also engaged in evaluating the task in terms of its difficulty or interest and checking or confirming their comprehension of the task as Excerpts 9 to 11 below show. For example, when planning his response to Part B on the computer, HH1 thought about whether the situation described in the task happens in real life (Excerpt 9), while HH2 found the task "bizarre" (Excerpt 10). Other participants found the task to be easy and clear (Excerpt 11). LH2, for example, reported that he felt that the task was not difficult because he is familiar with this kind of task because he used to work in tourism and has to deal with trip cancellations every day, "so it wasn't hard to write a response" (LH2, CB, A). A few participants also reported that they paused to check their comprehension of the task. In Excerpt 11, HH1 reported that he paused to think about what the word "feel" in the task meant in order to decide what to write (Excerpt 12).

> Excerpt 9: Uh, so and that happens in real life a lot? (HH1, CB, B)

> Excerpt 10: It [the task] was bizarre; it was not what I had expected, it was not an essay or something. (HH2, CB, A)

> Excerpt 11: I thought both of them were pretty clear. The only confusion I had is who is the guy who wrote me that email. (HH3, PB, both)

> Excerpt 12: When I saw the word *feel* I become sensitive because its, we're asked to do that so uh, I was just wondering if it's really a feeling or it's a you know or a feeling or thought or something. (HH1, CB, B)

Considering or constructing audience

As Table 7 shows, 25 of the SRs included reference to considering or constructing the audience. This involved: (a) considering facts about the audience given in the task; and/or (b) making inferences about the audience based on task description and/or constructing hypothetical audience characteristics which may or may not be accurate (cf. Berkenkotter, 1981). In terms of considering facts about the audience, participants tried to compose a picture of the audience for Part B or choose a particular audience/reader for Part A. For example, LL3 paused to think whether the manager is male or female (Excerpt 13), while HH3 and HH1 paused to think about which friend to address in Part A (Excerpts 14 and 15).

> Excerpt 13: Yeah. And then I think uh is x a female's name, or a male's name... Yeah, and then uh I think it is a male's name because uh, a G-O looks like "Josh", yeah. (LL3, PB, A)

> Excerpt 14: He is my best friend we talk about everything. I was thinking he is the guy I can talk with freely about my feelings and who will not judge me. (HH3, PB, A)

> Excerpt 15: I thought of a different friend and thought about who I should think about and then I just came up with, it was actually one of my friends so, it's not a made up name. (HH1, PB, A)

However, some participants felt that they needed to infer or imagine additional characteristics of the audience/reader in order to decide what information to include and to be able to complete the writing task, such as making inferences about what the reader already knows. Drawing inferences about audience characteristics was reported 41 times and in half the SRs. For example, when responding to Part B on the computer, HL4 reported that he assumed that the manager knows about the situation and as a result decided not to include "much detail" about the situation (Excerpt 16). Similarly, HL1 and HH1 assumed that their reader (a friend) knows about the situation and so decided not to include details about the situation when responding to Part A on paper (Excerpts 17–18). HL4, in contrast, assumed that his reader (the manager) "is always busy" and so he has to indicate the purpose of his letter; otherwise the reader will ignore his message (Excerpt 19).

> Excerpt 16: I don't need to talk him or her [the manager] too much detail about the show because he absolutely knows the show, so I do not want to waste too much words on this. (HL4, CB, B)

> Excerpt 17: Uh, I was thinking that uh if she's my friend so she definitely knows about my trip so I'm just gonna tell them that I don't need to explain which trip or yeah I'm just gonna say that you know the trip that we had planned just uh yeah explain it that been cancelled. (HL1, PB, A)

> Excerpt 18: Pretty much the first, like the beginning of the email so I was thinking, how uh, I would refer to the email that I got. Cause assuming he [my friend] got the same email he knows, he doesn't need an extensive introduction. So I just thought of a nice way of starting it by referring to the email cause he already knows about it too. (HH1, PB, A)

> Excerpt 19: The manager is always busy and if I can't tell him the purpose I write the letter he is going to ignore me. (HL4, PB, B)

Other participants needed to imagine additional details about the audience in order to complete the writing task. For example, LH4 reported that she had to imagine "the psychology" of the reader when responding to Part B on the computer in order to decide what and how to write her response, while HL4 needed to decide whether his friend is going to the event or not so he could determine what his friend knows and what he does not know in order to write his response to Part A on the computer. LL3 imagined that her friend has health problems in order to justify inviting her to the event, pointing out that her friend should attend the event because plants are good for her health (Excerpt 20). It seems that LL3 needed to think of a specific person and to imagine specific audience characteristics to be able to complete the task and this required recalling information about a specific friend. For Part B, most participants imagined that the reader has a higher status than the writer and so they have to write to him/her in a more formal way. HL2, however, thought that because he pays club fees, the reader has a lower status than the writer and, as a result, HL2 decided to address the reader by first name and to tell him "you are wrong here, you are wrong here, you should have done this better" (Excerpt 21).

> Excerpt 20: Uh, my friend is, uh, uh her life's, her life uh (isn't) very healthy and then xx (at one) she can become more healthy, and then uh, x plants can uh, make her better I think. (LL3, CB, A).

> Excerpt 21: In my mind, he [the manager] is working for me, so I should tell him you are wrong here, you are wrong here, you should have done this better. (HL2, PB, B)

Finally, it is worth noting here that, while most of the participants thought of the audience as specified in the task (i.e., a friend in Part A and the club manager in Part B), some participants had the test marker and/or the researcher as an audience or at least as a secondary audience for their responses.

For example, when responding to Part B on paper, HH4 reported that he did not want to use the same ideas and wording he used in Part A to avoid "being repetitive" (HH4, PB, B). Similarly, when writing on paper, HL4 reported that he avoided using some words in Part B because he already used them in his response to Part A, although he used ideas from his response to Part A when responding to Part B. This suggests that these participants thought of the test marker as the reader with both parts since it does not make sense to think about repetitiveness when the two messages are intended for two different audiences/readers (friend vs. club manager).

Considering or constructing the situation

As Table 7 shows, 30 of the SRs included reference to considering or constructing the situation, which was mentioned 183 times and accounted for about 4% of all the reported processes in the study. This involved: (a) considering facts about the situation given in the task; and/or (b) making inferences about the situation based on task description and/or imagining additional details about the situation which may or may not be accurate. Some participants identified specific details about the situation to help them plan their responses to the task. In Excerpt 22, HL4 identified two points about the situation, which he later used to plan his response. Similarly, LH2 paused to think about the situation and how to respond to it (Excerpt 23).

> Excerpt 22: So the first part of the story is they cancelled the trip and then I lost some money because of it. (HL4, PB, A)

> Excerpt 23: It's not reality but what I will do if I have a trip cancellation like today here, if I have planned a trip and received an email telling that the trip has been cancelled. (LH2, CB, A)

Other participants needed to infer details about the situation described in the notice, "imagine" the situation, and/or "make up" additional details about the situation in order to be able to respond to the task. HH1 and HL1, for example, reported that they had to "imagine" the situation or being in the situation to complete the writing task (Excerpts 24 and 25). When responding to Part A on the computer, LH4 felt that the task did not provide enough information and that she had to imagine additional details, reporting "I had to imagine that I am in the club and that the club has trees and a swimming pool" (LH4, CB, A). But she also imagined other details to fill in some gaps in the description of the situation in the task. For example, she imagined that she had read an ad for the trip and signed a contract and that the contract for the trip did not say anything about trip cancellation (Excerpt 26). Another example comes from the SR of LH3 when responding to Part A on the computer. LH3 felt that he needed "to create a situation" in order to identify "my problem" and to decide "how do I feeling [about this]". LH3 reported that he needed to imagine the situation in order "to put me in that situation" so "I can have the feeling" because "it's easier to write my feelings" (LH3, CB, A). LL1 also had to imagine additional details about the situation, based on his own experience, such as the role of insurance companies, to address the task (Excerpt 27), while LH2 imagined that he has "been a member of the club for a long time" in order to make convincing suggestions (LH2, CB, B).

> Excerpt 24: I imagined myself uh, being in the situation then I, I was thinking what I should say also, I was pretty much thinking about the situation more than exactly what I should write (HH1, PB, Both)

> Excerpt 25: I was thin- imagining that uh if it's a real case uh I might start with 'have you heard about the email' or 'I don't know if you heard or not' and I was just imagining that yeah I should imagine a real case so I can start writing. (HL1, CB, A)

> Excerpt 26: [I imagined] I had the contract in my hand and that I was looking at the back of the contract for the terms about the cancellation of the trip. [I then wrote] I DO NOT AGREE WITH THE SITUATION because it was not written on the contract paper that I signed. (LH4, CB, A)

> Excerpt 27: I'm thinking about the, because the travel company usually will pay the money to the insurance company... And then, when they have some problems or troubles... the insurance company will pay the premium back to the, the, the travel company. And actually the travel company didn't miss anything actually they make more money on it. (LL1, PB, B)

Similarly, LH1 felt that she needed to contextualise the situation or the problem by imagining or making up a story to be able to introduce the situation and justify why she was writing about the situation to her friend. HL2 also reported that he needed to imagine the situation and "make up a story" to respond to the task with both writing modes. When writing on the computer, HL2 felt that the problem described in the notice "is not a big thing, but I have to write it as such" (HL2, CB, B). Consequently, HL2 felt that he needed to present the problem as one example of a larger problem, that "the club is facing many problems recently and is falling apart". HL2 then used the first half of his response to describe this imagined situation before writing about the cancellation of the event, which he presented as an example of the larger problem that "the club's credentials are gradually falling down... [which] is alarming for me" (HL2, CB, B). To "make the story real" and give himself "some authority", HL2 made up additional details such as that he has been a member of the club "for the past 3 years" and has brought "10 new members to the club" to indicate that "I am an important member and my opinion should be addressed. Talking about how many members I have brought maybe it will give me some authority while the other person is reading the letter" (HL2, CB, B). When responding to the paper-based task, HL2 also reported that he had "to make up a story", "mix fact with fiction", and "to draw things from [his] personal life, names or figures or something happened" in order to be able to complete the task (HL2, PB, A). Similarly, HH4 engaged in imagining additional details while writing on paper and on the computer as shown in Excerpts 28 and 29. For example, in Excerpt 29, HH4 reported that he had to "make up" scenarios and people in order to complete the task.

> Excerpt 28: So I I made up a reason, I made up an alternative, and because I saw that the club is history club, right? So it must have something to do with archaeology, so I think about we all going to archaeology museum so that has something to do with the history club that's what the history club does, right? So so I make up this alternative so I xx write to the manager that the club should visit the national archaeology museum as an alternative. (HH4, CB, A)

> Excerpt 29: And here, I I was thinking about the second reason for the skills workshop. And then I thought I can I could make up a person and he he was also an experienced gardener who who could give talk about his experience, [...] So here I was thinking about the name of that person, what what should be the name of him? [...] And here I thought about, "what should he talk about? What was he, what was he good at? What he was good at?" So I wrote, HOW TO EMBELLISH AND DECORATE A GRADEN. (HH4, PB, B)

In some cases, participants spent a significant amount of time and effort imagining and making up additional details about the situation. For example, some participants felt they needed to create or imagine additional details about the context and the story behind the notice they received when responding to Part A in order to establish and communicate the context and relevance of what they are saying to their friend. This raises questions about the role of being able to imagine or make up additional details about the situation and audience in performance on Aptis Writing Task 4 and whether this uses up time that should be devoted to writing.

Goal setting

Goal setting was the most frequently reported macro-planning strategy accounting for more than 6% of all the processes reported in the study (total 314 occurrences). Following Flower and Hayes (1980) and Berkenkotter (1981), four types of writing goals were identified:

- *Audience/reader-related*: To affect the reader, such as convincing the reader of a particular point.
- *Persona/self-related*: To create a persona or voice such as representing oneself to the audience in a particular way or establishing a particular relationship with the reader.

- *Meaning-related*: To build a coherent network of ideas and convey specific meaning.
- *Form-related*: To develop the formal or conventional features of the text (i.e., language, text organisation and balance).

The participants reported 52 reader-related goals in 22 SRs. LL1, for example, reported that he wanted to "Threaten, threaten. [Laughs]... Yeah threatening" the reader by warning the reader of the consequences of not refunding him (LL1, PB, B), while LH2 reported that one of his goals was "to put the fear of a potential refund on the company" (Excerpt 30). LH2 adopted the same strategy when writing on the computer as well, his goal being "to win" or get "something back" (Excerpt 31). Another reader-related goal set by some participants is to have the reader "understand" or sympathise with them (Excerpts 32 and 33).

> Excerpt 30: If I need to complain about a bad service in my real life, I always try to put the fear of a potential refund on the company, because they never want to refund you, they want to keep the money. So I always tell them you that you provide me what I want or you are going to refund me. (LH2, PB, B)

> Excerpt 31: To win, because also in real life I always want to win, I never give up, so if I receive an email like this in real life I could be dealing with the company for days until I win, until they give me something back. (LH2, CB, B)

> Excerpt 32: Try to make my friend think the whole fact in as similar way as me. [...] after telling my story, my friend can understand my situation. (HL4, PB, A)

> Excerpt 33: When you are writing to your friend, you want your friend is on your side [...] so I expect my friend to be sympathetic. (HL2, PB, A)

The participants also attended to how they present themselves and their relationship with the reader. HH3, for instance, reported that he wanted to be perceived as being "polite", but also "strong" (Excerpt 34). Similarly, HH1 reported that he wanted to be perceived positively and to be "nice" (Excerpt 35). HH4 also reported that he wanted to be perceived as being polite and that this affected what information he included and how he organised his response to Part B when writing on paper. As shown in Excerpt 36, HH4 thought that to be perceived as being polite and "friendly", rather than "careless", he felt he had to ask about the speaker's health before talking about the cancelled event, thus, showing a concern for how he presents himself to the reader but also awareness of what is appropriate to say and when to say it in this context.

LL3 reported that when responding to Part B on paper, she wanted to present herself as being "angry" (Excerpt 37), while HL2 wanted to present himself as "a valued member who has brought many [new] members [to the club]" when responding to Part B on the computer, to give himself "some authority" (HL2, CB, B). When responding to Part B on paper, HL2 presented himself as "a senior member of the club" and felt that because he pays club membership fees, the club manager has to treat him "in a proper manner" (HL2, PB, B). As noted above, HL2 viewed the reader as having a lower status than the writer and so he can talk to the reader however he wants (Excerpt 38). Finally, HL4 "identified" himself as "the bridge between the manager and the audience" [i.e., other members of the club], imagining that he was writing the letter on behalf of all club members to tell the manager about the members' feelings, including his own (HL4, CB, B).

> Excerpt 34: I was trying to get a little strong, you know, I was really polite, and now I was trying to get a little strong so he knows what is actually bothering me. (HH3, CB, B)

> Excerpt 35: I also wanted to be sympathetic again, that beginning nicely and ending nicely... I try to be sympathetic at the end, to just make it, make them take me seriously and also, not make them defensive. (HH1, CB, B)

> Excerpt 36: I was thinking I should not just go straight into the matter, instead what we will do rather than just listening to this topic again. So I think that I should say like I should like ask about uh the the speaker who has been ill why I feel sorry for him, I hope he will get better rather than just go straight to what I want. It would be like careless if I I think I should just ask about ask about the speaker who has been ill first. So just to show that I'm friendly and I care about, care about the speaker rather than just his talk. (HH4, PB, B)

> Excerpt 37: Uh I want to uh express my feeling that is like I am very angry uh to the manager, because I don't like their way uh, cancel the trip and then just send me an email. (LL3, PB, B)

> Excerpt 38: I thought of it like me being the boss talking to an employee or me being an authority and telling someone who did something wrong, you shouldn't have done that [...] Technically he [the club manager] works for me and so the tone should not be friendly, it should be a bit more formal [...] being a member to the club you feel entitled so you feel it doesn't matter the way you talk to people who work in the club. (HL2, PB, B)

The participants reported setting writing goals related to content or what their response will be about as well. HL4, for example, reported that the main goal of his response to Part A on paper is to "complain" (Excerpt 39), while HH2 planned to talk about two points in response to each part: her feelings and suggestions (Excerpt 40). LL3 indicated that her main goal for Part B was to express her feeling (angry) (Excerpt 41). HL1 reported that she intended to write about her feelings and what to do (Excerpt 42).

> Excerpt 39: What I need to do is to complain, complain again and again that's it. (HL4, PB, A)

> Excerpt 40: Again same process [as in Part A], like feelings and suggestions. (HH2, PB, B)

> Excerpt 41: Uh I want to uh express my feeling that is like I am very angry uh to the manager, because I don't like their way uh, cancel the trip and then just send me an email. (LL3, PB, B)

> Excerpt 42: I was thinking that I'm gonna tell her that I'm upset and what should I do and just explain it the situation. (HL1, PB, A)

Form-related goals concerned language, text organisation, and/or balance. For example, when responding to Part B on paper, HH2 wanted his message to be polite but "stern" which led to many pauses to make decisions on how to express his ideas and what details to include and when (HH2, PB, B). HH1 reported that he planned how to start and end his response in his head (Excerpt 43). When responding to Part A on paper, HL4 planned "to tell a story" of what happened, why he is writing the letter to his friend, and talk about his feelings (HL4, PB, A). HL2 reported that because of the requirement not to exceed 50 words, he planned to keep his response as short as possible, deciding "not to chat much" in order "to keep it short" and then "to jump into the topic and talk about it" (HL2, CB, A). As noted above, when responding to Part B on paper, HL2 imagined that he is "a senior member of the club" and so he can talk to the manager as he would talk to one of his employees. Consequently, he wrote the letter as if he is talking to the manager: "So I am just talking to them and writing what I'd say to them" (HL2, PB, B). Excerpt 44 provides another example of goals concerning text organisation.

> Excerpt 43: Um I first read this, this first sentence [of Part B] and then I uh looked at how long it should be and planned in my head like how I should begin it, how I should end it and how I should conclude. (HH1, CB, B)

> Excerpt 44: I wanted to be more organised... just to organise it and make it more formal (HH2, PB, B)

The participants also reported writing goals in relation to balance or appropriateness of language, including level of formality. HL3, for example, decided to write his response to Part A as "a personal letter, as an informal letter starting with Hi" (HL3, CB, A).

Similarly, LL2 intended his response to Part A to be not too formal (Excerpt 45). HH3 treated his response to Part A as a "chat" with his friend (Excerpt 46). In contrast, when responding to Part B, HH1 intended to write a formal letter (Excerpt 47). HL4 wanted "to make the whole letter memorable" when responding to Part A on paper (HL4, PB, A), while LH2 intended his responses to have different levels of formality (Excerpt 48). HL1 intended her response to Part B to be of a different style than her response to Part A (Excerpt 49).

> Excerpt 45: Because it's letter, uh I don't think I need to write too formal, too formal things. (LL2, CB, A)

> Excerpt 46: If I was writing to my friend on Facebook how I will actually write to him about this thing, how would I talk to my friend in chat, how would I talk to him if I was chatting with him. (HH3, PB, A)

> Excerpt 47: So it has to be I thought that's what I thought the following x so it has to be to the manager, it has to be formal, uh or otherwise they wouldn't take it seriously. (HH1, CB, B)

> Excerpt 48: I had to write the first email in a friendly way and the second email had to be formal. (LH2, CB, both)

> Excerpt 49: Uh yeah about uh the answers that uh what kind of uh style I should use for the second one and uh maybe I should use different styles and different grammar [than Part A] and yeah. (HL1, CB, Both)

Difficulty macro-planning

The participants reported 62 instances of difficulty with macro-planning. These concerned difficulties understanding the task or parts of the task, difficulties constructing the audience, and/or difficulties constructing the situation. Some participants reported using some problem-solving strategies to address these difficulties, while others did not report any problem-solving strategies. Participants with low ELP tended to report difficulties with understanding the tasks or parts of it more frequently with both writing modes. LL4, for example, had difficulty understanding several words and phrases in the task (Excerpt 50). As a result, LL4 had to reread the task and guess the meaning of the words in order to be able to respond to the task (Excerpt 51). In fact, LL4 spent the first 10 minutes rereading the task and writing and rewriting the first sentence in her response to Part A when writing on the computer. This included writing few words, pausing, adding few other words, pausing again, rereading the task, and making changes to spelling and punctuation as well as adding details "to make the sentence longer". After 13 minutes and after writing only two lines, LL4 looked at the time and decided to stop writing and move to Part B. LL4 had difficulties understanding the task when writing on paper as well (Excerpt 52). When asked what helped her understand the task, LL4 was not sure and reported that she just reread the task "again and again" (LL4, PB, A). When responding to Part B, LL4 encountered the same problem (Excerpt 53). Because she did not understand the task (a reading problem), she was not sure why she had to write to the manager or what her role is ("I am not sure I am the member [of the club]?"). As a result, she was not able to generate ideas to address the task.

> Excerpt 50: Uh, (recall) at here I don't understand the *coach trip*, what is, because I know the coach the meaning is the teacher to train somebody? But I don't know xx the *coach trip*. Is the, so I confused, I'm not sure […] Yeah, because this is cone- what is the meaning *late cancellation*? Uh, I think this is, I know the meaning but, but I'm not sure it's, I'm not sure. I know *late cancellation* but I don't know, uh why, this have relationship in the last, in the last sentence. (LL4, CB, A)

> Excerpt 51: Yeah, yeah, when I writing I guess, I guess because I'm not sure I guess I think this, because I, I need to write a paragraph right? So I must understand. I think yeah I guess. I read this sentence again and I, because when I read this sentence I think... Because I, I want to make some, uh, make some, make some information can improve my gue- Improve my guess. (LL4, CB, A)

> Excerpt 52: When I read the topic, uh, in the beginning I don't know what's the email say. I don't understand, and then I read again, I read three times maybe, and then I ha- I little understand what the email said. (LL4, PB, A)

> Excerpt 53: I want to, I don't know, what I, what I want to say, to the manager, I don't know, because I no idea about this... I don't know why I want, why I want to, why I need to, why I need to email manager... I, I don't know why, no idea. (LL4, PB, B)

Other low-ELP participants reported difficulties with understanding the task as well. The writing performance of these participants was affected by their inability to understand the task, including the rhetorical parameters of the task (purpose, audience, writer role). LL3, for instance, was not sure why she needed to tell the manager about her feelings; nor did she understand what the club was about (Excerpt 54). LL3 had difficulties understanding some of the words in the task when writing on the computer as well. For example, she did not "really understand *suggest possible alternative*s" (LL3, CB, A). LL1 also had difficulties understanding the task and had to reread the task several times to try to understand it (Excerpt 55). When writing on the computer LH3 reported that he did not understand some words in the task and that he had to reread the task more than once to understand it "more clearly" (LH3, CB, A). LH1 also reported having difficulties understanding the task (Excerpt 56). Similarly, LL2 indicated that he did not understand the task with both writing modes and, as a result, was not able "to make a story" (Excerpts 57–58). To address this difficulty, LL2 reported that he had to guess the meaning of some words (Excerpt 59).

> Excerpt 54: Uh send another email to the manager. Uh, but I don't understand why I tell the manager about my feelings. Yeah, and then I think uh is can make me write uh, more words in the email, yeah. And then, uh and then what this club is? I was thinking what is the, what is this club? (LL3. CB, B)

> Excerpt 55: Uh, when I uh read the para- ok when I read the paragraph... Well uh I'm thinking about what the main point is so, a- at that time I'm, when I read the paragraph, I'm little bit confused what they are focus on, and when I... And I'm a little bit confused about uh, why he changed, the uh speakers, and also they changed the topics. (LL1, CB, A)

> Excerpt 56: I do not understand the whole meaning of the letter, the letter that they sent to me, and I was like what can I ask? (LH1, CB, A)

> Excerpt 57: Topic the topic is about, it's about like, uh I think it's like a lecture like a like a talk or uh or lecture something just just like sitting around I I I don't know actually mmm but I can guess uh something it's cancelled just like what I what I write is is something cancelled I can go go there and then uh I got a new one. (LL2, PB, both)

> Excerpt 58: Yeah and uh when I finish the reading well I actually read uh, three or four times, but I still can't get the point, I just I only- the only thing I know is some trip, there's some trip and I can't go there, uh because of something reason... because the (for the) some of the vocabulary in in this letter, I (even) don't understand I'm I'm not very clearly understand that the the exactly meaning of the whole letter [...] Well I I really can't make, to make a story, you know because the (for the) some of the vocabulary in in this letter, I (even) don't understand I'm I'm not very clearly understand that the the exactly meaning of the whole letter. (LL2, CB, A)

> Excerpt 59: So, just like I actually don't know the meaning, I just just, I guess it's about. Uh … yeah so so just some plan has been cancelled, and uh the very they just, send a letter to apologise. (LL2, CB, A)

Another difficulty the participants reported concerns constructing the audience. HL2, for example, reported that he would not write a letter to his friend, but text them instead, noting that "even if it is informal letter, it is formal in a sense because it is written format [rather than texting]" (HL2, PB, A).

When responding to Part A on the computer, HL4 did not know whether his friend will also attend the talk or not. In order to plan his response, HL4 felt he needed to determine what his friend knows and what he does not know so he can decide what information to include in his message. HL4 reread the notice several times in order "to find some useful information and to help me locate myself in a suitable position to write the letter" (HL4, CB, A). Another difficulty encountered by some participants concerns understanding or constructing the situation. HH1, for example, felt that the task did not provide enough information about the situation and, consequently, he had to imagine the missing parts (Excerpts 60 and 61). As noted above, some participants reported that they needed to imagine additional details about the situation.

> Excerpt 60: When I first skimmed through it I thought I may have um misread or, missed a word that explains the situation better cause at first when I read it the situation wasn't clear in my head for some reason, so that's that was pretty much the confusion I just didn't know what the situation was and what exactly was happening. (HH1, CB, A)

> Excerpt 61: There is not infor… there isn't there was not enough information about the background. Um things that happened that led to this. So I just felt free to imagine things... So I just imagined that the uh promise the trip and there was no term or condition about the cancellation so I was just trying to imagine that in my head as I was trying to write it. (HH1, CB, A)

Macro-planning problem-solving strategy use

To address the problems they encountered, some participants reported using problem-solving strategies as note above (e.g., Excerpts 59 and 61). For example, LH1 felt that writing in a formal tone ("to use more formal words") in response to Part B on paper would make the task difficult. To circumvent this problem she "pretended" that "he [the manager] is like my friend" and then wrote her response to Part B using a less formal tone (LH1, PB, B). As noted above, LL4 and LL2 reported that they reread the task several times and tried to guess the meaning of the words they did not understand (see Excerpts 51, 52, and 59).

3.2.2 Organisation

Organisation involves ordering the generated ideas, identifying relationships between them, and determining which ideas are central to the goals of the text and which are of secondary importance (Field, 2004). As shown in Figure 2, organisation includes four subcategories: organising the message: considering audience when organising; difficulty with organisation; and using organisation problem-solving strategy. Organising the message was the most frequently reported organisation process (*f*= 95, *Mdn*= 1.70%), followed by considering audience when organising (*f*= 15, *Mdn*= 0%).

Organising the message

Organising the message was reported 95 times in 25 SRs. HL4, for example, reported that he planned to "tell the truth [i.e., what happened], reflect the feelings, show my understanding of the decisions the manager made, and then come to my suggestion. I need to make sure that the whole process of letter will be naturally combined" (HL4, CB, B). When responding to Part A on paper, HL4 planned "to tell a story" (Excerpt 62). When responding to Part B on paper, LL1 planned to describe his feelings first, ask why he will not receive a refund, and then propose a solution, including giving an example to persuade the reader of the alternative (Excerpt 63). Some participants reported that they "wrote what came to my mind" without much planning (e.g., HL3, PB, A); others mentioned that they thought about how to organise their ideas, but did not specify which ideas (Excerpt 64); still others were more articulate about how to organise their response (Excerpt 65).

Excerpt 62: First, to let my friend know what happened to me and why I am complaining these things to my friend [...] and then to express my emotions to tell a story that contains my feeling, that's the second part of the whole letter. (HL4, PB, A)

Excerpt 63: I was organise uh what I should respond to the manager... First I my emotions. I feel upset. Next, name, why... I no- I [went] back to the Part A [about the point about] refund all the money but, but not all, yeah. And I wrote about the solution... I I give the example why uh to persuade the manager why you should give the coupon of the gift card... (LL1, PB, B)

Excerpt 64: I just organise my idea... Yeah and uh, uh yeah I was organising my idea. (LL3, CB, B)

Excerpt 65: I wanted to begin with uh, explaining I understand it's an unfortunate thing, and then tell what I, what my concern is. (HH1, CB, B)

Considering audience when organising ideas

Some participants reported considering the audience when organising their ideas (mentioned 15 times in 11 SRs). For example, HH4 reported that in order to be perceived as being polite and "friendly", he decided to ask about the speaker's health first and then talk about the cancelled event (Excerpt 36). As Excerpt 63 above shows, when responding to Part B on paper, LL1 considered the reader when organising his response.

Difficulty organising the message

Difficulty organising the message was reported in only 2 SRs. LL4, for example, reported that she had difficulty deciding how to organise or "order" her ideas (Excerpt 66). Only one instance of using a problem-solving strategy to address organisation difficulties was reported (see Appendix H).

Excerpt 66: And then, when I finish writing DEAR MY MANAGER I have some idea but I'm not sure how to, first what can I say. And then, the order. Yeah, just think order. (LL4, PB, B)

3.2.3 Micro-planning

Micro-planning concerns planning the part of the text that is about to be produced (i.e., what to write next). Micro-planning includes five subcategories (see Figure 2): local planning; generating and retrieving; considering audience when micro-planning; difficulty with micro-planning; and using micro-planning problem-solving strategy. Local planning was the most frequently reported micro-planning process (*f*= 319, *Mdn*= 6.94%), followed by generating and retrieving (*f*= 282, *Mdn*= 5.06%), considering audience when micro-planning (*f*= 185, *Mdn*= 2.97%), and difficulty with micro-planning (*f*= 40, *Mdn*= 0%).

Local planning

Local planning refers to planning and/or choosing what to write next (i.e., content or ideas) in regard to units no longer than a paragraph. This process, accounted for 6.94% of all the processes reported in the study. LH4, for example, wrote "I AM CONFUSED" and then paused to think about what to write next ("thinking confused for what?"). She then wrote "CONFUSED TO GO OR NOT TO GO" and paused again to think of a reason for this, and then wrote "I WANT TO HEAR SOMETHING TOTALLY DIFFERENT" (LH4, PB, B). Excerpts 67–69 provide other examples of local planning.

Excerpt 67: I wanted to uh say that's it's better that he (comes) he yeah he talks not somebody else it's better to wait for him to come back [...] Yeah I thinking what to say. What kind of excuse should I find? (HL1, CB, B)

Excerpt 68: So I was thinking about the second reason here. The first reason is that there are sometimes are skeletons that have been newly excavated and transported from South America to here so people will want to see, and then the second reason. (HH4, CB, B)

Excerpt 69: Because I was imagining like I am writing a letter, writing an email to the manager, I just wanted to include my number, my ID number, something like that. I was thinking if I write my name and I am an active member of the club, how will he know? How will he make sure? So I was like Okay, I should write my number. (HH2, CB, B)

Generating and retrieving

The retrieval and generation of ideas accounted for 5% of all the processes reported in the study. Four sources of generating and retrieving ideas were identified: self-based, text-based, task-based, and translating from L1. Self-based generating involves generating an idea without any stimulus or retrieving relevant information from long-term memory. This was the most frequently reported among the four generating and retrieving strategies, accounting for 70% of the reported instances of generating and retrieving. Excerpt 70, for example, shows that LL3 had to rely on her background knowledge of Chinese gardens when generating one of her ideas. As mentioned above, HL2 had to "make up a story" in order to generate ideas to complete the writing task: "I have to make up something about it" (HL2, PB, A). Excerpt 71 provides another example of self-based generating.

Excerpt 70: Mmm I think uh, English garden is different from Chinese garden, and then uh, uh English garden had uh they had x (tend) uh, more than Chinese garden. (LL3, CB, B)

Excerpt 71: Uh, so, and I thought if that's the case, at least it could have been done with less cost, less money being lost, being, being ruined, than just the whole cost of it. For the whole time I thought this is a good alternative that they could have maybe extended the time, uh, for signing up, so enough people would sign up or reschedule it somehow that could happen or maybe, uh, yeah. (HH1, CB, B)

The second most frequently reported generating strategy is task-based generating, which was reported in 21 SRs. Task-based generating consisted in generating ideas after or based on (re)reading the task or retrieving specific details from the task. The participants mined the task for ideas, details, words, as well as format and organisation. For example, several participants copied and paraphrased details from the task to summarise the situation described in the notice (e.g., HH3, HH4, LH2). When he could not come up with any ideas, LL2 reread the task looking for more details to add to his response to Part A (Excerpt 72). HL1 copied details from the task too (Excerpt 73), while other participants copied the format of the notice when writing their responses (Excerpts 74 and 75). Participants with low ELP tended to copy words and sometimes complete sentences from the notice too. LL1, for example, referred to the task frequently in order to copy words and ideas and to check the spelling and punctuation of his message against those in the notice (Excerpt 76). Nevertheless, LL1 obtained a low score.

Excerpt 72: Yeah I mean, I'm thinking about should I write something else and I was I'm reading the topic again about this part, about maybe the last part [of the task] uh well I was trying to find some details that I can say. (LL2, PB, A)

Excerpt 73: Yeah I again I was looking for name [of the speaker]. Yeah I was trying to find something in the question and use it. (HL1, CB, B)

Excerpt 74: Yeah and so when I write the first line I just uh follow from there from first uh first fir- first letter. Following yeah the rule the rule the law law when some write a pa- a letter. It's like I have to write x and write dear ma- manager of the club. (LH3, PB, B)

> Excerpt 75: I was reading the question, and then I copy the format first, the format of the letters, because I was not thinking about what I should write (at the time), I just copy the format first. And then I guess I was thinking about what what uh, possible alternative should be. (HH4, CB, A)

> Excerpt 76: Copy the sentence yes. Re- rewrite the sentence [in the task] again. (LL1, CB, B)

Text-based generating refers to generating ideas related to what has been written, often after re-reading text written so far. For example, LL2 reported that she had to reread what she wrote several times in order to generate new ideas (Excerpt 77), while LH4 reported referring back to her response to Part A to generate ideas when responding to Part B on paper (LH4, PB, B). Other participants (e.g., HL3, LL2) also reported rereading their responses to Part A to generate ideas when responding to Part B.

> Excerpt 77: I think I read, I read again maybe. When I have no idea I will read, the sentence, again. (LL4, CB, B)

Some participants reported that they generated ideas in their L1 and then translated them into English. LL4, for example, paused to think about how to express an idea she had in her L1 but she was not sure how to express it in English, particularly in terms of word order (Excerpt 78). LL3 and LH3 also reported translating some of their ideas from L1 (Excerpts 79 and 80). Other participants (e.g., LH1 and LH4) reported translating the format of the letter from their L1 (Spanish). LH1, for example, reported that in her L1, letters usually start by asking how the reader and their family are and that she paused to think whether to ask about how her friend is or to ask about her friend's family too as she would do if she were writing in Spanish (LH1, CB, A).

> Excerpt 78: Yeah, I have some idea in my mind but... I'm, but I'm not, I don't know how to translate in English... Yeah, because I know in Chinese but I don't know, I want to translate in English... So, I don't know, the word the order, the word order... Yeah, I want to say we can prepare this show more, more, more ready... Like this, but, ready you can, I want to say this show can prepared uh, more, yeah, understand? To ready, more satisfy, for me, this is I want to said but, I don't know how to, translate in English. (LL4, PB, B)

> Excerpt 79: Yeah. And then uh, in my (brain), I thought about uh in Chinese uh we, we say uh, (tide of x over), yeah. (LL3, PB, A)

> Excerpt 80: I had this sentence in my mind, but I want to know how to translate from my language to English. (LH3, CB, B)

Considering audience when micro-planning

Considering audience when micro-planning was reported 185 times in 31 SRs. LL1, for example, reported using specific examples, to persuade his reader (Excerpt 81). When responding to Part B on paper, HH3 paused to think how to lessen the impact of what he just wrote on the reader, then wrote "THIS IS NOT MEANT TO OFFEND YOU" (Excerpt 82). Excerpt 83 provides another example of considering the audience when micro-planning.

> Excerpt 81: I so I use another example to make more, more what persuasive. (LL1, PB, B)

> Excerpt 82: I wanted to put something in the last paragraph so the last part of the second paragraph does not have a negative impact on the manager. (HH3, PB, B)

> Excerpt 83: Uh I want to attract, uh attract the manager's notice on my message, so uh- Uh, attract her or his notice on my writing, so uh, I want to write more uh, interesting things at the beginning. (LL3, CB, B)

Difficulty micro-planning

The participants reported experiencing difficulties coming up with ideas in 15 of the SRs. In some of these cases, the participants used a problem-solving strategy to address the difficulty. LL1, for instance, paused frequently and for long periods of time when responding to Part B on the computer to think about what to write next. LL1 tended to pause after completing each sentence to think about what to write next, start to write, then delete what he wrote and pause to think again repeating "[I am] Stuck" (Excerpt 84). Similarly, when writing on paper, LL2 felt he needed to add more details but could not think of anything to add and so he abandoned the task (Excerpt 85). LL2 experienced similar difficulties when writing on the computer and had to abandon the task (Excerpts 86 and 87). As noted above, the main reason LL2 was not able to come up with ideas was because he did not understand the task and some words in the notice. LL4 also did not understand the task and, as a result, was not able to generate ideas. When writing on paper, LL4 would write an idea, sometimes less than a sentence, think what to write next, then write some words and then pause to think about what to write next; she also had difficulty expressing her ideas in English and so had to change her ideas (Excerpt 88). LH4 also paused several times to think about what to write next: "okay, what is next, what is next" (LH4, PB, A).

> Excerpt 84: I'm thinking how to describe, yeah. Yeah long pause... Stuck [laughs]... I don't know, I I think I should put some word, word at here... But, I don't know what should put [...] Because I don't know what I should type next, so I little bit nervous... So I type, randomly I don't know what I should type. (LL1, CB, B).

> Excerpt 85: Yeah I think the same thing I'm looking for some details. Finally I think I think is nothing there, so I just decide to end... so that that that's it, then so so from here I don't, I don't know how what what can I write? What else can I write about? So I just end [my response]. (LL2, PB, A)

> Excerpt 86: Uh, uh, yeah this time I I I read, read the whole thing, read the here [part A] and here [part B] to say some-to see if there is something I can add. But but but then I think I have to finish it, I can't I can't add anything else, so I click finish. (LL2, CB, A)

> Excerpt 87: I want I want to finish the sentence, but I can't. I can't make story anymore, so I stop, I stop here for a long time. Maybe two minutes, I stop there, I'm just thinking about next, and then I delete it. Two minutes. (LL2, CB, B)

> Excerpt 88: Because I no idea, and then write this and then I think... Yeah, I no idea. I want to say something but is difficult to say, in English so I change another way to say, I, I, I, I don't know how to say I will, I will f- I will, I will change another way. (LL4, PB, A)

Micro-planning problem-solving strategy

As the excerpts above show, to address micro-planning difficulties, some participants used some problem-solving strategies such as abandoning the task (e.g., Excerpts 85 and 86) or postponing the task (e.g., Excerpt 89). LL2 reported that because he did not understand the situation and the task, he could not generate ideas and ended up repeating the same idea again and again when responding to Part A on the computer (Excerpt 90). In contrast, when he could not generate ideas, HH1 decided to start writing with the hope that "more stuff would come to [his] mind" later (Excerpt 91).

> Excerpt 89: Yeah I thinking what to say. What kind of excuse should I find. [...] Yeah I thought maybe I I'm better start the the sentence that I'm going to say I'm not coming and then after that I might find something and put it there. (HL1, CB, B)

> Excerpt 90: uh, the only thing I do is to repeat my feeling of I disappointed, I'm sad, I'm disappointed I'm sad, that's it. I can't add anything else, that's why that's why sometimes I stop, it's only because I'm I'm trying trying so hard to get more details from there. (LL2, CB, A).

Excerpt 91: I thought I should start anyways cause I obviously didn't, I didn't have enough points then. So I had to start writing hoping that I would, like more stuff would come to my mind. (HH1, PB, B)

3.2.4 Translation

At the translation stage, propositional content previously held in abstract form is converted to linguistic form (Field, 2004). Drawing on their awareness of the target readership and the discourse and genre requirements of the writing context, writers make choices about language that is lexically, syntactically and functionally appropriate to both represent ideas identified during macro-planning and ensure that rhetorical demands are met. Writers also intentionally include some textual features in order to assist the reader in building an appropriate meaning representation (e.g., cohesion and coherence). Translation includes four subcategories (see Figure 2): planning or choosing how to write; considering audience when translating; difficulty translating; and using translation problem-solving strategy. Planning or choosing how to write was the most frequently reported process (*f*= 600, *Mdn*= 14.21%), followed by considering audience when translating (*f*= 164, *Mdn*= 3.16%) and difficulty with translation (*f*= 142, *Mdn*= 2.72%).

Planning or choosing how to write

Planning or choosing how to write the next part of the text in regard to units no longer than a paragraph accounted for more than 14% of the processes reported in the study. The participants considered language, balance, cohesion and coherence, and layout. Language accounted for most of the segments coded in this category. In Excerpt 92, for example, LL2 knew what he wanted to say, but paused to think about how to say it. Participants also paused to search for vocabulary (Excerpts 93 and 94) and/or to consider spelling (Excerpt 95), grammar (Excerpt 96 and 99), sentence length (Excerpt 100), wording (Excerpt 101), how to paraphrase phrases from the task (Excerpts 102 and 103), and punctuation (Excerpt 104).

Excerpt 92: Uh actually I know I know what I gonna say, I know I know I want to show, uh that I'm happy for this I'm happy to hear this, and I'm just thinking about which sentence I'm gonna use, which word, so. (LL2, PB, A)

Excerpt 93: I just wanted to refer to the um the people in the administration the people who handle the tickets um I was just I was searching for a good word to refer to them. (HH1, CB, A)

Excerpt 94: I was thinking how to say 'give them', you've got our money back [i.e., refund]. Yeah I was thinking to uh how to say it uh, that they're saying that uh, I don't know uh refund is not gonna be whole money? I just was thinking to how to say it and then I said we uh WE ARE NOT GOING TO PAY YOUR MONEY BACK. (HL1, PB, B)

Excerpt 95: The (climb) I'm not sure. Do you know (climb) mountain? X (climb), I know this word but I not sure the spell. (LL4, CB, B)

Excerpt 96: Uh, I after I wrote uh I FEEL SAD, I, mmm and then I begin to uh think about I should write in past tense, or single present tense...and then uh, I I AM looking forward, or I WAS looking forward because it is uh before I write this email. (LL3, PB, A)

Excerpt 97: oh the past tense [chuckles]. Yeah the past tense, they they I xx it's about some grammar things, uh they tell me that they cannot that the letter said they cannot we we cannot refund the cost, and I think if if I gonna repeat this, I gonna I have to change the past tense, so I use that THEY COULD NOT TELL ME. (LL2, CB, A)

Excerpt 98: Should I write has been cancelled or was cancelled? (LH2, PB, A)

Excerpt 99: I was thinking presented or present, but no, because it is going to be in the future, so I can't put presented. (LH1, CB, B)

Excerpt 100: How to express an efficient way because of the limit of words because I already wrote almost half the words, more than 20 words, so I need to make the sentence as short as possible. So it took me sometime to decide the sentence. (HL4, PB, A)

Excerpt 101: I'm, I'm talking about, their responsibilities so uh, I was thinking how I should word that in a sense that if they did not estimate uh, I was just rewording what I actually wrote at… I was just thinking how I should word it, uh, it was pretty much a wording thing. (HH1, CB, B)

Excerpt 102: I was thinking like how to rephrase, rephrase [TEXT]. (HH4, CB, A)

Excerpt 103: Oh here, I'm I'm thinking about to use another word to describe to describe [TEXT] uh this I I gonna so I I used the the THE SPEAKER GOT SICK…. Like just something paraphrase. (LL2, PB, A).

Excerpt 104: Oh I'm thinking about I should put semi colon or full stop... Because when I learn the English I, learn from different teacher some teacher say I can use semi colon... Or some teacher say no only full stop. So this at that time I a little bit confuse which one but finally I put full stop. (LL1, PB, B)

Balance or appropriateness of style and register was the second most frequently mentioned subcategory under planning or choosing how to write. Here the participants were not thinking about how to express their ideas in English, but how to achieve a particular effect or make their text appropriate for a specific audience and/or purpose. For example, when responding to Part B on the computer, HL4 paused to think about "how to tell the manager my suggestion in acceptable way". He also paused to consider word choice, specifically whether to use "tell" or "invite", deciding to use "invite" because "tell is rude". He paused again to "look for suitable words" and then decided to use "if possible" to make a suggestion "to make my tone, my words, more kindly" (HL4, CB, B). Excerpts 105 to 113 provide other examples of considering balance from the data.

Excerpt 105: I wanted to say 'you cancelled our trip and you do not give us a refund?'... I put a question mark to make more of an impact and to make it more stern and crude. (HH3, PB, B)

Excerpt 106: [I paused] to plan the structure of the sentence and choose some suitable words, not rude but friendly to show my understanding to the manager. (HL4, PB, B)

Excerpt 107: I thinking whether to say it in a direct way or in an indirect way. (HL3, CB, B)

Excerpt 108: Mmm, I wanted to like, write it very like serious that you can not you know uh don't give our money back I wanted to add something very I don't know the strong maybe I was just looking for good words. (HL1, PB, B)

Excerpt 109: Keep it professional, keep it formal and write Sir… because I don't know the manager. (HL2, CB, B)

Excerpt 110: Uh here I'm thinking about, It's gonna to, you know G-G-G-O-N-A. This this is totally same with "going to" but, that is more y'know, for speaking for speaking. So uh I'm thinking about if it's okay to use. But if I know xx decided to use IT IS GOING TO. (LL2, PB, B)

Excerpt 111: And then I wrote RECEIVE, I I remember in my book it is about business they usually use receive and then, uh I think uh, yeah I was considering about receive. (LL3, PB, B)

> Excerpt 112: Yeah I just, REGARDS or BEST REGARDS or YOURS SINCERILY. I just went with BEST REGARDS cause that's what we usually, what I usually write. (HH1, PB, B)

> Excerpt 113: It's not a formal letter so I wanted to say ditch or skip it [the talk]. (HH2, CB, A)

The participants also considered coherence and cohesion and layout, but not frequently. Excerpts 114–117 provide examples related to considering cohesion and coherence, while Excerpts 118–119 provide examples related to considering layout.

> Excerpt 114: And then since it asks "suggest possible alternatives" so I will just uh say that we we can still go because there there will be [another talk], so that will be a alternative, so I wrote HOWEVER as a transition word. (HH4, PB, A)

> Excerpt 115: Yeah I want to, think the, uh, connecting word... Yeah, which word I can choose, so just think this, think the connecting word, which one is better in here, yeah. (LL4, PB, B)

> Excerpt 116: I want to connect two uh, two different things and but it is not very big different because the history club and the manager is, they are uh connected.. because I can connect two two sentences. Uh and then the manager is come from his trip up uh so I just write AND to connect them. (LL3, PB, A)

> Excerpt 117: And then uh well I was thinking about what what uh communication uh- no no no what, connection yeah what connection I gotta use... Like, like like the relationship between the sentence and next. (LL2, PB, B)

> Excerpt 118: Yeah, and then I know that we uh, while we were while we were writing email, we put space and space after the paragraph. (LL3, CB, B)

> Excerpt 119: Yeah, I think uh, I was concerned about not putting all the email in one paragraph, so I, I just started, started on a new uh, paragraph just because xx when I'm writing any email if its long I just want to break it up so it's easier for the reader to read. (HH1, CB, B)

Considering audience when translating

In 164 cases in 26 SRs, decisions about how to write were made with explicit reference to the reader. HH3, for example, paused to think whether to use the present tense or past tense and which "will make more difference [impact]" (Excerpt 120). HH1 also reported using specific words (e.g., would) in order to achieve a specific impact on the reader (Excerpt 121).

> Excerpt 120: *I am disappointed* will make more of difference [impact] than *I was* [*disappointed*]. I was thinking which one will make more of an impact and I went with *I AM*. (HH3, PB, B)

> Excerpt 121: [writing I WOULD APPRECIATE YOUR RESPONSE] I think I put WOULD there, yeah, to just uh, make the sentence sound like I'm waiting for the response, force that person to tell me something, rather than just… to acknowledge my, you know, my… I just wanted him or her to acknowledge my email by responding… just a tactical thing. (HH1, CB, B)

Difficulty translating

Several participants reported difficulty translating their ideas into text. The difficulties the participants reported related mainly to language and balance. For example, LL1 paused several times while responding to Part B on the computer to consider how to express his ideas. He would think of a complex idea, but then could not express his idea in English and so he would abandon the idea or express it unclearly. In Excerpt 122, for example, he wanted to say that "who the presenter is" is more important than the topic, but he could not express this idea and so he deleted it. Excerpts 123–129 provide other examples of difficulty with language (e.g., grammar, vocabulary), while Excerpts 130–132 provide examples related to balance.

Some participants reported using problem-solving strategies when faced with translation difficulties (e.g., Excerpts 122, 124, 127 and 128) or abandoning the task (e.g., Excerpt 125).

> Excerpt 122: A little bit messy because, the sentence not make sense so I delete it and type delete it and type... I want to describe the name is more important than the, topic... Yeah because I want to describe, uh why I choose this, uh this this presentation because his name... But I don't know, how to describe it so I didn't, I delete it, xx. Yeah, long pause. (LL1, CB, B)

> Excerpt 123: I want to make a question but I don't know, I don't know how to make a question after uh, this sentence, that's not a sentence, it's not a question. (LL3, CB, B)

> Excerpt 124: Yeah, I want to, I, I, don't want to, use a x, but I don't know another word, I forget how to, how do I, how to spell this? How to spell the word... Is difficult to say in English so I change another way, to say, I, I, I, if I don't know how to say I will, I will f- I will change another way. (LL4, PB, A)

> Excerpt 125: And then I don't know how to explain "go to the trip on our own". And then I left it, so I want to finish because the time is up. (LL3, PB, A)

> Excerpt 126: I was thinking to change the sentence [from the task] without writing the same words of the email. I was trying to write something else for [TEXT] but I write [TEXT] because I didn't know how to say it in another way. (LH2, CB, A)

> Excerpt 127: I was looking for a word instead of *genuinely* because I uh I I was not sure how to write that [word]. I was looking for another word that I couldn't find it just wrote that. I'm sure it's wrong. [laughs]. (HL1, PB, B)

> Excerpt 128: I was thinking about saying something else about him, about the manager, like, I hope you are good, your family is good or something like that, but I really don't know how to say that so that's why I deleted it. (LH1, CB, B)

> Excerpt 129: So here I forgot it should be (amounts), amounts of chemical products. Here I tried to think about it, word for chemical products [i.e., fertiliser] like in the form again, but I still cannot think of it so I use CHEMICAL PRODUCTS again. Yes here I was thinking about that word but I cannot get it, so I use it again. (HH4, PB, B)

> Excerpt 130: I had a hard time wording that portion because I, as you will see I back and forth, I, I go back and forth a lot so, it's just a structure thing. I formed my thought before that for the whole sentence… I included that, I, as I intended to just to feel, just to sound sympathetic also, not just, you know somebody who just thinks of themselves. (HH1, CB, B)

> Excerpt 131: Uh I wanted to say now that is not coming or in this case what I was looking for a better word like to start the sentence not NOW or in this case I thought maybe it's not very formal to use. (HL1, CB, B).

Excerpt 132: Uh I wanted to say it's hard to make it it's hard to find time again for same speaker I was thinking maybe it's not nice to say like that but I don't know what. (HL1, CB, B)

3.2.5 Execution

Execution involves the physical process of writing, either through handwriting or typing on a keyboard. Execution includes four subcategories (see Figure 2): controlling; making notes; difficulty typing or handwriting; and using execution problem-solving strategy. Controlling was the most frequently reported execution process (*f*= 58, *Mdn*= 0.91%), followed by making notes (*f*= 69, *Mdn*= 0%).

Controlling

Controlling or managing the writing process was mentioned 58 times in 20 SRs. LH3, for example, thought about writing a draft of his response to Part B on scratch paper first but after checking the time, he felt he did not have enough time to write a draft and decided to write his response directly on the test paper (Excerpt 133). Similarly, HL1 thought about planning and drafting her response to Part B on scratch paper, but then decided not to because she thought she would not have enough time to copy her response (Excerpt 134). Finally, LL4 circled some words in the task in order to focus her attention and help her understand the task (Excerpt 135).

Excerpt 133: Uh uh I think I were thinking uh so I have to write uh write on the spare paper. What I'm thinking again but I think when I see clock that ha- uh maybe uh fifteen fifteen minutes. So I think if I write on the paper on some paper m- maybe I don't I don't have enough time to write again in the uh first page. So I decide write that in the [test] page. (LH3, PB, B)

Excerpt 134: I was thinking about the time and I decided to start uh like, writing drafts first and I said, no, I might not have time to just transfer it... I started writing it again. (HL1, PB, B)

Excerpt 135: [I circled those words] Yeah, it's pay me attention... Pay me attention focus on this thing... so I, I pay attention to read this information... Make me understand, more clear, just this... I want to know what does this, this, writing want me to write... I don't know, so I want to, focus on the notice because this, I, I, I think this is, this right?... I not sure so I circle. (LL4, PB, A)

Making notes

Making notes (on scratch paper and/or on the computer) was reported 69 times in 13 SRs. LL1 and LL2, for example, reported jotting down some points from the writing task (Excerpts 136–137).

Excerpt 136: Yeah, so at that time I I take notes what's going on x email respond. [TEXT]. Yeah I write, yeah notes, short notes. (LL1, PB, A)

Excerpt 137: I'm still try to get the point and uh, yea, and then I start to take some notes... Well the main thing is that something cancelled, that's the main point... and then uh and then we know we got a new one. (LL2, PB, A)

Difficulty typing or handwriting

In few cases, the participants reported difficulties with typing or handwriting. For example, LH4 complained that she "was writing so badly" because "the pen was so big" (LH4, PB, B), as did LL2 (Excerpt 138). HH1 reported that because he typed fast he often misspelled some words and so he had to go back and correct what he had typed (Excerpt 139). When writing on paper, LH2 wrote a draft on scratch paper and then copied his response onto the test paper commenting, "I was copying as fast as I could" pausing only "to rest my hand" (LH2, PB, B). This was the only example of an execution problem-solving strategy reported in the study.

Excerpt 138: It's just because the the the pen is too thick, it's too thick. (LL2, PB, A)

Excerpt 139: I think it's because when I put my fingers on the again like on the wrong button. (HH1, CB, A)

3.2.6 Monitoring

Monitoring may occur at different stages of the writing process and may relate to different aspects of writing. Monitoring includes 13 subcategories (see Figure 2): rereading to monitor; evaluating global text; evaluating local text; evaluating content; evaluating language/form; evaluating organisation/ rhetoric; evaluating balance; evaluating text length; reaction to own writing; considering audience when monitoring; checking the time; difficulty monitoring; and using monitoring problem-solving strategy.

Local text evaluation was the most frequently reported monitoring process (*f*= 322, *Mdn*= 7.72%), followed by language evaluation (*f*= 286, *Mdn*= 7.29%), rereading to monitor (*f*= 92, *Mdn*= 1.41%), reacting to own writing (*f*= 80, *Mdn*= 1.44%), considering audience when monitoring (*f*= 75, *Mdn*= 0.97%), and evaluating text length (*f*= 70, *Mdn*= 1.32%).

Overall, the participants reported more local text evaluations than global text evaluations (*Mdn*= 0.76%). They also reported evaluating language more frequently than other aspects of writing.

Reading to monitor

Reading text written so far to monitor language and/or content was mentioned in 21 SRs. LL3, for example, checked the time and because she felt she still had time, decided to read her response to Part B, checking how many words she had written (Excerpt 140). Similarly, after completing a first draft, LH4 checked the time, found that she still had time and decided to read her response to Part B "to go back and read carefully" (LH4, CB, B).

Excerpt 140: And then I x, and then I I know I have time, yeah I have time and then I, go back. And I read my writing. I think it's this one [response to Part B]. Uh read the whole thing. Uh because here I've uh, more words required then I want to and then I count my words to, uh roughly. (LL3, PB, B)

Global text evaluation

Evaluating the generated text at a global level (paragraph and above) was reported in 20 SRs. HH1 and HH4, for example, read their responses to evaluate it (Excerpts 141–142).

Excerpt 141: I think I doubt again and just read over quickly to see if it makes sense. (HH1, PB, A)

Excerpt 142: I just I thought I finish it. And then I just read, I check the whole text that I wrote, so I was checking Part A first. (HH4, CB, A)

Local text evaluation

Evaluating part of the generated text was reported 322 times in 32 SRs. LL1, for instance, evaluated a relative clause he wrote, deciding that it could be confusing for the reader (Excerpt 143). HH1 and HH4 also reported evaluating local text (Excerpts 144-145). In Excerpt 143, LL1 decided to revise his text after evaluating its clarity, but in other cases participants felt that the text was fine (e.g., Excerpts 146–147).

Excerpt 143: Yes which question but after that I (didn't) because that would let the reader confuse... Relative clause Sometime will let the reader confuse... I think, so so after that I deleted it. (LL1, CB, A)

Excerpt 144: I was just reading the sentence to see if there are errors, misspell. (HH4, CB, B)

Excerpt 145: I went back to see if my sentence was complete so I can put the full stop. (HH1, PB, A)

Excerpt 146: I read my sentence... Just check it very carefully. I think it's correct. (LL1, PB, A)

Excerpt 147: I wasn't so sure about grammar and how it sound and then I realised that there is no problem, it is correct. (LH2, PB, A)

Evaluating content

Evaluating content or ideas written or not written yet (with or without revising) was mentioned in 18 SRs. HH1, for example, felt that what he wrote was "reasonable" (Excerpt 148), while HH4 felt that one of the ideas he included was "not very bright" (Excerpt 149). In Excerpt 150, HL1 felt that what she wrote "was not very interesting".

Excerpt 148: I felt, I felt that uh, I would not have a strong reaction but I found what I wrote reasonable. That's what I can say about my feelings. (HH1, CB, B)

Excerpt 149: And then I was examining this sentence again and I I thought that what I wrote before was not very bright, there's a newly excavated dinosaur skeletons, it was kind of awkward, so I I made a change it. (HH4, CB, B)

Excerpt 150: Uh, I think I was going back and reading sometimes, the whole paragraph. I was kind of confused cause I didn't know, I don't know it was not very, interesting for myself I was trying to say better things. (HL1, PB, B)

Evaluating language

Evaluating language (grammar, lexis, spelling, punctuation) written or not written yet (with or without revising) was mentioned in 32 SRs. Excerpts 151–155 provide examples of evaluating language.

Excerpt 151: I'm checking my grammar because but and because cannot put in the same sentence so I delete it. (LL1, CB, B)

Excerpt 152: [I paused] to to check check the grammar mistake, check something else in the whole whole writing, uh fix someone, and fix fix fix the, mistake. (LL2, CB, B)

Excerpt 153: I was still checking on this sentence, still looking for error, yeah so I changed that misspell. (HH4, CB, B)

Excerpt 154: And so here I, I reread the sentence and I thought that maybe how how people are indifferent is not grammatically correct, so I change that. (HH4, CB, A)

Excerpt 155: I looked back to see if I wrote HEARD right. (HH1, PB, A)

Evaluating rhetoric/organisation

Evaluating organisation (with or without revising) was mentioned in 14 SRs. HL4, for example, paused to check whether his next sentence "combines with the other sentence naturally" because "if some mistakes happen between sentences then the letter will not be natural, then the manager will not accept my suggestion" (HL4, CB, B). Similarly, after adding a new idea to her response to Part B on the computer, HH2 read her response to see if the new idea she added "has a flow to it, if it makes sense and the sentence is right and it is coherent" with the other parts of her response (HH2, CB, B). In Excerpt 156, HL1 read what she had written and then changed the order of two sentences.

Excerpt 156: Thinking to change it. I was uh I caught this part I I say that I'm sorry for his health first and then I'm afraid I can not come, I thought that [the order of the two ideas] would be better. (HL1, CB, B)

Evaluating balance

Evaluating balance (with or without revising) was mentioned in 26 SRs. HL4, for example, took a long time reviewing his response to Part B on the computer because "writing a letter to the manager is serious" and so he had to check if there are any mistakes, if the letter "is suitable", and if he needs to add more details (HL4, CB, B). Similarly, HH3 thought of writing "the guy" but then changed it to "the speaker" because "this is to the manager" (HH3, CB, B). He then paused again to consider "if it [a sentence] is appropriate to write it to the manager" (HH3, CB, B). LH4 thought about how wording can be perceived by her reader and changed "TO MEET WITH YOU FACE TO FACE" to "MEET WITH YOU", deleting "FACE TO FACE" because it suggests "a fight and I don't want to fight with him" (LH4, CB, B). HL2 felt that he "sounded funny" when responding to Part A because he is not used to writing to his friend in a formal way (Excerpt 157). In Excerpt 158, HH4 felt that the way he expressed his idea was not appropriate, while in Excerpt 159 HH1 paused to think whether one of the words he used was "too strong".

> Excerpt 157: I sounded funny in my head, talking in a weird way to my friend, Oh, I am writing this to you because of this... None talks like that these days, so I thought it is weird. (HL2, PB, A)

> Excerpt 158: At first I wanted to write IF YOU HAVE ANY CONCERNS but if I, if I said, if I wrote that way it was like I am the manager, so later I change it, because I think like the phrase, IF YOU HAVE ANY CONCERNS, it's more like something that a manager would tell to a club members, so I deleted that... I changed it. (HH4, CB, B)

> Excerpt 159: I looked at that word UNFAIR, I was not sure if I should use the word UNFAIR. If it's too strong or not. If someone reads it would they back off, too much or not. (HH1, CB, B)

Evaluating text length

Evaluating text length was mentioned in 19 SRs. LL4, for example, decided that she had written enough, but then reviewed her response and thought that she had to write more because of the length requirement in the task, but she did not know what to write next (Excerpt 160). Other participants also paused to count how many words they had written (Excerpts 161–162). In most cases, the participants who considered text length felt they did not write enough (e.g., Excerpts 160, 163), but in some cases they were satisfied with how much they wrote (Excerpt 164).

> Excerpt 160: Uh, I think after I finish this, this… And then I think is not enough, enough word... Yeah because you said, one hundred twenty, one hundred twenty to one hundred fifty, so I want to say, same word... And I think, yeah, I think, wha-, what can I say after this. Yeah, and then think think think. (LL4, PB, B)

> Excerpt 161: Uh, I I was calculating the words. (LL3, CB, B)

> Excerpt 162: I was counting the words because I have to write between 120 and 150 words, so I was checking if they were enough. (LH2, PB, B)

> Excerpt 163: Uh no most of the time I was just thinking it's hundred fifty words or not yet and, if I wrote it right I... Yeah I was thinking uh if it's enough. [...] I was thinking it's not enough that uh whatever I I wrote so I should add more I was thinking what should I add. (HL1, CB, B)

> Excerpt 164: I thought that I said enough that, I would just repeat myself if I go on more, I think I decided to bring it to an end. (HH1, CB, B)

In some cases, the requirement to write a specific number of words seems to have affected the performance of the participants. As Excerpts 160 and 163 show, some participants frequently referred to making their responses to Part B longer, often in response to the requirement to write 120–150 words, rather than to address the task of writing a message about their feelings and suggesting alternatives (i.e., *I have to make the response longer*, rather than *I need to add more details to address a specific rhetorical goal*). Other participants felt that the length requirement was a constraint. HL2, for instance, "thought of writing some more", but did not because "the word limit was there" (HL2, CB, A). Similarly, LH1 thought to add more ideas, but then decided not to because the task asked for only 50 words and so "it's enough" (LH1, CB, A). HL4 reported that he considered how to express his feeling in "an efficient way because of the limit of words because I already wrote almost half the words, more than 20 words, so I need to make the sentence as short as possible" (HL4, PB, A).

Reacting to own writing

Reacting in personal and affective ways to own writing was mentioned in 24 SRs. For example, HL1 reported that she did not like or was not happy with what she wrote without explaining why (Excerpts 165–166), while HL2 felt that he "sounded funny" when responding to Part A because he is not used to writing to his friend in a formal way (Excerpt 157 above).

> Excerpt 165: I didn't like it I just delete it. (HL1, CB, B)

> Excerpt 166: I was not happy with that I was thinking to change it but I didn't have anything else. I used it again. (HL1, CB, B)

Considering audience when monitoring

Considering audience when monitoring was reported 75 times in 20 SRs. The participants evaluated the anticipated response of the audience to both the content and language of their texts, with one third of the comments concerning audience reaction to content and two thirds concerning audience reaction to language. LH1, for example, read what she wrote and thought that the reader will say "oh, she is very angry" so she added "SORRY TO BE SO RUDE" (LH1, CB, B). Excerpt 167 provides another example of considering the reader's reaction to content, while Excerpts 168–171 provide examples of considering the reader's reaction to language. In Excerpt 172, HH4 reported that he did not want to use the same phrase in both parts of the task, although the two messages are intended for different readers, suggesting that he thought of the marker as the reader in both cases.

> Excerpt 167: [I read my response to Part A] to see for the person who's gonna read, it make sense to this person. (LH4, CB, A)

> Excerpt 168: Hmmm, first I want to say THEY, but they is mean, who? so, it not make sense so I change it... If I write they the reader cannot know who... So I delete they ... So I write THE OPERATING COMPANY. (LL1, CB, B)

> Excerpt 169: That is I WILL BE HAPPY TO JOIN THAT, mmm I think both okay and uh, in my my opinion. Yeah, will and may, Will and may, I think both okay, uh but I I just change it. I think they will be more comfortable to read [MAY BE HAPPY]. (LL2, PB, B)

> Excerpt 170: [I did not change the mistake] because it doesn't make sense if you correct your mistakes when he is your friend, like, he is not going to take it as serious so I just wrote it as I like it. (HL3, CB, A)

> Excerpt 171: I was also thinking should I be that um I was thinking should I be that just um you know just say I want this is ridiculous and I just thought I should if I should write that or if it sounds silly to you that's why... yeah like how I actually put the like uh exclamation mark and all that. (HH1, CB, A)

> Excerpt 172: Here I saw I started a letters by the some greetings HOW ARE YOU? before I use HOW HAVE YOU BEEN? I don't want to be repetitive so I use HOW ARE YOU? rather than the same same same phrase that I use before [in Part A], so I use HOW ARE YOU? (HH4, PB, B)

Checking the time

Checking the time was mentioned 34 times in 20 SRs (e.g., Excerpts 173 and 174).

> Excerpt 173: I was thinking about the time and I decided to start uh like, writing drafts first and I said no I might not have time to just transfer it... I started writing it again. (HL1, PB, B)

> Excerpt 174: I I think I looked at the time. (HL1, CB, B)

Difficulty monitoring

Difficulty monitoring was mentioned 13 times. HL1, for example, reported that she was not happy with one part of her response and thought about changing it but then did not change it because she "couldn't come up with anything else" (HL1, CB, B). LL4 considered her use of prepositions, but was not sure how to judge if "the preposition can be put in here" (Excerpt 175). Only a handful of problem-solving strategies were reported to address difficulties with monitoring (see Appendix H).

> Excerpt 175: Yeah, I don't think is this need the preposition so, because I'm not sure, the preposition can be put in here? Yeah so, which preposition I can chose so I, I forget this, I forget the preposition, I continue. (LL4, PB, B)

3.2.7 Editing and revising

As a result of monitoring activities, a writer may return to those aspects of the text considered unsatisfactory and make corrections and adjustments in terms of different aspects of writing (e.g., lexis, grammar, rhetoric, degree of formality) after a sentence, after a paragraph, or after the whole text has been written (Field, 2004). Editing and revising include eight subcategories: review decision; content revision; language revision; organisation revision; balance revision; typography or spelling revision; difficulty revising; and using problem-solving strategies to address revising difficulties (see Figure 2).

Language revision was the most frequently reported editing and revising process (*f*= 144, *Mdn*= 2.75%), followed by content revisions (*f*= 81, *Mdn*= 0.95%), typography and spelling revisions (*f*= 79, *Mdn*= 1.41%), and balance revisions (*f*= 40, *Mdn*= 0%).

Review decision

Deciding to review and improve the text was reported 39 times in 15 SRs. HH2, for example, read her response to Part B and changed the order of the two suggestions she had made. She then decided to review and edit the whole text to make it consistent with the change she made in the order of the suggestions describing these changes "like a domino [effect]" (HH2, CB, B). LL2 read her response to Part A "to see if there is something I can add" (Excerpt 176), while HH4 reviewed his response to Part A to check "if there were any errors" (Excerpt 177).

> Excerpt 176: Uh, uh, yeah this time I I I read, read the whole thing, read the here [Part A] and here [Part B] to say some-to see if there is something I can add. But but but then I think I have to finish it, I can't I can't add anything else, so I click finish. (LL2, CB, A)

> Excerpt 177: Here I was just, I was just examining the whole paragraph, if there were any errors. (HH4, PB, A)

Content revision

Content or conceptual revisions affect the informational content of the text at the global level (i.e., the global summary of the text written thus far) and/or at the local level (e.g., sentence). The participants reported 81 content revisions in 23 SRs. These revisions involved mainly adding new content (Excerpts 178–182) and, less frequently, deleting content (Excerpts 183–184) and substituting content (Excerpt 185).

> Excerpt 178: And then uh uh after I count my first writing, uh I think it is almost uh x this required. Uh, and then I thought one hundred and twenty-first not too long and not too short. And then-... I want uh, write more words so uh, I find I find uh this sentence. Yeah. Uh I want to explain it clearly. I just want to uh make it clearly. (LL3, PB, B)

> Excerpt 179: Because I want to add more, more thing in my sentence... So I think this one is not, not what, not complete so... Yeah so I add more detail. More specific. Because (I say) this one is draft I can put inside or not. So if not necessary I will delete it. (LL1, PB, B)

> Excerpt 180: Uh yeah because because I write this [response to Part B], because I write uh, I I I was checking this part [Part B], uh and I said I AM INTERESTED IN THOSE TRIP, PLEASE SEND ME MORE DETAILS ABOUT yeah something in the future. So I think I can add a sentence [from Part B] on this [to Part A]. (LL2, CB, A)

> Excerpt 181: And then I check it... and then I add in TEN NEW MEMBERS just to be more detailed. Yeah so I think I was just reading this sentence. (HH4, PB, B)

> Excerpt 182: Just be more informative I thought I should add that SO WE COULD GO TO THE TRIP AND NOT BE PENALISED I think, so, uh, I just thought it would be more informative, it just makes more sense to explain, I thought it would just explain me better if I added a description to my sentence, as to what exactly I meant by that. (HH1, CB, B)

> Excerpt 183: It's not, uh, not logical, I think it not logical so I delete it. (LL1, CB, A)

> Excerpt 184: Then I delete it. Uh I thought thought it's not good, that. (HL1, CB, B)

> Excerpt 185: Yeah here, here I thought that the manager pay for the fees, that would not be right like manager, we cannot have the manager pay for the money from his pockets, maybe our club, then I thought maybe our club has some like something like money the fund for the club, the fund collected from people for the club so I changed that to YOU PAY FROM THE FEES FROM THE CLUB FUND. That that made more sense because I don't think it's likely that the manager will pay for all the fees for for all the members from his own pockets, that's not likely, so I changed that. (HH4, CB, B)

Language revisions

These are revisions made to language (i.e., grammar, vocabulary, punctuation), but they do not affect the meaning. Language revisions were reported 144 times in 29 SRs. Excerpts 186–192 provide examples of language revisions made by the participants.

> Excerpt 186: I was still checking on this sentence, still looking for error, yeah so I changed that misspell. (HH4, CB, B)

> Excerpt 187: I write the WERE? WERE but I think I can't use *were* so I change the word to WAS uh it's about vocabulary, it's about grammar. (LH3, PB, A)

> Excerpt 188: I was writing I CAN'T and I change it to I WILL NOT BE. (HL1, CB, B)

Excerpt 189: Yeah here uh I thought that I should put a comma after AFRAID for gram- grammatical. (HL1, CB, B)

Excerpt 190: So I add an S because it's plural. (HH4, CB, A)

Excerpt 191: I delete THAT, I think it's more fluent without, because normally you just say 'I think blah blah blah' you don't need to say 'I think that blah blah blah' so I delete THAT. (HH4, CB, B)

Excerpt 192: I change WITH to ABOUT. I felt that would be more fluent you would have a question about a suggestion, rather than you have question with something. ABOUT is more appropriate. (HH4, CB, B)

Organisation revision

The participants reported only 8 instances of organisation revisions (i.e., changes to the order of paragraphs or sentences). For example, after writing a first draft on scratch paper, LL1 decided to add new details and reorganise his ideas when writing the final draft on paper. Thus, in the first draft, he asked for a gift card and referred to the insurance company, but when writing the final draft, he decided that these are two different ideas and should be discussed separately "because when, because at that time I thinking about the insurance and the coupon is the different ideas... So I separate to the first part and second part" (LL1, PB, B). HL1 changed the order of two ideas when reviewing her response to Part B on the computer (Excerpt 193).

Excerpt 193: Thinking to change it. I was uh I caught this part I I say that I'm sorry for his health first and then I'm afraid I can not come, I thought that [the order of the two ideas] would be better (HL1, CB, B).

Balance revision

These are revisions that affect the text on a stylistic rather than a formal or conceptual level. They are changes that adjust the text in order to make it more (or less) appropriate for the intended reader. LL1, for example, reported that he made changes to a sentence to make it "more personal" (LL1, PB, B) and revised another sentence to make it shorter and avoid "redundancy" (Excerpt 194). Excerpts 195–197 provide other examples of balance revisions made by the participants in the study.

Excerpt 194: I change the sentence... Oh because I want to make, to shorter, because when I separate the sentence will become longer. So I put it together, I put NOT ONLY and BUT ALSO together. That's called redundancy. Redundancy? to make it shorter. (LL1, PB, B)

Excerpt 195: Uh I th- I thought that that I had to say MIGHT not WILL. (HL1, CB, B)

Excerpt 196: That is I WILL BE HAPPY TO JOIN THAT, mmm I think both okay and uh, in my my opinion. Yeah, will and may, will and may, I think both okay, uh but I I just change it. I think they will be more comfortable to read [MAY BE HAPPY]. (LL2, PB, B)

Excerpt 197: Uh, I'm thinking about your company because but your company is just only one. Because actually most of the travel company have paid the insurance rates to the insurance company. So I change it to more general. At the beginning I write COMPANY, but but I don't like finally change it to I E S. (LL1, PB, B)

Typography or spelling revision

These are revisions undertaken as a result of a typing or a spelling error. These revisions were reported 79 times in 27 SRs. When writing on the computer, LH4, for example, tended to type fast and to pause frequently to correct typos. Similarly, when responding to Part B on the computer, LH3 felt that he did not have enough time and so had to type his response fast without planning. As a result, he engaged in many revisions at the point of inscription to correct both spelling/typos and content (Excerpt 198). Excerpts 199–201 provide other examples of typography and spelling revisions made by the participants in the study.

> Excerpt 198: When typing quickly, maybe something wrong with the spell. (LH3, CB, B)

> Excerpt 199: Uh the better? That's a spelling mistake so I cancel it out. (LL2, PB, B)

> Excerpt 200: That was my mis- typing mistake. (HL1, CB, B)

> Excerpt 201: DISAPPOINTED, I think it's wrong. I add a "p". I don't know it's wrong or not. (LL2, CB, A)

Difficulty revising

The participants reported only eight instances of difficulty revising. LL3, for example, wanted to make a change to her text, but she "didn't know how to change it" (Excerpt 202). Similarly, HL1 was "not happy" with part of her text and wanted to change it, but she "didn't have anything else" (Excerpt 203), while LL2 wanted to add "something", but he could not "add anything else" and decided to "finish" (Excerpt 204).

> Excerpt 202: Yeah. And then I thought that can I use AS... As, as that time, because it is not xx. It is not clear. [But] I didn't know how to change it. (LL3, PB, B)

> Excerpt 203: I was not happy with that I was thinking to change it but I didn't have anything else. (HL1, CB, B)

> Excerpt 204: Uh, uh, yeah this time I I I read, read the whole thing, read the here [Part A] and here [Part B] to say some-to see if there is something I can add. But but but then I think I have to finish it, I can't I can't add anything else, so I click finish. (LL2, CB, A)

3.3 Variability in writing processes across Parts A and B

Both forms of the task consisted of (a) a short notice that describes a situation where a planned club event has been cancelled followed by (b) instructions to write two messages, one to a friend and one to the club manager, describing the candidate's feelings and "suggesting possible alternatives".

Most of the participants interpreted the task as intended and many of them were aware of the differences in the level of formality required by the two parts of the task. For example, HH1 reported that the two parts ask him to write two messages to express his feelings about the situation described in the notice and to suggest possible alternatives, but that Part B requires a longer and more formal response given the differences in terms of audience (Excerpt 205). Similarly, HL2 felt that both task parts are about the same topic, but address different audiences, which affects the level of formality of the response (Excerpt 206).

> Excerpt 205: For Part A I have to uh, tell my friend about it [the notice] and show my feelings, I mean talk about my feelings and suggest possible alternatives. [In Part B] I have to do the same thing but to the manager of the club, explaining my feelings about the notice and suggesting possible alternatives it should be under 120, under 150 words. It has to be more formal. (HH1, PB, interview)

> Excerpt 206: Part A is writing to your friend to complain about [TEXT], which is informal. I had to tell my friend what happened and how it affected me, so I was talking to my friend. [Part B] is asking the same thing as Part A, but to address it to the manager, about the problem and the possible solutions. (HL2, PB, interview)

In the follow-up interview, the participants identified several differences across the two parts of the task and how these affected how they approached the task and what they wrote, as the excerpts below show. The differences concerned the audience/reader (e.g., Excerpt 207), the level of formality (e.g., Excerpt 208), the level of reasoning and argumentation required (e.g., Excerpt 209), the content of each message such as suggesting alternatives in Part B, but not Part A (e.g., Excerpts 210 and 211), the content and organisation of each message such as that one needs to introduce themselves in Part B, but not in Part A (e.g., Excerpt 212), length (e.g., Excerpt 211), importance of linguistic accuracy (e.g., Excerpt 213), attitude (e.g., Excerpt 214); importance (e.g., Excerpt 210), genre (e.g., Excerpt 215), purpose such as whether to request a refund (e.g., Excerpt 210), appropriateness of revealing one's feelings (e.g., Excerpt 216), level of difficulty (e.g., Excerpt 217), level of comfort (e.g., Excerpt 217), and reader background knowledge (e.g., Excerpt 218).

> Excerpt 207: I think Part A and Part B is the same thing, just the person is different. I write the friend and write the manager right? Email the friend just the person is different. [...] Part A just ask me to write, (forty) word right? (Forty) words is very short. Yeah, I think is different when I write my friend I think the word can be different, and write the manager maybe, y- the word might be maybe use the official word. Official word, yeah, and friend, I think friend can be use, usual word. (LL4, PB)

> Excerpt 208: Part A is less formal and should be easier, like, take it easy, just write your feelings and, rather than Part B when, I think it's after Part B, where you're restricted to certain things, certain words. The way to explain things I guess. (HH1, PB)

> Excerpt 209: I think when you talk to your friend, you're not really that much concerned about making… making a case for it, like you just say your opinion, but Part B is less opinionated, more reasoned because you are trying to prove a point. Uh I think with Part A you're just assuming that the person has the same opinion [...] cause for Part A you don't, as I said you don't, you're not trying to prove a point, you don't try to reason, you're looking for sympathy, uh, for approval. For Part B you're just, you're not trying to sound like a child, just saying I want this, I want that, I just you just reason things. So you refer to the logic part, part of your brain much more, than… And you just feel like you are being watched, so you just try to behave. (HH1, CB)

> Excerpt 210: Part A, I think, it's a casual way, just complain and complain. I didn't think a lot before I write, because to my friend no matter how many mistakes I make, how many rude language I use. It doesn't matter. To talk about my feeling, not suggestions, because my friend doesn't care about suggestions. Part B I'm writing to the manager which is to complain the cancellation and ask him or her to return the benefits I deserve. The most important part of part B is the suggestion. [...] When I write to my friend, it is much casual, but to the manager I need to be polite all the time because I know if I write something rude, the manager will not reply me as soon as possible or I can be easily ignored, so if I need to get some benefit I need to be polite and need to think before I write the sentences. (HL4, PB)

> Excerpt 211: When I wrote the first one I didn't think of suggestions, but for the second one I had to make suggestions how to make the event better. The second one was longer and I had to include suggestions and solutions and why, I had to support them, just to prove what my suggestions are and why I am suggesting this. The first one I was just writing to my friend, it was just three lines, it was nothing. The second one was more like an actual formal writing task although it was a letter, it is more organised and ordered, I wrote it down in order of importance; I started writing about my feelings, and then first suggestion, second suggestion. (HH2, CB)

Excerpt 212: I have to introduce myself in Part B but not Part A because my friend knows me. (HL3, CB)

Excerpt 213: Uh maybe I don't care what my friends think about my writing or m- how I'm writing it but I I care that what my manager thinks. [...] Yes so for first one I didn't use any, I didn't like think about it but for second one I think it was formal, I I tried to correct my grammar mistakes I was worried about my spelling. Uh I wanted to be very logical and not very, I don't know, I tried to make sense for second one. (HL1, CB)

Excerpt 214: Yes, Part A was to a friend so I was not as hostile or aggressive when writing to my friend because it was not his fault. But when talking to the manager, I am addressing the person who is responsible for what happened so I was more aggressive, this is your fault, you should have done better, you should have done this or that. (HL2, PB)

Excerpt 215: Part A is like an email that you can write everyday and Part B is more like occasional. One is formal and one is friendly. Maybe writing to a friend, you might need to find a solution by yourself and Part B you are asking for a solution. Part A, I respond as you write to a friend and Part B, I respond how you write to a company like a job email, and pretending something. (LH2, PB)

Excerpt 216: Uh it's like uh when I write with my friend. I choose way it's easy way to talk it's like talk with my friend I can talk call uh with comfortable... Yeah I can talk anything. Yeah say he's my friend he can know that my feeling. Part B, I can't I can't show all my feeling. Because uh uh sometime the I I had to respect with the manager but... To keep the because I member of this club. So I can't maybe can not uh talk more like more like rude. Rude with him. So uh maybe I have to write careful. (LH3, PB)

Excerpt 217: Part A was easier and more comfortable, I could think of many things so I had many ideas for the first topic. Here I feel comfortable and I feel like have my ideas clearly. Part A is okay, I do not write to my friend, but I was thinking that I was talking with her by phone so I was writing letter to leave like evidence. The second part I say okay you are the responsible of the situation and I feel okay to write a letter. I had to write something different for Part B and I had to be very polite because if I am not polite he will not have the meeting. (LH4, CB)

Excerpt 218: Uh, Part A is write to my friend, and Part B is write to the manager. Because my friend maybe uh, didn't know the trip and I told I tell her the trip is cancelled so uh maybe she, uh is like uh is uh this trip cancelled that is not my business so uh, I have to uh tell her about this uh without my angry feelings. So uh, yeah uh to to the manager uh I can tell the manager my my emotion uh I angry, I feel irritated so uh and then I want I want him, I want the manager to make this trip for the members. (LL3, PB)

Of the 4,517 processes reported in the study, 39% related to Part A, 59% related to Part B, and about 2% related to both parts of the task. Table 8 reports descriptive statistics for the percentages of the main categories of reported processes by task part (across both writing modes). Comparisons of the proportions of main categories of cognitive processes across task parts (i.e., Wilcoxon Signed-Ranks tests) indicated that Part A elicited significantly more macro-planning processes (*Mdn*= 24.04%) than did Part B (10.65%) (Z= 3.5, p<.05, r=.62). Part A also elicited significantly more execution processes (*Mdn*= 2.36%) than did Part B (1.14%) (Z= 3.3, p<.05, r=.58).

On the other hand, Part B elicited significantly more monitoring processes (*Mdn*=26.46%) than did Part A (22.47%) (Z= 2.2, p<.05, r=.39). Additionally, as Table 8 shows, Part B elicited more organisation, micro-planning, translation, and editing and revising than did Part A, but these differences were not statistically significant. In terms of subcategories of writing processes (see Appendix I), Part A elicited more (by 2%) reading the task, task conceptualisation, and analysing or constructing situation (under macro-planning) than did Part B, while Part B elicited more (by 2%) organising the message (under organisation), generating and retrieving (under micro-planning), and planning or choosing how to write, particularly balance (under translation).

	Part A				Part B				Wilcoxon Test	
	M	Med	Min	Max	M	Med	Min	Max	Z	Sig
Macro-planning	25.35	24.04	3.70	50.00	15.14	10.65	1.00	46.67	3.5	.00
Organisation	1.73	.00	.00	12.50	2.86	2.28	.00	11.39	1.7	.09
Micro-planning	19.82	14.46	.00	58.82	19.36	17.25	5.70	61.67	.06	.95
Translation	19.30	19.13	.00	54.84	23.69	22.86	.00	46.27	1.7	.08
Execution	4.30	2.36	.00	25.00	2.01	1.14	.00	7.50	3.3	.00
Monitoring	21.91	22.47	.00	41.94	27.35	26.46	11.90	49.00	2.2	.03
Editing & revising	7.61	6.28	.00	20.63	9.58	8.79	.00	33.00	1.4	.16

Table 8: Comparisons of cognitive processes (%) across task parts

Parts A and B ask the candidate to adopt different roles or relationships *vis a vis* the reader (friend vs. club member) and this is expected to affect what and how candidates write. As noted above, all the participants in this study were aware to some extent of the differences between the two parts of the task and this seems to have affected how some participants went about responding to each part. In Excerpt 219, for example, HL1 reported that she was aware of the differences between the two parts of the task and described how these differences affected her approach to the task. Because Part A was "for a friend", HL1 reported that she "didn't really think about it". But for Part B, she "thought a lot" about what and how to write. Awareness of how the audience for the two parts of the task was evident in HH1's stimulated recalls as well. For example, in response to a question about what he was thinking during a pause, he responded: "If I should have written the same thing I wrote to my friend or something more formal" (HH1, PB, B). When writing on the computer, HH1 reported that he paused frequently when responding to Part B because he had to write formally (Excerpt 220).

Similarly, HH3 used a spoken register (CUS, THESE PEOPLE, THE GUY, and THEY ARE LIKE for they said) when responding to Part A on the computer, but avoided such words when responding to Part B. For example, when responding to Part A, he used "cus" for because and "guy" to refer to the speaker since he was writing to his friend: "I was thinking if I should write the name, but it's a chat, it's my friend so [I wrote] THE GUY guy", writing "CUS THE GUY FELL ILL" (HH3, CB, A). When responding to Part B, HH3 reported that he thought of writing "the guy" but then changed it to "THE SPEAKER" because "this is to the manager"; he also indented all his paragraphs in Part B, which he did not do in Part A (HH3, CB, B).

> Excerpt 219: I think Part A was for a friend and, I didn't really think about it. But for Part B, I thought a lot to find better words. I like Part A more. Because it's easy I don't need to think but for Part B I should think to better words. Mmm I think they're totally different. For Part B, I should write it very formal, for Part A you don't need to write it. It's for a friend, you can write it f- like the way that you want to. (HL1, PB, interview)

> Excerpt 220: I stop, even more [than in Part A] and rethink and backspace a lot because it's formal, uh, I think you're going to find this more in the second task, uh, particularly uh, I was thinking how to begin writing... I was thinking how I should write my email in a nice way. We cannot begin the email with a rant. (HH1, CB, B)

Likewise, when responding to the CB version, HL4 felt that his response to Part B should be different from his response to Part A in terms of length (Part B should be longer), the kind of suggestions he had to make (suggestions to the manager should help solve the problem as a club member), level of formality (Part B should be more formal), and how to start the response ("because writing to a manager, a good start is necessary").

Thus, HL4 began his response to Part B by summarising the notice he received ("to begin with the facts, I think, is suitable"), but he "did not need to talk him or her too much detail about the show because he absolutely knows the show, so I do not want to waste too much words on this" (HL4, CB, B). When responding to the PB version, HL4 reported that, although he wrote about his feelings and made suggestions in both parts of the task, he thought that making suggestions was the most important part of his response to Part B, while expressing his feelings ("complaining") was the most important part for his response to Part A. He explained that making suggestions is the most important part of his response to Part B "because my friend does not care about the suggestion, but the manager may help him or her make a decision and it is possible that I can get more benefit from what the manager do next time" (HL4, PB, B).

Finally, HL3 felt that Part B has to be formal and Part A can be informal, but also that he has to suggest alternatives only in Part B, but not Part A (Excerpt 221).

> Excerpt 221: Part A was really easy because you are writing to your friend so you can mix up your emotions. For Part B, you are writing to the manager, so you have to write in a formal way and be careful about your language. The parts are similar because you write the same thing except the alternatives which you write to the manager but not your friend. (HL3, PB)

When asked how they evaluate their responses to the task in the follow-up interview, some participants reported that they found Part B more challenging and as results were less satisfied with their responses to Part B than their responses to Part A. HL2, for example reported: "I like my response to Part A because I made up a story about a friend, I made things up, but Part B was kind boring because I was just complaining because I could not build up a story about the manager" (HL2, PB, follow-up interview). HL1 reported that Part A "was very comfortable", while Part B "was confusing, very hard" because "when you imagine that your friend is gonna read your writing you maybe don't care, but for the Part B you should write it very strong and maybe impressive to get the result that you want to so you have to choose very appropriate words and style for it" (HL1, PB, interview). Similarly, LH1 felt that Part A "was the easier one so I feel comfortable with my work in Part A. Part B was a little bit more difficult so I have a lot of mistakes and I don't feel so confident with my response to Part B. I need to improve and I need to do a better job" (LH1, CB, interview).

While candidates are instructed to respond to Part A and then Part B, not all the participants in this study responded to the two parts in order. For the PB task, ten participants completed their responses to Part A before responding to Part B. The remaining six participants moved back and forth between the two parts of the task. For the CB task, nine participants completed their responses to Part A before responding to Part B. The remaining seven participants moved back and forth between the two parts of the task. Only four participants, all with high ELP, completed their responses to Part A before responding to Part B with both writing modes. Only one participant (LH4) moved back and forth between the two parts of the task with both writing modes.

The stimulated recalls indicated that some participants considered both parts of the task as they planned, drafted, and/or wrote their responses. These participants read both parts of the task before responding to Part A. They then planned their responses to both parts together (e.g., HH2, PB) or at least thought of how to respond to Part B while or immediately after completing Part A (e.g., HH1, PB). HH2, for example, planned her response to both parts of the task together when writing on paper, while HH1reported that he thought about and compared how to respond to both parts of the task when writing on the computer (Excerpt 222). HH1considered both parts when writing on paper as well (Excerpt 223). Other participants read Part A and responded to it first and *then* read Part B and responded to it; these participants did not consider Part B till they finished their response to Part A with both writing modes (e.g., HL3, HL1). Still other participants completed Part A first, then completed Part B, and then revised their response to Part A (e.g., HH4, CB). When writing on the computer, HH4, for example, went back and forth between Parts A and B making revisions and additions to one in relation to the other and linking his response to each part to the other response. Finally, when revising his response to Part A, LL2 checked his response to Part B for ideas to add to Part A, deciding to add one idea from Part B to his response to Part A (Excerpt 224).

> Excerpt 222: I was thinking uh, what I should write to my friend as simultaneously I was thinking what I should write to the manager and I was comparing in my head the two and how they should be different. (HH1, CB)

> Excerpt 223: I've thought about both kind of, not so much task B but, on and off during task A. (HH1, PB)

> Excerpt 224: I I I was checking this part [Part B], uh and I said I AM INTERESTED IN THOSE TRIP, PLEASE SEND ME MORE DETAILS ABOUT yeah something in the future. So I think I can add a sentence [from Part B] on this [to Part A]. Yeah, to tell my friend. (LL2, CB, A)

Other participants used ideas from Part A when responding to Part B, while others did not. For example, LH1 referred to ideas from her response to Part A when responding to Part B when writing on the computer, specifically that she wrote to her friend about the situation and that they are both disappointed about the cancellation, in order to justify "why I was being so rude" (LH1, CB, B). She also reread her response to Part A looking for ideas to add to her response to Part B. Similarly, LH3 referred to his response to Part A when responding to Part B indicating that he had invited his friend to go on another trip instead (Excerpt 225). LH2 also referred to his response to Part A when responding to Part B. Specifically, in order to "put pressure on the manager", LH2 wrote in Part B that he had written to his friend about the situation and that his friend was also "upset about the cancellation" in order to "make the email stronger" (LH2, PB, B). When writing on paper, HH4 wrote in Part B that he will attend the talk because he invited his friend (Excerpt 226). When writing on the computer, HH4 went back and forth between the two task parts making revisions and linking his two responses. HH4 felt that he needed to link his responses to the two parts of the task (Excerpt 227). He then included ideas from Part A in his response to Part B (Excerpt 228).

The examples above reveal the ability of some participants to imagine the situation in a way that allowed them to link their responses to both parts of the task. Other participants treated the two parts as separate tasks. These patterns raise questions about the extent to which the two parts of the task are independent.

> Excerpt 225: I have uh x he can know uh I have I invite a friend to go with me to go uh that trip so after then after I had uh I re- I receive your notice I were writing to my friend uh to uh te- tell him about th- the cancel. We can go there, and then we had, we had a plan so its uh one he know we had plan to go to the trip. Yeah, and I write that. (LH3, PB, B)

> Excerpt 226: And then here I am going to connect these two letters, because I I mention my friend and why I will still go to it so I said I AM STILL PLANNING TO PARTICIPATE IN IT SINCE I WILL BRING MY FRIEND WHO HASN'T HEARD OF IT, so it's kind of connected to the first part, to the Part A so that they don't contradict each other. That's why I still want to go, since I will bring my friend, who hasn't heard of it yet. (HH4, PB, B)

> Excerpt 227: So I want tell my friend that I want to write a letter to the manager for that alternative. So I just told my friend so this also makes sense, because there is a second letter for the manager, so I said THEREFORE I INTENT TO WRITE A LETTER TO THE MANAGER OF THE CLUB THAT WE so I made up a reason, I made up an alternative [...] I also tell my friend to just email the manager, because I after he suggests it to me, I will just email the same thing to the manager so I can just say I feel free to write back to me or email the club manager, so xx the manager is here so I just copy that. (HH4, CB, A)

> Excerpt 228: Yeah so in the first letter I said that my friend wanted to go to the museum because there is like dinosaur skeleton exhibition, so I was o- I included the idea in the second letter. (HH4, CB, B)

3.4 Variability in writing processes across writing modes

Of the 4,517 processes coded in the study, 46% were reported during the PB task and 54% were reported during the CB task. Table 9 reports descriptive statistics for the percentages of reported processes by writing mode (across both task parts). Comparisons of the proportions of main categories of cognitive processes across writing modes (i.e., Wilcoxon Signed-Ranks tests) indicated that the participants reported significantly more translation processes (*Mdn*= 25.19%) when writing on paper than they did when writing on the computer (21.23%) (*Z*= 1.99, *p*=.05, *r*=.50), but they reported significantly more editing and revising when writing on the computer (*Mdn*= 12.58%) than they did when writing on paper (6.26%) (*Z*= 3.10, *p*<.05, *r*=.78). The participants also reported more macro-planning and monitoring when writing on the computer than they did when writing on paper, but these differences were not statistically significant.

In terms of subcategories of writing processes (see Appendix J), the participants reported more goal setting (under macro-planning), planning or choosing how to write, particularly language (under translation), and fewer instances of reading to monitor (under monitoring) and content revisions (under editing and revising) when writing on paper than they did when writing on the computer.

	Paper-based				Computer-based				Wilcoxon Test	
	M	Mdn	Min	Max	M	Mdn	Min	Max	Z	Sig
Macro-planning	18.58	15.74	7.34	32.77	18.86	19.89	6.06	38.53	0.05	.95
Organisation	2.76	2.22	.00	8.16	2.13	1.82	.00	6.25	0.45	.65
Micro-planning	20.89	16.75	5.53	61.11	17.91	15.26	7.14	39.86	0.34	.73
Translation	24.22	25.19	.00	39.45	19.22	21.23	.00	31.91	1.99	.05
Execution	3.22	2.15	.00	10.59	3.03	1.29	.00	17.50	0.97	.33
Monitoring	24.37	24.33	15.74	40.40	26.87	27.08	15.22	44.29	0.93	.35
Editing & revising	5.98	6.26	.85	16.33	11.98	12.58	2.60	23.12	3.10	.00

Table 9: Comparisons of cognitive processes (%) across writing modes

The writing mode seems to have affected how "carefully" some participants approached the writing task. As noted above, when writing on the computer, LH4 tended to type fast and to pause frequently to correct typos. Similarly, when responding to Part B on the computer, LH3 felt that he did not have enough time and so had to type his response fast without planning. As a result, he engaged in many revisions at the point of inscription to correct both spelling/typos and content.

Writing on the paper, on the other hand, seems to have led some participants to be very carful when writing. For example, when writing on paper, HH1 reported that he checked every sentence he wrote in order to avoid making mistakes and crossing out words (Excerpt 229). The fact that he was writing on paper and he did not want to cross out words on his final draft sometimes seems to have affected HH1's decisions about what to write next. For example, he wrote OR before finishing his response and then, because he did not want to cross the word out, he had to think of what to write next (Excerpt 229). Similarly, after completing her response to Part B on paper, LH4 thought of additional details (alternatives), but did not add them to her response because she did not wan the paper to look "disorganised" (Excerpt 230).

> Excerpt 229: I just quickly looked write the whole thing again to just make sure I won't have to, like, uh cross out words I don't, I try to avoid that throughout the whole writing [...] I did not really mean to write OR and then I wrote it. I don't know for what reason but I didn't want to scratch it. Like I mean I didn't want, uh draw a line through it so, I thought of the next thing which was GIVE ME A MESSAGE. (HH1, PB, A)

> Excerpt 230: I already passed the alternative part. I didn't have space in the alternative part and I didn't want to add the alternatives at the end because that's disorganised, it will look confusing for the person who is going to read the paper. (LH4, PB, B)

Another observation concerns the use of scratch paper. The participants were allowed to use scratch paper with both writing modes. However, only nine participants used scratch paper to jot down ideas and words, plan, and/or draft their responses when responding to the PB version. For the CB version, only two participants (HH3and LH3) used scratch paper; both participants used scratch paper with both writing modes. Of the eight participants with high ELP, four used scratch paper with the PB version. For the low ELP group, five used scratch paper. In both ELP groups, it was participants with high computer ability (*n*=7 out of 8) who used scratch paper when responding to the PB version; only a quarter of the participants with low computer ability (*n*=2 out of 8) used scratch paper.

Writing on scratch paper ranged from jotting down or copying some words, ideas and details from the writing task (e.g., LH3, LH1) to planning or writing a full draft of the response (e.g., LH2, PB). A major reason for not using scratch paper when writing on the computer is that one "can write and type and backspace" (HH1, follow-up interview). Similarly, HH4 did not use scratch paper when writing on the computer because "normally if I if I'm gonna type in computer I just do it all on the computer. I don't write on scratch paper, yeah". LH1 reported that she did not use scratch paper because "you can write on the computer and then you can delete it and write again and delete and the mistakes you can fix it" (LH1, CB). When writing on paper, however, both HH1 and LH1 drafted their responses to both parts of the task on scratch paper first and then copied them to the test paper in order to keep the final paper clean. HH1explained: "I prefer to type, and go back and forth and backspace and it's neat, it's fast but with paper it's different. So you might want to have some structure formed, or else you have to keep scratching out words and sentences" (HH1, follow-up interview). LH2 also did not use scratch paper when writing on the computer, but drafted his response on scratch paper when responding to the PB task "because on the computer it is easier to write and then delete something it's faster and I didn't like to erase something with the pen and so many writing mistakes. I wanted the final paper clean" (LH2, follow-up interview).

Other participants reported that they did not use scratch paper because they do not usually plan their responses. For example, HL2 reported that: "In general I don't use scratch paper even during exams. I feel that I write better when I just go with the flow, when I go with what I am thinking, instead of having a set plan or what to write" (HL2, CB). Similarly, HL3 reported: "I did not use scratch paper because I don't plan. I just go straight [to writing]" (HL3, PB). Still, other participants reported that they did not use scratch paper because they did not think they had enough time to write on scratch paper and then copy their response (e.g., LL3, LL4, LL1), while others felt that they did not need to plan their responses to Part A because it was for a friend. LL3, for example, did not use scratch paper "because I think if I use scratch paper I will uh, have less time to write in my answer" (LL3, CB). Similarly, LL1 reported that he did not use scratch paper because "Uh I'm afraid the time will, I afraid I don't have time" (LL1, CB). HL1 reported: "I thought that it's better to write uh like for my friend and I don't need to use any paper to make like drafts and uh I just started to write but for the other one I thought I'm gonna use it" (HL1, PB). Similarly, HL4 reported that he did not use scratch paper "because usually I need paper to plan, but letter is not that formal. I also need a plan, but thinking it in my mind is enough. If I don't write a long essay such as 500 words, I don't need [scratch] paper" (HL4, CB).

The final questionnaire asked the participants about which writing mode was easier. Half the participants (*n*=8) agreed that "completing the task on paper was easier than completing it on the computer", while the other half disagreed. However, only two participants (HH3 and LH3) out of eight with high computer ability agreed that completing the task on paper was easier, compared to six out of eight with low computer ability. Two participants with low computer ability (LL2 and LL3) disagreed with the statement.

Participants were asked about their perceptions of the writing modes in the final interview as well. All the participants with high computer ability reported that they preferred writing on the computer. HH1, for example, reported: "I'm more comfortable with typing. I was, I was more comfortable with typing so that would help probably my thoughts processes" (HH1, follow-up interview). HH4 explained that "writing on the computer is more uh, it's more comfortable because yeah because I type faster than I write" (HH4, follow-up interview), while HH2 reported that she prefers writing on the computer "because it corrects my spellings and then I can cut and paste and move them around" (HH2, follow-up interview). Similarly, LH1 reported: "I prefer to write in the computer. Because I I'm more faster in the computer, and I can delete things, yes. It same with like x, uh like clean more, yeah" (LH1, follow-up interview). Two participants with low computer ability (HL2, LL2) also preferred writing on the computer. LL2, for example, reported that he usually prefers writing on the computer, because the computer reduces the cognitive load associated with writing in L2 and thus allows him to generate more ideas, particularly when he can use the editing tools in MS Word (Excerpt 231).

> Excerpt 231: Uh well in my view writing on computer is more comfortable than writing on paper. I can have more, sometimes I can have more idea when doing the typing uh, little bit more than writing just the feeling, the feeling you can… I can get the idea is more [...] When I use computer to write an essay anyways more comfortable to get, maybe just because of the Word, the Word y'know the Office the Office Word, it can fix some problem, it can fix some grammar and vocabulary mistake and if y'know, computer can fix it then you will not worry about this and you can keep your mind, you can keep going, you can keep thinking about other idea, about your topic but if you need if you are right, if you are y'know just use your pen to write essay, then you have to figure out you have to focus on every words that you write it's if it's correct or not. Then, if you think about this, you may lose some point you may lose you may yeah, the idea. (LL2, follow-up interview)

The remaining six participants with low computer ability preferred writing on paper because they are not used to typing (e.g., HL1, HL4) or because writing on paper helps with the writing process (e.g., HL3). HL1, for instance, reported: "I was much more comfortable on paper because I always write; I am not used to typing, so that's hard for me" (HL1, follow-up interview). HL3 reported that because he has to look at the keyboard when typing, he finds writing on the computer "distracting" (Excerpt 232). Two participants (HL4 and LL4) tended to pause more frequently when writing on the computer to think about what to write next and/or how to express their ideas when writing on the computer, compared to when writing on paper. HL4, for example, reported that he paused more frequently when writing on the computer and that writing on paper is "more natural" for him (Excerpt 233). Finally, at least one participant (LL1) reported that he prefers writing on the computer in his L1, but prefers writing on paper when writing in English (Excerpt 234).

All participants, however, agreed that writing on paper can be "messy", while writing on the computer allows one to produce a "clean" copy. LL4, for example, reported that she prefers writing on paper, but "[writing on the] computer can be, is very beautiful to look, because when you write in the paper, you must correct and you will, is very, it's not beautiful to see the paragraph" (LL4, follow-up interview).

> Excerpt 232: It's totally different, it makes you think faster and far better when you write on paper than when you write on computer because when you write on the computer you see the full desktop so it makes you distracted, but when you write on the paper you are just focused on thinking more. When you write on the computer you have to type and see, type and see [look at the keyboard to type and then look at the screen to see what you wrote]. But when writing on paper, you just focus on writing. I feel typing on the computer is distracting. (HL3, follow-up interview)

> Excerpt 233: I paused a lot when writing on the computer, but on paper I am more natural than the typing. Writing on paper is the way I am most familiar with and I feel natural writing English words by hand. (HL4, follow-up interview)

> Excerpt 234: Because English is not my first language so... I'm writing I can write faster than typing. But in my first language actually I can type faster than writing. My first language is Mandarin. Well I think writing [in English] is easier than typing [laughs]. Why? Because first when I learn the English I usually write on the paper not type on the computer. So I think it is the reason why my writing on the paper is faster than typing on the computer. Actually I prefer paper test, easier to write paper. (LL1, follow-up interview)

3.5 Variability in writing processes across English language proficiency groups

Of the 4,517 processes coded in the study, 56% were reported by the high-ELP group and 44% were reported by the low-ELP group. Table 10 reports descriptive statistics for the percentages of reported processes by ELP group (across writing modes). Table 10 shows that participants with low ELP reported more macro-planning than did participants with high ELP, who reported more organisation and micro-planning. However, Kolmogorov-Smirnov two-sample tests indicated that these differences were not significant.

In terms of subcategories of writing processes (see Appendix K), participants with low ELP reported more analysing and constructing situation and difficulties with macro-planning (under macro-planning), planning how to write language (under translation), monitoring local text and monitoring language (under monitoring) than did the high ELP group. The high ELP group, on the other hand, reported more goal setting, particularly in relation to text/form (under macro-planning) than did the low ELP group.

	Low ELP				High ELP				K-S Test	
	M	**Med**	**Min**	**Max**	**M**	**Med**	**Min**	**Max**	**Z**	**Sig**
Macro-planning	19.04	21.16	6.06	35.71	18.40	14.54	7.34	38.53	0.7	.69
Organisation	1.92	1.19	.00	6.25	2.97	3.00	.58	8.16	1.2	.09
Micro-planning	15.87	15.12	7.14	32.69	22.93	18.10	5.53	61.11	0.9	.41
Translation	24.12	22.88	11.25	33.67	19.32	22.98	.00	39.45	0.9	.41
Execution	3.04	1.68	.00	17.50	3.21	1.82	.00	10.59	0.5	.94
Monitoring	26.93	26.46	19.23	40.40	24.31	25.75	15.22	44.29	1.24	.09
Editing & revising	9.09	7.11	1.13	18.75	8.87	7.01	.85	23.12	0.7	.69

Table 10: Comparisons of cognitive processes (%) across ELP groups

To further examine the relationship between English language proficiency and writing processes, the 16 participants were classified into two groups, based on their scores on Aptis Writing Task 4: those who scored 3.5 or below on both writing tasks (n= 7) and those who scored 4 or above (n= 9). The writing processes reported by the two groups were then compared. Of the 4,517 processes coded in the study, 35% were reported by the low-scoring group and 65% were reported by the high-scoring group. Table 11 reports descriptive statistics for the percentages of reported processes by score level (across writing modes). It shows that the low-scoring group reported more macro-planning than did the high-scoring group; the latter reported more micro-planning. However, Kolmogorov-Smirnov two-sample tests indicated that these differences were not statistically significant.

In terms of subcategories of writing processes (see Appendix L), participants with low scores reported more difficulties with translation, particularly difficulties with language (under translation), local text monitoring and language monitoring (under monitoring) than did participants with high scores. Participants with high scores, on the other hand, reported more goal setting (under macro-planning), generating and retrieving, particularly self-based generating, and considering audience when micro-planning (under micro-planning) than did participants with lower scores.

	Score of 3.5 or lower				Score of 4 or higher				K-S Test	
	M	Med	Min	Max	M	Med	Min	Max	Z	Sig
Macro-planning	18.63	20.80	7.34	35.71	18.79	16.58	6.06	38.53	0.54	.94
Organisation	2.36	2.03	.00	6.25	2.51	2.02	.00	8.16	0.58	.89
Micro-planning	16.88	14.66	7.14	41.94	21.36	18.11	5.53	61.11	0.85	.47
Translation	23.23	22.88	3.23	39.45	20.54	22.98	.00	36.17	0.42	.99
Execution	2.82	1.00	.00	17.50	3.36	2.54	.00	10.59	0.91	.38
Monitoring	27.10	26.46	19.23	40.40	24.47	25.93	15.22	44.29	1.09	.19
Editing & revising	8.99	6.98	1.83	18.75	8.97	7.80	.85	23.12	0.74	.65

Table 11: Comparisons of cognitive processes (%) across score levels

Finally, although they were often aware of the differences in level of formality across task parts, students with low ELP tended to have difficulty understanding the task and/or to misinterpret the task requirements more frequently. For example, some of these participants thought that they had to suggest possible alternatives only for Part B, but not Part A (e.g., LH1, Excerpt 235), while others did not understand some words and phrases in the task, which prevented them from addressing all task requirements. For example, although they were both aware that the two parts of the task required different levels of formality, LH3 and LL2 did not understand parts of the notice and some task requirements, such as the meaning of "suggesting possible alternatives" (Excerpts 236 and 237). Similarly, LL3 was aware that there is a difference in "register" between the two parts, but she thought that the task is asking her to invite her friend to the talk; LL3 also did not understand the meaning of "suggest possible alternatives" (Excerpt 238).

> Excerpt 235: Part A was a little bit more easy because I only need to write 50 words. Part B was a little bit more difficult because I need to write more words and more sentences. Part B was more difficult because I have to write suggestions and my feelings, but Part A is about my feelings only and I can explain my feelings and it is not so difficult. Part B, I need to write in a formal way, but when I write to my friend [Part A] because when you are writing to someone you know it is easy to write because it is not formal, but in Part B, I have to use formal words like *even though, moreover*. (LH1, PB)

> Excerpt 236: [Part A] ask me to do a uh a I write about my feeling about to uh my friend about the that notice. [Part B] it's the that part asked me to do uh I had to write a p- a letter for my manager uh of this club and uh explain him uh to my feeling and feeling about the notice and x uh don- I don I was don't understand that [*Suggesting possible alternatives*]. Maybe some advice for him [the manager], I'm not sure. Yeah, it's uh actually uh maybe a little a little a little I don't understand ho- I can I do this task why. [I don't understand why I have to do this task]. When I write for my friend, I think it's a it's a he's my friend I can talk anything with him. In Part B, it's I write to uh manager of club so I think I have to write something and talk and careful to... Careful when uh when because he's a manager. Manager, I can't use any word any word in the letter when talk with him so I think more it's like respect. Respect him. (LH3, PB, interview)

> Excerpt 237: Yeah and uh when I finish the reading well I actually read uh, three or four times, but I still can't get the point. Yeah, but that's that's very strange for me and I have never seen this kind of stuff, this kind of topic before. And then, and then to write to write a letter to a friend, well I just, uh tell someone about my my feeling my feeling about this, well I I really can't make, to make a story, you know to add something because the (for the) some of the vocabulary in in this letter, I (even) don't understand I'm I'm not very clearly understand that the exactly meaning of the whole letter. I didn't, I didn't get many information and I don't I don't know about uh like the notice is suggesting, possible uh *possible alternative*.

Well I don't know what that [*alternatives*] mean. But the second one is for the manager, so I should be more apply, you know? Just be more, more formal to say something, but you know, you can see for the first part I it's not very, uh formal just to, just to tell him my feelings because it's a friend. (LL2, CB)

Excerpt 238: Mmm, the first one is, uh invite, uh invite a friend and Mmm, I was thinking uh, I say uh, want me uh, invite my friend but, he has a uh feelings, and I don't really understand *suggest possible alternative*. Mmm, tell my friend that uh they are going to uh host this talk show uh and invite them to there and then we, we would like uh have more people to join the talk show. Uh, I think uh they, they are going to uh, collect people if they feel uh, interest in this talk show. Uh, is like uh uh, uh register. [For Part B] Uh send another email to the manager. Uh, but I don't understand why I tell the manager about my feelings. Yeah, and then I think uh is can make me write uh, more words in the email, yeah. (LL3, CB)

3.6 Variability in writing processes across computer ability groups

Of the 4,517 processes coded in the study, 53% were reported by participants with high computer ability and 47% were reported by the low-ability group. Table 12 reports descriptive statistics for the percentages of reported processes by computer ability group (across writing modes). It shows that the group with low computer ability reported more macro-planning, organisation and translation, but fewer micro-planning and editing and revising than did participants with high computer ability. However, Kolmogorov-Smirnov two-sample tests indicated that these differences were not statistically significant.

In terms of subcategories of writing processes (see Appendix M), participants with low computer ability reported more task conceptualisation (under macro-planning) and difficulty translating (under translation), than did participants with high computer ability. The latter reported more goal setting (under macro-planning), generating and retrieving, particularly self-based generating, considering audience when micro-planning (under micro-planning), and planning or choosing how to write language (under translation) than did participants with low computer ability.

	Low computer ability				High computer ability				K-S Test	
	M	Med	Min	Max	M	Med	Min	Max	Z	Sig
Macro-planning	19.93	19.89	7.34	38.53	17.50	16.58	6.06	32.77	0.5	.94
Organisation	2.90	3.39	.00	6.25	1.99	1.27	.00	8.16	1.1	.21
Micro-planning	19.48	14.66	5.53	61.11	19.32	18.11	8.75	35.84	0.7	.69
Translation	22.43	24.36	.00	39.45	21.00	21.48	3.47	33.67	0.5	.94
Execution	2.25	1.25	.00	9.09	4.01	2.20	.00	17.50	0.5	.94
Monitoring	25.03	26.00	15.22	40.40	26.21	26.07	16.33	44.29	0.5	.94
Editing & revising	7.97	6.95	.85	18.75	9.98	8.87	1.13	23.12	0.8	.42

Table 12: Comparisons of cognitive processes (%) across computer ability groups

3.7 Further analyses

Although the two forms of the task included in the study were equivalent in terms of requirements and expectations, some participants reported that the situations described in the two forms differ in terms of the severity or seriousness of the situation (cancellation of a talk vs. cancellation of a trip and not getting a refund) which could have affected how they responded to the two forms of the task. In order to examine this question, the proportions of main categories of cognitive processes were compared across task forms. Of the 4,517 codes in the study, 52% were reported with form 1 and 48% were reported with form 2. Table 13 reports descriptive statistics for the percentages of reported processes by task form (across writing modes). It shows that form 1 elicited more macro-planning and fewer micro-planning, translation, monitoring, and editing and revising than did form 2. However, Wilcoxon Signed-Ranks tests indicated that none of these differences was statistically significant.

	Form1				Form2				Wilcoxon Test	
	M	Med	Min	Max	M	Med	Min	Max	Z	Sig
Macro-planning	20.42	21.75	7.34	35.71	17.02	12.70	6.06	38.53	1.2	.22
Organisation	2.51	1.61	.00	8.16	2.37	2.49	.00	5.10	0.3	.77
Micro-planning	18.99	13.82	5.53	61.11	19.81	16.88	8.11	41.94	0.3	.73
Translation	23.75	21.97	.00	39.45	19.68	23.63	.00	33.67	1.5	.14
Execution	2.69	1.59	.00	10.59	3.56	2.01	.00	17.50	0.3	.78
Monitoring	23.68	24.65	15.74	33.33	27.55	27.56	15.22	44.29	1.3	.19
Editing & revising	7.95	6.98	.85	18.75	10.00	8.21	1.68	23.12	0.9	.35

Table 13: Comparisons of cognitive processes (%) across task forms

Additional exploratory analyses indicated that there were some interaction effects between the different factors in the study on the proportions of main categories of cognitive processes. First, there were some interaction effects for task part and ELP group. Thus, while Part B elicited more micro-planning (Table 8), it was the low ELP group that engaged in more micro-planning with Part B (*Mdn*= 18%) than they did with Part A (*Mdn*= 11%); the high-ELP group did not vary across task parts (*Mdn*= 17%). In contrast, while, overall, Part B elicited more translation than did Part A, it was the high-ELP group that engaged in more translation when responding to Part B (*Mdn*= 24%) than they did when responding to Part A (*Mdn*= 15%); the low-ELP group did not vary across task parts (22%). Furthermore, while Part B elicited significantly more monitoring processes than did Part A, it was the high-ELP group that engaged in more monitoring when responding to Part B (*Mdn*= 27%) than they did when responding to Part A (*Mdn*= 17%); the low-ELP group did not vary across task parts (about 26%).

Second, there were interactions effects between writing mode and computer ability group. As Table 9 shows, the participants reported more translation and fewer macro-planning, monitoring, and editing and revising when writing on paper than they did when writing on the computer. However, it was the participants with low computer ability who reported more macro-planning when writing on the computer (*Mdn*= 21%) than they did when writing on paper (*Mdn*= 14%); participants with high computer ability reported more macro-planning when writing on paper (*Mdn*= 19%) than they did when writing on the computer (*Mdn*= 14%). Furthermore, participants with high computer ability reported more monitoring when writing on the computer (*Mdn*= 28%) than they did when writing on paper (*Mdn*= 19%); participants with low computer ability reported the same amount of monitoring with both writing modes (*Mdn*= 25%).

Finally, while Table 12 shows that, overall, participants with low computer ability reported more macro-planning than did participants with high computer ability, this pattern varied across writing modes. When writing on paper, participants with high computer ability engaged in more macro-planning (*Mdn*= 19%) than did those with low computer ability (*Mdn*= 14%), but when writing on the computer, participants with low computer ability reported more macro-planning (*Mdn*= 21%) than did those with high computer ability (*Mdn*= 14%).

4. SUMMARY AND DISCUSSION

This study aimed to examine the cognitive processes engaged by Aptis Writing Task 4 and the extent to which these processes vary across delivery modes, task parts, and candidate groups. Each of 16 participants with different levels of English language proficiency (low vs. high) and computer ability (low vs. high) responded to two forms of Aptis Writing Task 4, one on the computer and one on paper, and then provided stimulated recalls about their writing processes. The stimulated recalls were coded in terms of the cognitive processes that the participants reported and then the results were compared across delivery modes, task parts, and groups. This section summarises the key findings of the study in relation to its four research questions.

4.1 Cognitive processes engaged by Aptis Writing Task 4

The participants reported a wide range of cognitive processes while responding to Aptis Writing Task 4. These processes are consistant with expectations regarding the processes that writers would engage in when writing as described in Field's (2004) model. Specifically, Aptis Writing Task 4 engaged the participants in macro-planning, organisation, micro-planning, translation, excution, monitoring, and editing and revising. In terms of macro-planning, the participants engaged in reading the task, task conceptualisation, analysing or constructing the audience, analysing or constructing the situation, and goal setting. The participants reported reading, analysing and evaluating the writing task at the beginning of the writing session to identify task requirements as well as at other points during the writing session. The participants also attended to the rhetorical situation by considering facts and making inferences about the audience and situation described in the notice in order to respond to the task. Goal setting accounted for the majority of the macro-planning processes reported in the study. The participants set writing goals related to achieving particular effects on the reader, presenting themselves in a particular way (i.e., persona), conveying specific ideas, and developing the formal or conventional features of their texts, including appropriateness of form for writing purpose and audience.

The participants also engaged in organising their ideas, with some participants reporting considering the audience when organising their ideas. As for micro-planning, i.e., planning the part of the text that is about to be produced, the participants engaged frequently in planning and/or choosing what to write next (i.e., local planning), as well as generating and retrieving ideas. The participants generated their own ideas (i.e., self-based generating) or mined the task for ideas and details (i.e., task-based generating). Often, the participants tended to consider the audience when micro-planning. Translation accounted for slightly more than a fifth of the processes reported in the study. Planning or choosing how to write the next clause or sentence was the most frequently reported process. When planning or choosing how to write, the participants attended mainly to language (e.g., vocabulary search, grammar, wording, paraphrasing, and mechanics) and balance or appropriateness of style and register. In many cases, decisions about how to write were made with reference to the reader.

Before, while and after typing or writing their texts, the participants also engaged in monitoring, and editing and revising their texts. More than a quarter of the processes that the participants reported related to monitoring. In particular, the participants engaged in rereading their texts to evaluate them at the local and global levels in terms of content, language, organisation/rhetoric, balance, and text length. They also reacted to their own writing in personal and affective ways, evaluated the anticipated response of the audience to both the content and language of their texts, and checked the time. The participants tended to monitor their texts at the local level more frequently than at the global level, and to evaluate language most frequently, followed by text length, balance, and content. As a result of monitoring activities, the participants engaged in editing and revising the content, language, organisation, balance, and typography and spelling of their texts. Most of the revisions the participants made related to language (i.e., grammar, vocabulary, punctuation) and, to a lesser extent, to typography and spelling, content, and balance.

The participants also reported encountering difficulties when responding to the writing tasks and using problem-solving strategies to address these difficulties. Most of these difficulties related to translation and, to a lesser extent, macro-planning and micro-planning. Thus, several participants reported encountering difficulty translating their ideas into text, with the majority of these difficulties being related to language and balance. Macro-planning and micro-planning difficulties included difficulties understanding the task or parts of the task, difficulties constructing the audience, difficulties constructing the situation, and/or difficulties generating content. Some participants reported using problem-solving strategies to address these difficulties, such as abandoning or postponing the task.

The most frequently reported processes, in a descending order, related to: monitoring (particularly monitoring local text and language); translation (particularly planning or choosing how to write, considering audience when translating, and difficulty translating); micro-planning (particularly local planning, generating and retrieving, and considering audience when micro-planning); macro-planning (particularly goal setting, constructing and analysing the situation, and reading the task); and editing and revising (particularly revising language). Execution and organisation were the least frequently reported. Execution was not reported frequently, perhaps because the participants did not feel the need to report on it except when they encountered an execution difficulty and/or when they engaged in note-taking or controlling. Organisation might have been reported relatively infrequently because the writing tasks were short and did not require much organisation and/or because the participants did not feel the need to spend much time on organisation.

The findings above concerning the processes that the participants reported employing show that Aptis Writing Task 4 does engage candidates in all the processing components in Field's (2004) model as described above. However, as noted above, at least some of the participants also engaged in processes that could be considered construct-irrelevant when responding to Aptis Writing Task 4 in this study. First, some participants reported that they had to "imagine" or "make up" additional details about the audience/reader and the situation in order to be able to complete the task. In some cases, this seems to have led some participants to spend more time and effort imagining additional details about the situation than on planning, writing, and reviewing their responses. The details of the situation described in the task, as well as task instructions, could be improved to eliminate this problem. Second, in some cases the requirement to write a specific number of words seems to have affected the performance of some participants. For example, some participants frequently referred to making their responses to Part B longer, often in response to the requirement to write 120–150 words, rather than to address the task of writing a message about their feelings and suggesting alternatives (i.e., *I have to make the response longer*, rather than *I need to add more details to address a specific rhetorical goal*). The length requirement is important because it ensures that candidates write a minimum number of words so the response can be evaluated. Third, some participants thought of the test marker and/or the researcher as the audience or at least as a secondary audience for their responses, rather than the audience specified in the task. Both the length requirement and the marker as audience can diminish the (perceived) authenticity of the writing task. Fourth, some participants, particularly those with low ELP, engaged in copying ideas, details, words, and phrases from the task. Often, these participants obtained low scores.

4.2 Variability in writing processes across Parts A and B

Parts A and B of Aptis Writing Task 4 ask the candidate to adopt different roles or relationships *vis a vis* the reader (friend vs. club member) and this is expected to affect what and how candidates write. In particular, it is expected that responses to Part B will be more formal than responses to Part A. As noted above, all the participants were aware of the differences in the level of formality required by the two parts of the task. Specifically, most of the participants reported in the follow-up interview that they felt that Part B was more formal and that this led them to approach Part B more carefully, pause more frequently to consider how to write their response, and to adopt a more formal style or tone.

Overall, the participants needed less time and wrote shorter texts when responding to Part A than they did when responding to Part B. The participants also reported more cognitive processes with Part B than they did with Part A.

Generally, Part A elicited significantly more macro-planning and execution processes, while Part B elicited significantly more monitoring processes and slightly more organisation, micro-planning, translation, and editing and revising processes than did Part A. One of the reasons why Part A elicited more macro-planning is because the participants engaged in reading the task, task conceptualisation, and analysing or constructing the situation more frequently when responding to Part A. This is not surprising since the participants had to read and reflect on the task while completing Part A. When responding to Part B, the participants did not read or analyse the task as frequently. Part B, on the other hand, elicited more instances of organising the message (under organisation), generating and retrieving (under micro-planning), and planning or choosing how to write, particularly balance (under translation). This suggests that, because Part B required a higher level of formality, the participants tended to think more carefully about what to write (i.e., ideas) and how to write (i.e., organisation and balance) when responding to Part B than they did when responding to Part A. The two parts of the task, thus, seem to engage candidates in different cognitive processes as expected.

While candidates are instructed to respond to Part A first and then complete Part B, not all of the participants in this study responded to the two parts in that order. Some participants moved back and forth between the two parts of the task, while others considered both parts of the task as they planned, drafted, and/or wrote their responses to each part. Other participants used ideas from Part A when responding to Part B, while others did not. It seems that some participants treated the two parts as separate tasks, while others linked their responses to the two parts of the task.

These patterns raise questions about the extent to which the two parts are independent. This may also affect the rating of candidates' responses if the two parts are very similar. To reduce variability across candidates in how they approach the two parts of the task, it is important to explicitly instruct all candidates to read and plan their responses to both parts of the task together. Otherwise, some candidates may be advantaged by the strategy of reading and planning both parts together.

Alternatively, candidates could access only one part at a time. This would mean separating and timing both parts of the task so that candidates have to first complete Part A in 10 minutes and then complete Part B in 20 minutes without being able to return to Part A once they have started Part B.

4.3 Variability in writing processes across writing modes

Overall, the participants obtained similar scores with both writing modes. However, when writing on the computer, the participants produced longer responses (cf. Russell & Haney, 1997; Wolfe et al., 1996) and reported more processes than they did when writing on paper. The participants reported significantly more translation and fewer editing and revising processes when writing on paper than they did when writing on the computer. They also reported slightly more macro-planning and monitoring when writing on the computer than they did when writing on paper. Overall, the participants engaged in more goal setting (under macro-planning), planning or choosing how to write, particularly language (under translation), and fewer rereading to monitor (under monitoring) and content revisions (under editing and revising) when writing on paper than they did when writing on the computer.

The participants seem to have engaged in macro-planning and planning or choosing how to write more frequently when writing on paper, perhaps because they were aware that they cannot (or did not want to) make changes once they transcribed their text on paper. The participants were also less likely to review and revise their texts when writing on paper. When writing on the computer, the participants seem to have engaged in less planning and more monitoring and revising (cf. Lee, 2002). As noted above, some participants reported that they were very carful when writing on paper to avoid making mistakes and crossing out parts of their text. When writing on the computer, in contrast, some participants reported that they did not need to plan their responses and were comfortable changing parts of their texts more frequently.

Finally, participants' preference of writing mode varied depending on their computer ability. Participants with high computer ability preferred writing on the computer, while those with low computer ability tended to prefer writing on paper because they were not used to typing or because writing on paper helped with the writing process. All participants, however, agreed that writing on paper could be "messy", while writing on the computer allowed them to produce a "clean" copy. This highlights the need to continue to provide candidates with the option of choosing which writing mode to use when responding to the test.

4.4 Variability in writing processes across English language proficiency groups

As expected, participants with higher ELP wrote significantly longer responses and obtained significantly higher scores than did those with low ELP, regardless of writing mode and computer ability. Furthermore, participants with high ELP reported more processes, on average, than did those with low ELP. The low-ELP group reported slightly more macro-planning and fewer organisation and micro-planning processes than did those with high ELP, but these differences were not significant. The main reason why the low ELP group reported more macro-planning is because they engaged in analysing and constructing the situation more frequently and reported more difficulties with understanding the task than did the high-ELP group.

Both the stimulated recall and interview data indicate that participants with low ELP tended to have more difficulties understanding the task and/or to misinterpret the task requirements more often. Some participants with low ELP did not understand some words and phrases in the task, which prevented them from addressing all task requirements. The low-ELP group also reported more planning or choosing how to write, particularly language (under translation), monitoring local text and monitoring language (under monitoring) than did the high-ELP group. The high-ELP group reported more goal setting, particularly in relation to text/form (under macro-planning) than did the low-ELP group. Furthermore, participants with lower scores reported more difficulties with translation, particularly language, as well as more local text and language evaluations than did participants with high scores. The latter reported more goal setting, generating and retrieving, particularly self-based generating, and considering audience when micro-planning.

Overall, these findings suggest that (a) the low-ELP participants struggled more frequently with translating their ideas into text or finding the language to express their ideas and (b) they revised their texts at the local level and in terms of language more frequently. Though the differences across the two groups were not significant, perhaps because of the small number of participants, it seems that the high-ELP group tended to set more writing goals, engage in self-based generating and consider audience when micro-planning more often, struggle less frequently with translating their ideas into text, and revise their texts in terms of language less often. That less proficient participants made more revisions than did more proficient participants is consistent with previous studies (e.g., Barkaoui, 2016; Chenoweth & Hayes, 2001). Chenoweth and Hayes (2001), for example, found that the number of revisions decreases with increased L2 proficiency because (a) students with higher L2 proficiency tend to produce more accurate language and, thus, do not need to revise as frequently as students with low L2 proficiency do, and (b) low-proficiency writers make more lower-level changes than do high-proficiency writers.

Furthermore, the high-ELP group seemed to vary their writing processes more effectively across task parts than did the low-ELP group. Specifically, while the low-ELP group engaged in more micro-planning with Part B than they did with Part A, the high-ELP group engaged in more translation and monitoring when responding to Part B than they did when responding to Part A. This might suggest that the low-proficiency participants intended their responses to the two task parts to differ in terms of content (i.e., *what* to say), while the high-proficiency group intended their responses to the two task parts to differ in terms of form (i.e., *how* to say what they want to say).

4.5 Variability in writing processes across computer ability groups

Participants with lower computer ability obtained lower scores, on average, than did participants with higher computer ability regardless of writing mode and ELP level. The fact that the differences between the two groups were larger for the PB task than they were for the CB task suggests that computer ability as defined and measured in this study might be tapping other skills that are related to L2 writing ability (e.g., editing skills). Additionally, participants with higher computer ability reported more processes than those with low ability. Participants with low computer ability reported more macro-planning, organisation and translation, but fewer micro-planning and editing and revising than did participants with high computer ability, but these differences were not statistically significant.

Generally, participants with low computer ability tended to report more task conceptualisation and difficulty translating than did participants with high computer ability. The latter reported more goal setting, generating and retrieving, particularly self-based generating, considering the audience when micro-planning, and planning or choosing how to write language than did participants with low computer ability. It seems that participants with high computer ability were able to attend to various aspects of their writing more often than did those with low computer ability.

Furthermore, participants with high computer ability engaged in more macro-planning when writing on paper, perhaps because they were aware that they had to plan their responses carefully since they cannot make changes on paper. These participants reported more monitoring when writing on the computer than they did when writing on paper. In contrast, participants with low computer ability reported more macro-planning when writing on the computer than they did when writing on paper, but they reported the same amount of monitoring with both writing modes. It seems that participants with low computer ability felt a need to macro-plan more often with the mode they were less familiar with, and did not take advantage of the computer capabilities for reviewing and, perhaps, improving their texts (cf. Phinney & Khouri, 1993).

5. LIMITATIONS AND IMPLICATIONS FOR RESEARCH

The study has its limitations. First, the study included small samples of participants and tasks and data were collected for research purposes, rather than in a real test setting. The small sample size could have prevented detecting real differences across candidate groups.

Second, the way the Aptis Writing Task 4 was administered in this study was different from how it is administered during the operational test. In the operational test, candidates respond to Tasks 1, 2 and 3 before they respond to Task 4; thus, the first three tasks introduce the candidate to the topic and context of Task 4 gradually. In this study, participants had access only to Task 4. Consequently, some participants were "surprised" by the task and might have spent some time adjusting to the task at the beginning of the first writing session. It would be interesting to examine whether and how completing the first three tasks in the test first affects how candidates respond to Task 4.

Third, it is possible, as noted above, that computer ability as defined and measured in this study is associated with some aspects of L2 writing ability (e.g., editing skills). This could explain why computer ability had a significant impact not only on scores on the CB version but also on scores on the PB version.

Fourth, as noted above, stimulated recalls have their limitations. In particular, participants might have reported only some of the writing activities they engaged in during the test; and/or reported other activities that they thought of during, or because of, the stimulated recall process. Additionally, participants can be selective in terms of what they report given the large number of activities they may employ at a given time and/or their awareness of an audience for their reports (Barkaoui, 2011; Cohen, 2011). Some participants reported that they could not remember everything they thought while writing. HH2, for example, reported: "I was thinking of many little things while writing and things just come to my mind without thinking about them. So I did not think I could remember all the details". Other participants claimed that it was easier to remember with one writing mode or task part than the other. HL2, for example, reported: "I think I remembered more and better when writing on paper than on the computer because writing on paper involves more effort physically to write so you remember more and recall things better". Furthermore, participants with low ELP required more prompting during the stimulated recalls than did participants with high proficiency. It is also possible that the stimulated recalls affected some participants' writing processes. HH3, for example, reported that the stimulated recall "made me aware of my thinking. I thought about the stimulated recall while writing because I expected you to ask me about what I was thinking while writing". Similarly, LL3 reported that while the stimulated recall did not change her writing performance, it forced her to remember her thoughts and actions while writing: "While I was writing the test uh I always (knew) remember that I had to uh explain my writing, so uh, I force myself I hope I can explain my ideas".

Fifth, this study examined only the frequency and distribution of reported processes, but not their order, effectiveness, interrelations, or importance for the writing process. Nor were the participants asked to explain why they engaged in particular processes (e.g., in relation to how they conceptualised the audience and purpose of their texts).

Finally, the texts produced by the participants were marked holistically, but were not analysed.

To address some of these limitations, the current data set could be explored further. For example, the participants' written responses could be analysed linguistically and in relation to the stimulated recalls. This requires adopting a case study approach whereby all data from a subsample of participants (i.e., the final written responses, videos of writing sessions, stimulated recalls, plans and drafts, and interview responses) are analysed to examine the relationships between when and how long they pause, what revisions they make and when, the frequency, order and timing of cognitive processes as reported in the stimulated recalls, the linguistic features of their texts as they emerge on the screen, the characteristics of their final texts, their writing scores, and their background data.

Additionally, the participants' written responses could be analysed to identify the linguistic, discourse, and pragmatic features and strategies (e.g., politeness strategies, register, and word choice) that the participants used in each part of the task and compare them across task parts, English proficiency levels, gender and L1 groups.

Future studies could also examine how candidates from different backgrounds in terms of L1, age, educational level, and goals vary in terms of how they interpret and approach Aptis Writing Task 4.

Furthermore, it may be useful to examine whether and how separating the two parts of Task 4 affects candidates' writing processes and scores.

Finally, it is important to compare the writing performance of candidates on Aptis Writing Task 4 and authentic writing tasks that allow more time and access to various writing and editing tools (e.g., spell and grammar checkers, dictionaries) in order to determine to what extent test conditions (i.e., time constraints and limited availability of editing tools) affect performance on Aptis Writing Task 4.

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APPENDIX A:

Online background questionnaire

What is your name?

Gender:

What is you first language?

How old are you?

Where were you born?

What language did you learn first?

How old were you when you started learning English?

For how long have you been studying English?

How long have you been in Canada?

How long have you been in an English-speaking country?

Which language(s) do you use at home?

Which language(s) do you use at work or school?

Which language(s) do you use socially (e.g., with friends)?

How many hours per day do you speak with people who are fluent English speakers?

What are you currently studying (program, department)?

How long have you been in your current program of study?

What is the highest level of education you have completed?

If you are in an ESL program, what level are you currently at?

Have you taken an English language proficiency test (such as TOEFL, IELTS, MELAB) before?

- If yes, when was the last time you took the test (please indicate the month and year)?
- What is the name of the test?
- What was your overall score on the test?

Have you ever taken a writing test on the computer before?

- If yes, what is the name of the test you took on the computer?

How do you rate your English language skills, on a scale from 0 (lowest) to 5 (highest)?

	0	1	2	3	4	5
Overall						
Listening						
Speaking						
Reading						
Writing						

APPENDIX B:

Computer familiarity questionnaire

Adapted from Stricker, Wilder and Rock (2004), Eignor et al., 1998; Taylor et al., 1999; Wolfe et al. (1996), and Russell (1999).

The following are statements about how often you have a computer to use and how often you use a computer for different things. Please select the option that best reflects how often a computer is available or used. Please select ONE number for each statement.

	Never	Once a Week or Less	Twice a week	Three times a week	Every day
1. How often do you have a computer to use at home, school, or work?	1	2	3	4	5
2. How often do you use a computer?	1	2	3	4	5
3. How often do you use a mouse with a computer?	1	2	3	4	5
4. How often do you use a computer to write letters or papers in English?	1	2	3	4	5
5. How often do you use a computer to make spreadsheets (for example, Lotus 123 or Microsoft Excel?)	1	2	3	4	5
6. How often do you use a computer to make graphs, drawings, or presentations (for example, Microsoft PowerPoint)?	1	2	3	4	5

Please answer each of the following questions.

7. For how many years have you had a computer at home?

8. For how many years have you been using a computer to write in any language?

9. For how many years have you been using a computer to write in English?

10. How comfortable are you with using a computer to write a paper?
0 Not at all 1 2 3 4 Very comfortable

11. How good are your keyboarding skills in English?
0 Terrible 1 Fair 2 Good 3 Very good 4 Excellent

12. In my first language, I can type faster than I can write by hand.
Strongly Disagree Disagree Undecided Agree Strongly Agree

13. In English, I can type faster than I can write by hand.
Strongly Disagree Disagree Undecided Agree Strongly Agree

14. When writing in your first language, do you prefer to write on paper or on the computer?

15. When writing in English, do you prefer to write on paper or on the computer?

APPENDIX C:

Computer aversion and attitudes questionnaire

Below is a list of items describing many of the thoughts and experiences that people have with computers. After reading each statement, select the number that best describes how true or how false the statement is as it applies to you at this time. If you have no opinion about the item, select "0", but please use this option only if it is absolutely necessary. Be sure to select only one number. Please do your best to respond to each item.

	Absolutely False			Neutral			Absolutely True
1. I enjoy using computers.	-3	-2	-1	0	1	2	3
2. Being able to use a computer is important to me.	-3	-2	-1	0	1	2	3
3. Computers are beneficial because they save people time.	-3	-2	-1	0	1	2	3
4. I like using word-processing programs.	-3	-2	-1	0	1	2	3
5. I feel like a fool when I am using a computer and others are around.	-3	-2	-1	0	1	2	3
6. I am smart enough to use a computer.	-3	-2	-1	0	1	2	3
7. I avoid using computers whenever possible.	-3	-2	-1	0	1	2	3
8. I do not understand how to use computer software (e.g., word-processing programs, spreadsheet programs, etc.).	-3	-2	-1	0	1	2	3
9. I feel that I understand how to use computer files, documents, and folders.	-3	-2	-1	0	1	2	3
10. I use a computer input device every day (e.g., a keyboard, a touch pad, a mouse).	-3	-2	-1	0	1	2	3
11. I can use a computer to successfully perform tasks.	-3	-2	-1	0	1	2	3
12. When I use a computer, I am afraid that I will damage it.	-3	-2	-1	0	1	2	3
13. I must have a reference manual or a help file to run computer software.	-3	-2	-1	0	1	2	3
14. Email is an easy way to communicate with people.	-3	-2	-1	0	1	2	3
15. I use email every day.	-3	-2	-1	0	1	2	3
16. Overall, I feel that I don't know how to use a computer.	-3	-2	-1	0	1	2	3
17. Computers are too scientific for me.	-3	-2	-1	0	1	2	3
18. When using a computer, I often lose data.	-3	-2	-1	0	1	2	3
19. I like to use computer input devices such as a keyboard, a touch pad, a mouse, etc.	-3	-2	-1	0	1	2	3
20. Using a computer is entertaining.	-3	-2	-1	0	1	2	3

Instructions for scoring: Items 5, 7, 8, 12, 13, 16, 17 and 18 are reverse scored.
Item breakdown by factor: Factor 1-Computer Attitudes: Items 1-4, 7, 10, 14-15 and 19-20.
Factor 2-Computer Aversion: Items 5-6, 8-9, 11-13 and 16-18.

Source: Schulenberg and Melton (2008)

APPENDIX D:
Stimulated recall instructions

Adapted from Gass and Mackey (2000) and Barkaoui (2015)

Stimulated recall instructions to research participant

Before doing the writing task:

In this study, I am interested in learning what you think about as you complete the writing task. To do this, I am going to first record your writing session. After you complete the writing task, I am going to play back the recording on the computer and ask you to recall and say out loud everything that came into your mind while completing the writing task.

After finishing the writing task:

We are going to watch a video of your writing session. We are interested in what you were thinking **at the time you were writing**. We can see what you were doing and writing by looking at the video, but we don't know what you were thinking then. So, I'd like you to watch the video and to tell me what you were thinking, what was in your mind **at that time while you were writing**. As you watch the video, try to put your mind back into the task. I am interested in finding out **what you were thinking when you were writing**, and it does not matter at all to me if those thoughts were silly or profound. *If you want to point at something on the screen please use the mouse* (not your finger) to point at it (so the mouse movement can be recorded too).

It is important that you do not plan or try to explain to me what you are thinking, and it is important that you keep talking all the time. If you are silent for any period of time, I will remind you to keep talking.

I am going to put the mouse on the desk here and you can pause the video any time that you want. So, if you want to tell me something about what you were thinking at that time, you can click the pause button. If I have a question about what you were thinking or what you have written, then I will push pause and ask you to think back and tell me what you were thinking at that time. You can pause the video as often as you want. Anytime you remember something, say it, interrupt me; stop the video if you want.

Do you understand what I am asking you to do? Do you have any questions?

Now we are going to watch the recording of your writing process for the writing task you just did. I'd like you to tell me what you were thinking **when you were completing the task**, **NOT** what you are thinking now. I am interested in **what was in your mind** from the point when you read the instructions for the task up until the time when you finished the task. Please do not think about what you should have thought or done. Again, I am interested in knowing **what you were thinking at the time you were writing**, **NOT** what you think about it now.

Please go ahead and tell me what you can remember.

[Researcher then clicks play]

Stimulated recall instructions to researcher

After reading the instructions to the participant, model stopping the video and asking a question. For example, choose a segment and stop the video. Ask your question. If the participant stops the video, listen to what s/he says. If you stop the video, ask something general like:

- *What were you thinking here/at this point/right then?*
- *Can you tell me what you were thinking at that point?*
- *I see you stopped writing, what were you thinking then?*
- *I see you changed (added, deleted, reordered, etc.) the text, can you tell me what you were thinking then?*
- *Is there anything else that comes to your mind?*
- *Do you remember anything else about what you were thinking at that moment?*

Use only open-ended prompts/questions.

Before starting the video of the writing session, ask the student how s/he understood or interpreted the writing task. Ask the following questions at the beginning of Part A of the task and again at the beginning of Part B:

- *How did you understand the writing task? (What did the writing task ask you to do?)*
- *How did you understand Part A? What is Part A asking you to do?*
- *How did you understand Part B? What is Part B asking you to do?*

Make sure to pause the video and ask the student about what s/he was thinking after long pauses and major revisions. Make sure to ask the student what they were thinking when they are reading the task (i.e., before they start writing). If the participant starts to talk about what s/he is thinking now (e.g., that s/he made a mistake), try to maintain orientation to time of writing, for example, by saying "were you thinking that at the time?" Keep him/her focused on the time when s/he did the writing. Emphasise thoughts **during the writing**, not interpretation now.

If the participant says "I don't remember", accept the comment and move on. If the participant cannot recall the item at once, do not ask any other questions. Continue to watch the video. Try not to focus or direct participants' attention beyond "what were you thinking then/at that time". It may also be useful to direct participants' attention to the pauses and revisions they make by saying something like:

- *I see you stopped writing, what were you thinking then?*
- *I see you changed (added, deleted, reordered, etc.) the text, can you tell me what you were thinking then?*
- *Can you remember what you were thinking when you paused?*
- *Can you tell me your thoughts when you paused (or made a change)?*

If the participant begins to talk without pausing the video, pause the video and angle the mouse towards the participant so that s/he can release the pause when s/he is finished talking. Additionally, you should not give concrete reactions to participants' responses. Backchannelling or non-response are preferable. For example: *I see, uh-huh, ok.* It is important to avoid extended responses or three-part exchanges, because providing feedback or input to participants may alter the nature of their recall comments. In short, try to be a "warm body", not a conversational partner.

When the participant finishes the recall, ask questions about his/her views of the writing task and his/her evaluation of his/her writing performance. Ask the following questions:

- *What do you think of the writing task? What about Part A? What about Part B?*
- *How do Part A and Part B of the writing task compare? Do you think the two parts are different? If yes, how and why? If not, why not?*
- *Did you respond differently to Part A and Part B? If yes, how and why? If not, why not?*
- *How do you feel about your response to the writing task? How do you feel about your response to Part A? How do you feel about your response to Part B? Why?*
- *Do you have any other questions or comments about the video or the writing tasks?*

APPENDIX E:
Follow-up interview

1. How did you feel about the writing tasks in this study?
    a. How did you feel about Part A?
    b. How did you feel about Part B?

2. How did you feel about writing on paper versus writing on the computer?
    a. Does it make any difference for you whether you write on paper or on the computer?
    b. How? Why?

3. What do you think about the stimulated recalls you just did?
    a. Do you think that knowing that you will provide stimulated recalls affected your writing in any way? How? Why (not)?

4. Do you have any thoughts or comments that you would like to add about your experience doing the writing tasks and the stimulated recalls?

APPENDIX F:
Paper-based writing task directions

Please read the instructions below very carefully.

The writing task includes **TWO** (2) questions, called *Part A* and *Part B*. You have to **respond to both** questions **in 30 minutes**.

You will have **30 minutes** to plan, write and revise your response to both questions. If you finish your response before the time is up, you can return your paper to the researcher.

The researcher will give you a special pen and special paper to draft and write your response. These are the pen and paper that you practised using earlier.

The researcher will provide you with 4 sheets of paper with your name. You can use three of these sheets to plan, draft and write your response, but you have to use the fourth sheet, marked Part A on one side and Part B on the other side, to write your final response. Write your response to each question on the relevant side (that is Part A or Part B).

As soon as the time starts, please press the icon for **Record** on the smartpen paper using the tip of the pen. When you finish writing, please remember to press the icon for **Stop** on the smartpen paper using the pen.

Please make sure to return all the materials (instructions, all sheets) to the researcher when you finish.

Please **do your best** on the task as if it is a real test.

Do you have any questions?

APPENDIX G:
Computer-based writing task directions

Please read the instructions below very carefully.

In this session you will complete one writing task on the computer. The task is **30-minute** long and includes **TWO** (2) questions. You have to **respond to both** questions in the allotted time.

Please note the following:

a. When the test starts you cannot ask any questions. Just follow the instructions on the screen.
b. You will have **30 minutes** to plan, write and revise your response to **both** questions.
c. You can only use the following editing functions: cut, copy, paste, and select text.
d. You can use the computer and/or the scratch paper to plan, draft and revise your response, but you have to **type the final version of your response on the computer**.
e. Please **do your best** on the task as if it is a real test.

Please make sure to return all the materials (instructions, all sheets) to the researcher when you finish.

Do you have any questions?

APPENDIX H:

Coding scheme for stimulated recalls with examples

Transcription conventions:

( ): uncertain transcription x: incomprehensible word comma: short pause
[ ]: Procedural and other behaviours ?: Questioning intonation
[TEXT]: Text read from task (not included here for test security reasons)
CAPITAL LETTERS: Words that the student has written, was thinking of writing, and/or read directly from his/her text

Each excerpt is followed by information about its source as follows: participant code, writing mode (PB or CB), and task part (A, B or Both).

Code	Definition	Examples (Participant code, writing mode, task part)
MACRO-PLANNING		
Reading Task	Reading or rereading the writing task or parts of it.	It's just that I first I, I read it [the task] then I was a bit confused so I read it over again one more time and then another time, so, I think three, four times I read it. (HH1, CB, A) I was looking at again to the question and uh I was trying to find some words and start with that. (HL1, CB, A)
Task Conceptualisation	Comprehending, reflecting on and/or evaluating the writing task.	
Analysing Task	Analysing task parameters, requirements and constraints (e.g., time, text length, purpose, audience, content, and structure of the writing).	Um I first read this, this first sentence [of Part B] and then I uh looked at how long it should be and planned in my head like how I should begin it, how I should end it and how I should conclude. (HH1, CB, B) Yeah, so at that time I I take notes what's going on x email respond. And the trip has been cancelled because lack of interest, so they will give me a refund but it's not, this refund not include the entrance ticket. Yeah I write, yeah notes, short notes. (LL1, PB, A)
Evaluating Task	Evaluating the writing task in terms of its difficulty/easiness or interest.	It [the task] was bizarre; it was not what I had expected, it was not an essay or something. (HH2, CB, A) I thought both of them were pretty clear. The only confusion I had is who is the guy who wrote me that email. (HH3, PB, both) I was reading the uh question and uh think at how I'm going to answer the two questions and uh the the first one was okay but the second one that is 120 that was scary I was thinking how I'm going to write 150 words in twenty minutes and yeah that was just thinking about this. (HL1, CB, Both)
Checking Task Comprehension	Checking or confirming comprehension of task.	I was confused so I read it again to find some useful information and to help me locate myself in a suitable position to write the letter. (HL4, CB, A) When I saw the word FEEL I become sensitive because its, we're asked to do that so uh, I was just wondering if it's really a feeling or it's a you know or a feeling or thought or something. (HH1, CB, B)
Constructing Audience		
Audience Facts	Considering facts about the audience given in the task.	Yeah. And then I think uh is x a female's name, or a male's name... Yeah, and then uh I think it is a male's name because uh, a G-O looks like "Josh", yeah. (LL3, PB, A) He is my best friend we talk about everything... I was thinking he is the guy I can talk with freely about my feelings and who will not judge me. (HH3, PB, A)
Audience Inferencing	Making inferences and/or constructing hypothetical audience characteristics (e.g., attributes, attitudes, etc.), which may or may not be accurate.	Pretty much the first, like the beginning of the email so I was thinking, how uh, I would refer to the email that I got. Cause assuming he [my friend] got the same email he knows, he doesn't need an extensive introduction. So I just thought of a nice way of starting it by referring to the email cause he already knows about it too. (HH1, PB, A) The manager is always busy and if I can't tell him the purpose I write the letter he is going to ignore me. (HL4, PB, B)

Code	Definition	Examples (Participant code, writing mode, task part)
Constructing Situation		
Situation Facts	Considering facts about the situation given in the task.	So the first part of the story is they cancelled the trip and then I lost some money because of it. (HL4, PB, A) It's not reality but what I will do if I have a trip cancellation like today here, if I have planned a trip and received an email telling that the trip has been cancelled. I will immediately email a friend and ask him for something else to do. (LH2, CB, A)
Situation Inferences	Making inferences based on task description and/or imagining/ constructing additional details about the situation which may or may not be accurate.	This part, uh, I made up something I think I was allowed to, or no, I'm not sure but, I just made up this thing. There was an ad in fact about the trip, usually clubs have ads about those they didn't state what if, I was just making, putting that thought and typing it out in a, like putting it, putting them in words that they did not write how we might be affected if let's say not enough people show up. (HH1, CB, B) I was imagining like I am writing a letter, writing an email to the manager, I just wanted to include my number, my ID number, something like that. I was thinking if I write my name and I am an active member of the club, how will he know? How will he make sure. So I was like, Okay, I should write my number. (HH2, CB, B)
Goal Setting		
Audience/Reader	Generating audience-related goals such as affecting the reader (i.e., what effect the writer wants to have on the reader).	Try to make my friend think the whole fact in as similar way as me. [...] after telling my story, my friend can understand my situation. (HL4, PB, A) If I need to complain about a bad service in my real life, I always try to put the fear of a potential refund on the company, because they never want to refund you, they want to keep the money. So I always tell them you that you provide me what I want or you are going to refund me. I always put this in the way how I would do that in my real life. (LH2, PB, B)
Persona/Self	Creating a persona, i.e., representing oneself to the audience and/or the relationship the writer wishes to establish with the reader.	I was trying to be sympathetic so, not just, you know complaining um I wanted to show my understanding of the situation. (HH1, CB, A) I was trying to get a little strong, you know, I was really polite, and now I was trying to get a little strong so he [the manager] knows what is actually bothering me. (HH3, CB, B) I thought of it like me being the boss talking to an employee or me being an authority and telling someone who did something wrong, you shouldn't have done that [...] Technically he [the club manager] works for me and so the tone should not be friendly, it should be a bit more formal [...] being a member to the club you feel entitled so you feel it doesn't matter the way you talk to people who work in the club. (HL2, PB, B)
Meaning/Content	Creating/conveying specific content/ideas/meaning.	I mean obviously first say what my concern was and then say, talk about why. (HH1, CB, B) What I need to do is to complain, complain again and again that's it. (HL4, PB, A) I was thinking that I'm gonna tell her that I'm upset and what should I do and just explain it the situation. (HL1, PB, A)
Text/Form	Producing a formal text. The focus is on the formal or conventional features of written text.	I was thinking I should use different styles and different grammar (HL1, CB, both) I wanted to be more organised, just to organise it and make it more formal (HH2, PB, B) Um I first read this, this first sentence [of Part B] and then I uh looked at how long it should be and planned in my head like how I should begin it, how I should end it and how I should conclude. (HH1, CB, B) I wanted to start with smooth and then I should show that I am angry and I want my money so I was thinking how can I start it. (HL1, PB, B) So it has to be I thought that's what I thought the following x so it has to be to the manager, it has to be formal, uh or otherwise they wouldn't take it seriously. (HH1, CB, B) Because it's letter, uh I don't think I need to write too formal, too formal things. (LL2, CB, A)

Code	Definition	Examples (Participant code, writing mode, task part)
Difficulty Macro-planning		
Understanding Task	Difficulty understanding the task or parts of the task.	It's just that I first I, I read it [the task] then I was a bit confused so I read it over again one more time and then another time, so, I think three, four times I read it. (HH1, CB, A) For this part I still don't get the point, I'm not very sure about the letter is telling me some some plan has been cancelled, I don't I don't know. So, I'm I'm still continue to read to read the the letter. (LL2, CB, A) I need to write fifty w- well fifty words is not too much, and, but I, if I don't know any information, and uh I just can't, I can't I can't write anything about this, so I don't have any details. I'm just guessing guessing, and try to write, try to try my best. (LL2, CB, A)
Constructing Audience	Difficulty constructing the audience.	I don't, I don't know if my friend will go to the talk or not. (HL4, CB, A) I don't know who I invite [to write the letter to] so then I thought of my friend in my home town. (LL3, CB, A)
Constructing Situation	Difficulty constructing the situation and/or not understanding the situation.	When I first skimmed through it I thought I may have um misread or, missed a word that explains the situation better cause at first when I read it the situation wasn't clear in my head for some reason, so that's that was pretty much the confusion I just didn't know what the situation was and what exactly was happening. (HH1, CB, A) And then, uh and then what this club is... I was thinking what is the, what is this club? (LL3. CB, B)
Macro-planning PS Strategy	Verbalising the use of a problem solving strategy to address a macro-planning difficulty.	When I read the topic, uh, in the beginning I don't know what's the email say… I don't understand, and then I read again, I read three times maybe, and then I ha- I little understand what the email said. (LL4, PB, A)
ORGANISATION		
Organising Message	Organising the message/ideas/content.	Yeah I was thinking should I write it like uh how how I I I'm gonna start. Like should I uh, I don't know start asking how is she or, start with something else or should I start it with explaining about the email? (HL1, CB, A) I was thinking if I should write about my feelings now or later? (HH1, CB, B)
Organise-Audience	Considering the audience when organising ideas/message.	I was organise uh what I should respond to the manager… First I my emotions. I feel upset. Next, name, why... I no- I [went] back to the Part A [about the point about] refund all the money but, but not all, yeah. And I wrote about the solution.... I I gave the example why uh to persuade the manager why you should give the coupon of the gift card... (LL1, PB, B)
Difficulty Organising Message	Referring to a problem/difficulty related to organising the message.	And then, when I finish writing DEAR MY MANAGER I have some idea but I'm not sure how to, first what can I say. And then, the order. Yeah, just think order. (LL4, PB, B) I think my format was a little bit off here, but I thought that's the best I could do right then so I did it. (HL2, CB, B).
Organising PS Strategy	Verbalising the use of a problem solving strategy to address an organisation difficulty.	I think my format was a little bit off here, but I thought that's the best I could do right then so I did it. (HL2, CB, B).
MICRO-PLANNING		
Local Planning	Planning and/or choosing what to write next (content/ideas) in regard to units no longer than a paragraph.	Hm I'm thinking what I should put the two reasons. (LL1, CB, B) Uh yeah I just I wanted to explain that I have some other things to do. (HL1, CB, B) I thought about why people will be interested, and then I thought a recent, what about saying there are ten new members who is new to gardening, then they must be interested in learning some gardening skills, right? (HH4, PB, B)

Code	Definition	Examples (Participant code, writing mode, task part)
Generating and Retrieving	The retrieval and generation of ideas.	
Self-based Generating	Generating an idea without any stimulus or retrieving appropriate information from long-term memory.	So here I stated why why holding a horticultural skills workshop will be a good idea, so I first started by PROBABLY PEOPLE WILL BE INTERESTED IN and then I thought about why people will be interested, and then I thought a recent, what about saying there are ten new members who is new to gardening, then they must be interested in learning some gardening skills, right? (HH4, PB, B) Uh, so, and I thought if that's the case, at least it could have been done with less cost, less money being lost, being, being ruined, than just the whole cost of it. For the whole time I thought this is a good alternative that they could have maybe extended the time, uh, for signing up, so enough people would sign up or reschedule it somehow that could happen or maybe, uh, yeah. (HH1, CB, B)
Text-based Generating	Generating an idea related to what has been written, by re-reading text written so far and generating ideas/content.	I think I read, I read again maybe. When I have no idea I will read, the sentence, again. (LL4, CB, B) Yeah that's that's the third one [note], that's the third note that I wrote that I got a new one [presenter]. (LL2, PB, B)
Task-based Generating	Generating an idea after/based on (re)reading the task or retrieving information from the task.	Uh, I I I thought I think I was reading the question, and then I copy the format first, the format of the letters, because I was not thinking about what I should write (at the time), I just copy the format first. (HH4, CB, A) Yeah I mean, I'm thinking about should I write something else and I was I'm reading the topic again about this part, about maybe the last part [of the task] uh well I was trying to find some details that I can say. (LL2, PB, A) Yeah I again I was looking for name [of the speaker]. Yeah I was trying to find something in the question and use it. (HL1, CB, B)
Translating or L1 Use	Generating ideas in L1 and then translating them into L2.	I had this sentence in my mind, but I want to know how to translate from my language to English. (LH3, CB, B) Yeah. And then uh, in my (brain), I thought about uh in Chinese uh we, we say uh, (tide of x over), yeah. (LL3, PB, A)
Micro-planning Audience	Considering the audience when micro-planning.	I wanted to put something in the last paragraph so the last part of the second paragraph does not have a negative impact on the manager. (HH3, PB, B) I wanted to say that I am upset at the cancellation and at the same time show them that I am interested so to make them able to find a solution for me. (LH2, CB, B) Uh I want to attract, uh attract the manager's notice on my message, so uh- Uh, attract her or his notice on my writing, so uh, I want to write more uh, interesting things at the beginning. (LL3, CB, B)
Difficulty Micro-planning	Referring to a problem/difficulty related to micro-planning (e.g., not knowing what to write/say next).	Yeah I think the same thing I'm looking for some details Finally I think I think is nothing there, so I just decide to end... so that that that's it, then so so from here I don't, I don't know how what what can I write? What else can I write about? So I just end [my response]. (LL2, PB, A) Uh, yeah same thing I was just not sure what to write. (HL1, PB, B)
Micro-planning PS Strategy	Verbalising the use of a problem solving strategy to address a micro-planning difficulty.	Yeah I thinking what to say. What kind of excuse should I find. [...] Yeah I thought maybe I I'm better start the the sentence that I'm going to say I'm not coming and then after that I might find something and put it there. (HL1, CB, B)

Code	Definition	Examples (Participant code, writing mode, task part)
TRANSLATION		
How to Write	Planning or choosing how to write the next part of the text in regard to units no longer than a paragraph.	
Language		Here I wanted to use a word for not interested, so I guess I was thinking about that word, and finally I use indifferent. (HH4, CB, A) The tense you know. When the main plan changes or has to change or. (HH1, PB, B) I'm thinking about THE is necessary or not the article... Or not because I have also have a article problem uh the a or no- nothing [i.e., whether to use the or no article]... Because he [the reader] knows [what I am talking about], and I know so I put THE. (LL1, PB, A)
Balance		I was thinking uh, I ask help uh, to my friend like this that I uh I uh just say I was wondering or is it too formal. (HL1, PB, A) I use [the word] CHARACTERISTICS because it makes me more professional. (HL4, CB, B) I was gonna go for a more formal way of saying HE'S SICK so I was wondering what I should write and then said NOT FEELING WELL. (HH1, PB, B) Uh I thought maybe HELLO is a little more formal than HI. (HL1, CB, B) I am disappointed will make more of difference [impact] than I was [disappointed]. I was thinking which one will make more of an impact and I went with I AM. (HH3, PB, B)
Coherence and Cohesion		Uh, thinking? (although), thinking another thing, another sentence, just this... Oh, I think that, (although) uh, (although) I'm not sure (although), because uh, (although) can be put in uh, middle sentence?... Yeah maybe it can put it (began) so. (LL1, PB, B) And then uh well I was thinking about what what uh communication uh- no no no what, connection yeah what connection I gotta use... Like, like like the relationship between the sentence and next. (LL2, PB, B)
Layout		Yeah, and then I know that we uh, while we were while we were writing email, we put space and space after the paragraph. (LL3, CB, B) Yeah, I think uh, I was concerned about not putting all the email in one paragraph, so I, I just started, started on a new uh, paragraph just because xx when I'm writing any email if its long I just want to break it up so it's easier for the reader to read. (HH1, CB, B)
Translate-Audience	Considering the audience when translating.	[writing I WOULD APPRECIATE YORU RESPONSE] I think I put WOULD there, yeah, to just uh, make the sentence sound like I'm waiting for the response, force that person to tell me something, rather than just… to acknowledge my, you know, my… I just wanted him or her to acknowledge my email by responding… just a tactical thing. (HH1, CB, B) I am disappointed will make more of difference [impact] than I was [disappointed]. I was thinking which one will make more of an impact and I went with I AM. (HH3, PB, B)
Difficulty Translation		
Difficulty with Language	Referring to a problem/difficulty related to language.	Yeah I was so hard I was struggling to find a word. (HL1, CB, B) I want to say something but is difficult to say, in English so I change another way to say, I, I, I, I don't know how to say I will, I will f- I will, I will change another way. (LL4, PB, A) I pause because I want to say like and I hope you can send my something to him but I cannot think of that word like send my words to him, but I think that would not be the right one but I cannot think of this send something to him, so I just write this sentence I HOPE HE WILL GET BETTER because I cannot phrase that sentence. (HH4, PB, B)

Code	Definition	Examples (Participant code, writing mode, task part)
Difficulty with Balance	Referring to a problem/difficulty related to balance.	Uh I wanted to say now that is not coming or in this case what I was looking for a better word like to start the sentence not NOW or in this case I thought maybe it's not very formal to use. (HL1, CB, B). I had a hard time wording that portion because I, as you will see I back and forth, I, I go back and forth a lot so, it's just a structure thing. I formed my thought before that for the whole sentence… I included that, I, as I intended to just to feel, just to sound sympathetic also, not just, you know somebody who just thinks of themselves. (HH1, CB, B)
Translating PS Strategy	Verbalising the use of a problem solving strategy to address a translation difficulty.	I was thinking to change the sentence [from the task] without writing the same words of the email. I was trying to write something else for [TEXT] but I write [TEXT] because I didn't know how to say it in another way. (LH2, CB, A) A little bit messy because, the sentence not make sense so I delete it and type delete it and type... I want to describe the name is more important than the, topic... Yeah because I want to describe, uh why I choose this, uh this this presentation because his name... But I don't know, how to describe it so I didn't, I delete it, xx. Yeah, long pause. (LL1, CB, B)
EXECUTION		
Controlling	Managing the writing process.	I think it is time to finish the task. (HL4, CB, B) [I circled those words] Yeah, it's pay me attention. Pay me attention focus on this thing… so I, I pay attention to read this information.. Make me understand, more clear, just this... I want to know what does this, this, writing want me to write... I don't know, so I want to, focus on the notice because this, I, I, I think this is, this right?... I not sure so I circle. (LL4, PB, A)
Making Notes	Writing down notes (on scratch paper and/or on the computer).	Yeah, so at that time I I take notes what's going on x email respond [TEXT]. Yeah I write, yeah notes, short notes. (LL1, PB, A) I'm still try to get the point and uh, yea, and then I start to take some notes... Well the main thing is that something cancelled, that's the main point.. and then uh and then we know we got a new one... (LL2, PB, A)
Difficulty Typing/Handwriting	Referring to a problem/difficulty related to typing handwriting.	I just stopped, because x when I when I when I was writing this word (*N)* it was a little bit, it was a little bit ugly, so I'm thinking should I should I need to just cancel it and write again, and I I uh I decide not to, so I just keep going. (LL2, PB, B) The same correction, the capital I, I did the same, then I thought why do I do the same mistake [typing small I instead of capital I] again and again. (HL3, CB, A)
Execution PS Strategy	Verbalising the use of a problem solving strategy to address an execution difficulty.	I felt lazy to type, then I was thinking if I should whether to end the letter like this. (HL3, CB, A)
MONITORING		
Re-read to Monitor	Re-reading text written so far to monitor language and/or content.	I review over this my first writing. I review over the first over this Part A, the first one. I want to track my mistakes. (LL3, PB, A) Here I'm reading it [my response] again. (HL1, CB, B) Yeah so I wrote that. Mmm after I was I was examining the sentence again, just to see to making more fluent, trying to make it more fluent. (HH4, CB, B)
Global Text	Evaluating the generated text at a global level (paragraph and above).	I think I doubt again and just read over quickly to see if it makes sense. (HH1, PB, A) I just I thought I finish it. And then I just read, I check the whole text that I wrote, so I was checking Part A first. (HH4, CB, A)
Local Text	Evaluating part of the generated text (with or without revising).	I was just reading the sentence to see if there are errors, misspell. (HH4, CB, B) Read my sentence... Just check it very carefully. I think it's correct. (LL1, PB, A)

Code	Definition	Examples (Participant code, writing mode, task part)
Content	Evaluating content or ideas written or not written yet (with or without revising).	I thought that it is not unreasonable that uh, they could just reschedule it. (HH1, CB, B) I think I was, it was not making sense say it [laughs] for myself. (HL1, CB, B)
Language	Evaluating language (grammar, lexis, spelling, punctuation) written or not written yet (with or without revising).	I was just reading the sentence to see if there are errors, misspell. (HH4, CB, B) I just didn't know how to use the word correctly so I just wanted to double check maybe triple check the structure again. (HH1, CB, B)
Rhetoric/Organisation	Evaluating organisation (with or without revising).	Thinking to change it. I was uh I caught this part I I say that I'm sorry for his health first and then I'm afraid I can not come I thought that [the order of the two ideas] would be better. (HL1, CB, B)
Balance	Evaluating balance (with or without revising)	Mmm after I was I was examining the sentence again, just to see to making more fluent, trying to make it more fluent. (HH4, CB, B) I looked at that word UNFAIR, I was not sure if I should use the word UNFAIR. If it's too strong or not. If someone reads it would they back off, too much or not. (HH1, CB, B)
Text Length	Evaluating text length.	Because I'm uh, because I'm, I'm not sure is enough wrote or... Not enough, so I want to... Yeah, I want to add more words so,.. And, I want to stop but... (LL4, PB, A) Here I was just coun- trying to count how many words I wrote so... And then I thought maybe the time, is finished I'd better write the last part and then go back and if I have anything I can add. (HL1, CB, B) I went back and I counted uh, the words to just, see where I'm standing. What, how many words. (HH1, PB, B).
Reacting to own Writing	Reacting in personal and affective way to own writing.	I didn't like it I just delete it. (HL1, CB, B) It's not, uh, not logical, I think it not logical so I delete it. (LL1, CB, A) I sounded funny in my head, talking in a weird way to my friend, Oh, I am writing this to you because of this... None talks like that these days, so I thought it is weird. (HL2, PB, A)
Monitoring-Audience		
Audience Response to Content	Evaluating content with regard to anticipated audience response.	[I read my response to Part A] to see for the person who's gonna read, it make sense to this person. (LH4, CB, A) I change you you have any suggestion to you already have other plans because the manager have plans, right? He he would not suggest (you) he's the one who decides things, so he will not say "I suggest" or something he has so I thought that if you have many plans, that makes more sense, rather than "you have suggestion". (HH4, CB, B)
Audience Response to Language	Evaluating language (accuracy, appropriateness, syntax, word choice, layout, formality, register, style) with regard to anticipated audience response.	[I did not change the mistake] because it doesn't make sense if you correct your mistakes when he is your friend, like, he is not going to take it as serious so I just wrote it as I like it. (HL3, CB, A) [I wrote] I STILL HAVE A QUESTION WHICH [then paused] Yes which question but after that I (didn't) because that would let the reader confuse... Relative clause Sometime will let the reader confuse... I think, so so after that I deleted it... Yeah I'm thinking because, sometimes the relative clause will let the reader confuse so I deleted it, because I have experience about that. (LL1, CB, A)
Checking the Time		Uh, I that's it I just I was thinking to start and I was most of the time I was thinking that my time is going and I'm not writing so was nervous. (HL1, CB, B) Uh uh I think I were thinking uh so I have to write uh write on the spare paper. What I'm thinking (again) but I think when I see clock that ha- uh maybe uh fifteen fifteen minutes. So I think if I write on the paper on some paper m- maybe I don't I don't have enough time to write again in the uh first page. So I decide write that in the page. (LH3, PB, B)
Difficulty Monitoring	Referring to a problem/difficulty related to monitoring.	I wasn't happy with it I just changed that word but still I wasn't I just like left it like that then I was like so I was just trying to think if I can change it then I I don't I didn't change it. (HH2, CB, B) I was thinking about grammar, if I should use s, apostrophe s here, and I am still not sure. (LH2, CB, A)

Code	Definition	Examples (Participant code, writing mode, task part)
Monitoring PS Strategy	Verbalising the use of a problem solving strategy to address a monitoring difficulty.	I wasn't happy with it I just changed that word but still I wasn't I just like left it like that then I was like so I was just trying to think if I can change it then I I don't I didn't change it. (HH2, CB, B) Yeah, I don't think is this need the preposition so, because I'm not sure, the preposition can be put in here. Yeah so, which preposition I can chose so I, I forget this, I forget the preposition, I continue. (LL4, PB, B)
EDITING AND REVISING		
Review Decision	Deciding to review and improve the text.	Uh, uh, yeah this time I I I read, read the whole thing, read the here [Part A] and here [Part B] to say some-to see if there is something I can add. But but but then I think I have to finish it, I can't I can't add anything else, so I click finish. (LL2, CB, A) I was still checking on this sentence, still looking for error, yeah so I changed that misspell. (HH4, CB, B)
Content Revision	Content or conceptual revisions affect the informational content of the text.	Because I want to add more, more thing in my sentence... So I think this one is not, not what, not complete so... Yeah so I add more detail. More specific. Because (I say) this one is draft I can put inside or not. So if not necessary I will delete it. (LL1, PB, B) Uh, I think uh I was thinking uh we should uh arrange another me- uh like meeting or event or th- the manager should arrange it or should have used we... [...] Then I delete it. Uh I thought thought it's not good, that. (HL1, CB, B) I change YOU HAVE ANY SUGGESTION to YOU ALREADY HAVE OTHER PLANS because the manager have plans, right? (HH4, CB, B)
Language Revision	A revision made to language (i.e., grammar, vocabulary, punctuation, or phrasing), but does not affect meaning.	I write the were? Were but I think I can't use were so I change the word to was uh it's about vocabulary it's about grammar. (LH3, PB, A) I was writing I CAN'T and I change it to I WILL NOT BE. (HL1, CB, B) I change WITH to ABOUT, I felt that would be more fluent you would have a question about a suggestion, rather than you have question with something, ABOUT is more appropriate. (HH4, CB, B)
Organisation Revision	Changes made in the order of paragraphs or sentences.	Thinking to change it. I was uh I caught this part I I say that I'm sorry for his health first and then I'm afraid I can not come I thought that [the order of the two ideas] would be better. (HL1, CB, B).
Balance Revision	Revisions that affect the text on a stylistic rather than a formal or conceptual level.	That is I WILL BE HAPPY TO JOIN THAT, mmm I think both okay and uh, in my my opinion. Yeah, will and may, Will and may, I think both okay, uh but I I just change it. I think they will be more comfortable to read [MAY BE HAPPY]. (LL2, PB, B)
Typography/Spelling Revision	Revisions undertaken as a result of a typing or a spelling error.	Uh the better? That's a spelling mistake so I cancel it out. (LL2, PB, B) That was my mis- typing mistake. (HL1, CB, B)
Difficulty Revising	Referring to a problem/difficulty related to revising.	Yeah. And then I thought that can I use 'as'... As, as that time, because it is not xx. It is not clear. [But] I didn't know how to change it. (LL3, PB, B) I was not happy with that I was thinking to change it but I didn't have anything else. I used it again. (HL1, CB, B) Uh, uh, yeah this time I I I read, read the whole thing, read the here [Part A] and here [Part B] to say some-to see if there is something I can add. But but but then I think I have to finish it, I can't I can't add anything else, so I click finish. (LL2, CB, A)
Revision PS Strategy	Verbalising the use of a problem-solving strategy to address a revision difficulty.	I was not happy with that I was thinking to change it but I didn't have anything else. I used it again. (HL1, CB, B)

APPENDIX I:

Descriptive statistics for codes by task part

	Part A				Part B			
	M	Med	Min	Max	M	Med	Min	Max
MACRO-PLANNING	**25.35**	**24.04**	**3.70**	**50.00**	**15.14**	**10.65**	**1.00**	**46.67**
Reading Task	4.07	3.18	.00	21.21	1.38	1.33	.00	4.39
Task Conceptualisation	4.07	3.08	.00	12.70	1.05	.00	.00	4.76
Construct Audience	3.08	2.30	.00	14.29	1.91	1.28	.00	7.50
Construct Situation	4.83	4.45	.00	11.76	2.78	2.02	.00	9.52
Goal Setting	6.58	4.42	.00	28.75	6.85	4.66	.00	23.81
Audience/Reader	.81	.00	.00	4.65	1.62	1.02	.00	9.68
Persona/Self	.95	.00	.00	5.77	.99	.81	.00	4.21
Meaning/Content	1.61	1.30	.00	8.75	1.89	1.02	.00	9.52
Text/Form	3.21	2.10	.00	15.00	2.35	1.40	.00	8.42
Difficulty Macro-planning	2.14	.00	.00	17.86	1.08	.00	.00	20.41
Macro-planning PS Strategy	.56	.00	.00	7.14	.10	.00	.00	2.04
ORGANISATION	**1.73**	**.00**	**.00**	**12.50**	**2.86**	**2.28**	**.00**	**11.39**
Organising Message	1.58	.00	.00	10.42	2.39	2.03	.00	11.39
Organise-Audience	.14	.00	.00	2.08	.36	.00	.00	1.90
Difficulty Organising	.00	.00	.00	.00	.08	.00	.00	1.43
Organising PS Strategy	.00	.00	.00	.00	.03	.00	.00	1.05
MICRO-PLANNING	**19.82**	**14.46**	**.00**	**58.82**	**19.36**	**17.25**	**5.70**	**61.67**
Local Planning	7.30	6.17	.00	17.65	7.60	7.08	1.67	18.33
Generating and Retrieving	6.76	4.82	.00	20.83	6.16	6.28	.00	18.33
Self-based Generating	4.23	2.12	.00	17.65	4.29	3.65	.00	18.33
Text-based Generating	.52	.00	.00	6.67	.47	.00	.00	2.63
Task-based Generating	1.91	.60	.00	10.42	1.00	.00	.00	5.71
Translating or L1 Use	.11	.00	.00	2.27	.41	.00	.00	6.45
Micro-planning Audience	3.91	1.92	.00	17.65	4.26	3.18	.00	18.33
Difficulty Micro-planning	1.10	.00	.00	9.33	.74	.00	.00	9.47
Micro-planning PS Strategy	.74	.00	.00	5.56	.60	.00	.00	9.47
TRANSLATION	**19.30**	**19.13**	**.00**	**54.84**	**23.69**	**22.86**	**.00**	**46.27**
How to Write	11.69	11.91	.00	32.26	14.26	14.87	.00	32.84
Language	6.30	5.62	.00	19.64	7.69	6.99	.00	23.88
Balance	3.82	2.67	.00	16.13	4.76	5.80	.00	11.32
Coherence and Cohesion	1.15	.00	.00	7.32	1.44	.85	.00	6.32
Layout	.43	.00	.00	3.70	.37	.00	.00	4.21
Translate-Audience	3.39	2.70	.00	11.54	3.50	3.39	.00	11.39
Difficulty Translation	2.64	2.20	.00	13.33	3.65	2.96	.00	10.00
Translating PS Strategy	1.57	.92	.00	6.67	2.28	2.03	.00	7.59

	Part A				Part B			
	M	Med	Min	Max	M	Med	Min	Max
EXECUTION	**4.30**	**2.36**	**.00**	**25.00**	**2.01**	**1.14**	**.00**	**7.50**
Controlling	1.36	.00	.00	7.84	1.17	1.00	.00	6.25
Making Notes	2.36	.00	.00	23.08	.60	.00	.00	5.26
Difficulty Typing/Handwriting	.55	.00	.00	4.88	.21	.00	.00	3.23
Execution PS Strategy	.03	.00	.00	.94	.03	.00	.00	1.05
MONITORING	**21.91**	**22.47**	**.00**	**41.94**	**27.35**	**26.46**	**11.90**	**49.00**
Re-read to Monitor	1.43	.00	.00	6.67	2.35	1.58	.00	10.00
Global Text	.55	.00	.00	3.23	1.04	.73	.00	4.20
Local Text	6.86	6.56	.00	16.13	7.72	7.04	.00	19.00
Content	.35	.00	.00	4.41	.82	.00	.00	4.00
Language	6.65	6.40	.00	17.86	6.56	6.80	.00	14.29
Rhetoric/Organisation	.33	.00	.00	3.75	.59	.00	.00	5.52
Balance	.98	.00	.00	7.50	1.48	1.03	.00	8.00
Text Length	1.57	.00	.00	9.80	1.53	.83	.00	5.71
Reacting to own Writing	1.28	.00	.00	5.56	1.92	1.51	.00	10.00
Monitoring-Audience	.41	.00	.00	4.88	2.19	1.19	.00	9.17
Checking the Time	.89	.00	.00	7.14	.75	.00	.00	3.75
Difficulty Monitoring	.33	.00	.00	4.88	.30	.00	.00	2.86
Monitoring PS Strategy	.26	.00	.00	2.44	.12	.00	.00	1.43
EDITING AND REVISING	**7.61**	**6.28**	**.00**	**20.63**	**9.58**	**8.79**	**.00**	**33.00**
Review Decision	.69	.00	.00	5.88	1.01	.00	.00	4.08
Content Revision	1.19	.00	.00	6.35	2.23	1.15	.00	12.90
Language Revision	3.12	2.47	.00	13.46	3.08	2.92	.00	15.00
Organisation Revision	.07	.00	.00	1.33	.16	.00	.00	1.89
Balance Revision	.64	.00	.00	4.88	1.00	.00	.00	5.00
Typography Revision	1.58	1.11	.00	6.45	1.89	1.61	.00	5.71
Difficulty Revising	.15	.00	.00	2.27	.14	.00	.00	1.02
Revision PS Strategy	.15	.00	.00	2.27	.09	.00	.00	1.02

APPENDIX J:

Descriptive statistics for codes by writing mode

	Paper-based				Computer-based			
	M	Med	Min	Max	M	Med	Min	Max
MACRO-PLANNING	**18.58**	**15.74**	**7.34**	**32.77**	**18.86**	**19.89**	**6.06**	**38.53**
Reading Task	2.44	1.85	.00	8.11	2.75	2.13	.00	10.42
Task Conceptualisation	2.54	1.97	.00	5.88	2.46	2.03	.00	8.93
Construct Audience	1.43	1.00	.00	3.97	1.38	.72	.00	4.35
Construct Situation	4.15	3.50	.00	8.07	3.71	3.19	.00	8.23
Goal Setting	7.23	6.33	.00	18.30	5.67	3.99	.00	16.02
Audience/Reader	1.28	1.17	.00	3.53	1.03	.61	.00	5.00
Persona/Self	1.16	1.23	.00	2.94	.95	.59	.00	3.75
Meaning/Content	2.23	1.79	.00	5.77	1.12	.67	.00	4.93
Text/Form	2.57	1.90	.00	9.36	2.58	1.63	.00	7.79
Difficulty Macro-planning	.69	.00	.00	3.03	2.40	.68	.00	16.07
Macro-planning PS Strategy	.10	.00	.00	1.01	.48	.00	.00	2.14
ORGANISATION	**2.76**	**2.22**	**.00**	**8.16**	**2.13**	**1.82**	**.00**	**6.25**
Organising Message	2.31	1.90	.00	7.48	1.83	1.48	.00	6.25
Organise-Audience	.38	.00	.00	1.59	.21	.00	.00	.87
Difficulty Organising	.06	.00	.00	1.01	.05	.00	.00	.72
Organising PS Strategy	.00	.00	.00	.00	.05	.00	.00	.72
MICRO-PLANNING	**20.89**	**16.75**	**5.53**	**61.11**	**17.91**	**15.26**	**7.14**	**39.86**
Local Planning	7.97	6.84	2.35	18.25	6.72	6.94	1.79	11.02
Generating and Retrieving	6.93	5.89	1.70	18.25	5.59	4.40	2.11	11.56
Self-based Generating	4.74	3.45	.00	18.25	3.84	3.95	.00	8.59
Text-based Generating	.79	.60	.00	3.03	.13	.00	.00	1.16
Task-based Generating	1.12	.90	.00	4.76	1.39	.68	.00	5.00
Translating or L1 Use	.28	.00	.00	3.03	.23	.00	.00	2.50
Micro-planning Audience	4.31	2.97	.84	18.25	4.02	2.95	.00	14.49
Difficulty Micro-planning	1.01	.31	.00	4.30	.87	.00	.00	6.52
Micro-planning PS Strategy	.66	.00	.00	3.23	.72	.00	.00	6.52
TRANSLATION	**24.22**	**25.19**	**.00**	**39.45**	**19.22**	**21.23**	**.00**	**31.91**
How to Write	14.82	17.31	.00	28.44	11.52	12.95	.00	22.34
Language	8.21	8.37	.00	18.35	6.02	5.98	.00	14.89
Balance	4.74	5.45	.00	9.43	3.96	4.15	.00	9.45
Coherence and Cohesion	1.34	1.02	.00	4.71	1.28	.97	.00	4.29
Layout	.53	.00	.00	2.94	.26	.00	.00	1.73
Translate-Audience	3.13	3.15	.00	9.79	3.43	3.35	.00	7.79
Difficulty Translation	3.72	3.48	.00	11.11	2.75	2.55	.00	6.94
Translating PS Strategy	2.55	2.09	.00	6.06	1.51	1.36	.00	4.86

	Paper-based				Computer-based			
	M	**Med**	**Min**	**Max**	**M**	**Med**	**Min**	**Max**
EXECUTION	**3.22**	**2.15**	**.00**	**10.59**	**3.03**	**1.29**	**.00**	**17.50**
Controlling	1.00	.88	.00	3.36	1.37	1.02	.00	5.35
Making Notes	1.99	1.11	.00	7.65	1.17	.00	.00	15.00
Difficulty Typing/Handwriting	.23	.00	.00	2.70	.42	.00	.00	2.14
Execution PS Strategy	.00	.00	.00	.00	.08	.00	.00	.72
MONITORING	**24.37**	**24.33**	**15.74**	**40.40**	**26.87**	**27.08**	**15.22**	**44.29**
Re-read to Monitor	1.55	.74	.00	5.05	2.24	2.32	.00	6.94
Global Text	.53	.63	.00	1.75	1.23	1.23	.00	2.96
Local Text	7.73	8.08	2.13	14.12	7.24	7.02	1.30	16.43
Content	.72	.21	.00	3.17	.67	.67	.00	2.89
Language	7.00	7.89	1.70	14.12	6.39	6.70	1.30	11.43
Rhetoric/Organisation	.48	.00	.00	1.70	.56	.00	.00	4.43
Balance	1.08	.82	.00	4.30	1.57	1.08	.00	7.86
Text Length	1.31	.68	.00	5.05	1.89	1.54	.00	4.81
Reacting to own Writing	1.49	1.14	.00	4.97	1.97	1.81	.00	5.35
Monitoring-Audience	1.25	.75	.00	5.11	1.77	1.20	.00	5.19
Checking the Time	.61	.65	.00	1.92	.94	.56	.00	4.28
Difficulty Monitoring	.40	.00	.00	2.02	.25	.00	.00	1.41
Monitoring PS Strategy	.21	.00	.00	1.01	.16	.00	.00	.70
EDITING AND REVISING	**5.98**	**6.26**	**.85**	**16.33**	**11.98**	**12.58**	**2.60**	**23.12**
Review Decision	.51	.00	.00	2.04	1.17	.79	.00	4.35
Content Revision	1.06	.00	.00	6.29	2.62	2.14	.43	6.25
Language Revision	2.30	2.21	.00	7.48	4.27	3.21	.43	9.83
Organisation Revision	.04	.00	.00	.62	.26	.00	.00	1.57
Balance Revision	.38	.00	.00	2.04	1.31	1.10	.00	3.57
Typography Revision	1.34	1.19	.00	2.70	2.09	2.00	.00	6.21
Difficulty Revising	.18	.00	.00	.93	.17	.00	.00	.79
Revision PS Strategy	.18	.00	.00	.93	.09	.00	.00	.71

APPENDIX K:

Descriptive statistics for codes by ELP group

	Low ELP				High ELP			
	M	**Med**	**Min**	**Max**	**M**	**Med**	**Min**	**Max**
MACRO-PLANNING	**19.04**	**21.16**	**6.06**	**35.71**	**18.40**	**14.54**	**7.34**	**38.53**
Reading Task	2.79	1.99	.00	10.42	2.40	2.06	.00	5.88
Task Conceptualisation	2.53	1.97	.00	8.93	2.47	2.04	.68	5.88
Construct Audience	1.25	.67	.00	4.35	1.56	1.25	.00	3.97
Construct Situation	3.95	4.02	.00	8.07	3.92	2.79	1.16	8.23
Goal Setting	5.56	3.99	.00	15.49	7.34	5.69	1.73	18.30
Audience/Reader	1.23	1.13	.00	5.00	1.07	.75	.00	3.53
Persona/Self	.94	.35	.00	3.75	1.17	1.08	.00	2.94
Meaning/Content	1.66	1.09	.00	5.77	1.69	1.34	.00	5.11
Text/Form	1.73	1.46	.00	6.34	3.41	2.94	.00	9.36
Difficulty Macro-planning	2.55	1.29	.00	16.07	.54	.00	.00	2.60
Macro-planning PS Strategy	.41	.00	.00	2.13	.17	.00	.00	2.14
ORGANISATION	**1.92**	**1.19**	**.00**	**6.25**	**2.97**	**3.00**	**.58**	**8.16**
Organising Message	1.76	1.19	.00	6.25	2.38	2.47	.53	7.48
Organise-Audience	.10	.00	.00	.88	.49	.51	.00	1.59
Difficulty Organising	.06	.00	.00	1.01	.05	.00	.00	.72
Organising PS Strategy	.00	.00	.00	.00	.05	.00	.00	.72
MICRO-PLANNING	**15.87**	**15.12**	**7.14**	**32.69**	**22.93**	**18.10**	**5.53**	**61.11**
Local Planning	6.49	6.94	1.79	11.54	8.20	6.85	2.35	18.25
Generating and Retrieving	5.87	5.46	1.87	14.42	6.64	4.98	1.70	18.25
Self-based Generating	3.74	3.45	.00	9.62	4.84	4.05	.43	18.25
Text-based Generating	.53	.00	.00	3.03	.39	.00	.00	2.52
Task-based Generating	1.09	.69	.00	4.17	1.42	.76	.00	5.00
Translating or L1 Use	.51	.00	.00	3.03	.00	.00	.00	.00
Micro-planning Audience	2.84	2.49	.00	6.83	5.49	3.67	.49	18.25
Difficulty Micro-planning	.49	.00	.00	3.03	1.39	.65	.00	6.52
Micro-planning PS Strategy	.17	.00	.00	1.01	1.21	.65	.00	6.52
TRANSLATION	**24.12**	**22.88**	**11.25**	**33.67**	**19.32**	**22.98**	**.00**	**39.45**
How to Write	14.38	14.11	6.25	22.34	11.97	14.72	.00	28.44
Language	8.27	8.52	1.86	14.89	5.96	5.14	.00	18.35
Balance	4.32	4.63	.00	9.18	4.38	5.11	.00	9.45
Coherence and Cohesion	1.45	1.33	.00	4.29	1.17	.56	.00	4.71
Layout	.34	.00	.00	1.92	.45	.00	.00	2.94
Translate-Audience	3.37	3.80	.00	6.57	3.19	2.95	.00	9.79
Difficulty Translation	3.75	2.87	.00	11.11	2.72	2.47	.00	5.91
Translating PS Strategy	2.63	1.97	.00	6.06	1.43	.85	.00	4.40

	Low ELP				High ELP			
	M	**Med**	**Min**	**Max**	**M**	**Med**	**Min**	**Max**
EXECUTION	**3.04**	**1.68**	**.00**	**17.50**	**3.21**	**1.82**	**.00**	**10.59**
Controlling	.63	.28	.00	2.02	1.75	1.12	.00	5.35
Making Notes	2.03	.00	.00	15.00	1.12	.00	.00	7.65
Difficulty Typing/Handwriting	.38	.00	.00	2.70	.27	.00	.00	2.14
Execution PS Strategy	.00	.00	.00	.00	.08	.00	.00	.72
MONITORING	**26.93**	**26.46**	**19.23**	**40.40**	**24.31**	**25.75**	**15.22**	**44.29**
Re-read to Monitor	1.79	1.77	.00	5.05	2.00	.78	.00	6.94
Global Text	.84	.76	.00	2.53	.92	.76	.00	2.96
Local Text	8.77	8.42	5.59	14.12	6.19	5.87	1.30	16.43
Content	.57	.25	.00	2.63	.82	.68	.00	3.17
Language	8.19	8.09	3.73	14.12	5.21	5.37	1.30	11.43
Rhetoric/Organisation	.30	.00	.00	1.41	.75	.58	.00	4.43
Balance	.94	.95	.00	4.29	1.71	1.00	.43	7.86
Text Length	1.47	.68	.00	5.05	1.73	1.50	.00	4.81
Reacting to own Writing	1.66	1.04	.00	4.97	1.80	1.64	.00	5.35
Monitoring-Audience	.93	.78	.00	2.70	2.09	1.65	.00	5.19
Checking the Time	.76	.62	.00	3.19	.79	.57	.00	4.28
Difficulty Monitoring	.46	.00	.00	2.02	.19	.00	.00	1.08
Monitoring PS Strategy	.25	.00	.00	1.01	.12	.00	.00	.79
EDITING AND REVISING	**9.09**	**7.11**	**1.13**	**18.75**	**8.87**	**7.01**	**.85**	**23.12**
Review Decision	.70	.00	.00	2.86	.98	.36	.00	4.35
Content Revision	1.61	.95	.00	6.25	2.06	.91	.00	6.29
Language Revision	3.51	2.98	.00	8.75	3.06	2.37	.00	9.83
Organisation Revision	.04	.00	.00	.62	.26	.00	.00	1.57
Balance Revision	.76	.00	.00	3.57	.94	.58	.00	3.47
Typography Revision	2.18	1.89	.00	6.21	1.25	.96	.00	2.90
Difficulty Revising	.15	.00	.00	.93	.20	.00	.00	.79
Revision PS Strategy	.15	.00	.00	.93	.12	.00	.00	.68

APPENDIX L:

Descriptive statistics for codes by score level

	Score of 3.5 or lower				Score of 4 or higher			
	M	Med	Min	Max	M	Med	Min	Max
MACRO-PLANNING	**18.63**	**20.80**	**7.34**	**35.71**	**18.79**	**16.58**	**6.06**	**38.53**
Reading Task	3.22	2.66	.93	10.42	2.11	1.92	.00	5.88
Task Conceptualisation	3.17	2.79	.92	8.93	1.99	1.78	.00	5.88
Construct Audience	.94	.80	.00	2.70	1.76	1.57	.00	4.35
Construct Situation	3.56	2.58	.00	7.89	4.23	3.86	1.16	8.23
Goal Setting	4.34	2.96	.00	12.50	8.09	7.25	.51	18.30
Audience/Reader	1.17	.54	.00	5.00	1.14	.91	.00	3.53
Persona/Self	.65	.00	.00	3.75	1.37	1.51	.00	2.94
Meaning/Content	1.17	.93	.00	5.77	2.06	1.91	.00	5.11
Text/Form	1.35	1.35	.00	3.74	3.52	2.89	.51	9.36
Difficulty Macro-planning	2.83	1.61	.00	16.07	.55	.00	.00	2.60
Macro-planning PS Strategy	.58	.00	.00	2.14	.06	.00	.00	.58
ORGANISATION	**2.36**	**2.03**	**.00**	**6.25**	**2.51**	**2.02**	**.00**	**8.16**
Organising Message	2.06	2.03	.00	6.25	2.08	1.48	.00	7.48
Organise-Audience	.23	.00	.00	1.08	.35	.00	.00	1.59
Difficulty Organising	.07	.00	.00	1.01	.04	.00	.00	.72
Organising PS Strategy	.00	.00	.00	.00	.04	.00	.00	.72
MICRO-PLANNING	**16.88**	**14.66**	**7.14**	**41.94**	**21.36**	**18.11**	**5.53**	**61.11**
Local Planning	7.68	7.09	1.79	17.20	7.08	6.94	2.35	18.25
Generating and Retrieving	5.02	4.00	1.83	14.42	7.22	5.89	1.70	18.25
Self-based Generating	2.75	1.50	.00	9.62	5.49	4.98	.43	18.25
Text-based Generating	.48	.00	.00	3.03	.44	.00	.00	2.52
Task-based Generating	1.32	.96	.00	4.17	1.20	.61	.00	5.00
Translating or L1 Use	.46	.00	.00	3.03	.09	.00	.00	.62
Micro-planning Audience	2.82	2.43	.00	8.60	5.21	4.10	.49	18.25
Difficulty Micro-planning	.81	.35	.00	4.30	1.04	.00	.00	6.52
Micro-planning PS Strategy	.54	.00	.00	3.23	.80	.00	.00	6.52
TRANSLATION	**23.23**	**22.88**	**3.23**	**39.45**	**20.54**	**22.98**	**.00**	**36.17**
How to Write	13.93	13.36	2.15	28.44	12.58	14.21	.00	21.47
Language	8.15	7.19	2.15	18.35	6.31	6.72	.00	14.12
Balance	3.93	4.15	.00	9.45	4.68	5.19	.00	9.43
Coherence and Cohesion	1.57	1.42	.00	4.29	1.11	.93	.00	4.71
Layout	.28	.00	.00	1.92	.48	.00	.00	2.94
Translate-Audience	2.67	2.78	.00	5.61	3.76	3.72	.00	9.79
Difficulty Translation	4.31	4.12	.00	11.11	2.40	2.31	.00	5.91
Translating PS Strategy	2.33	1.69	.00	6.06	1.80	1.81	.00	4.40

	Score of 3.5 or lower				Score of 4 or higher			
	M	Med	Min	Max	M	Med	Min	Max
EXECUTION	**2.82**	**1.00**	**.00**	**17.50**	**3.36**	**2.54**	**.00**	**10.59**
Controlling	.85	.45	.00	5.35	1.45	1.09	.00	5.07
Making Notes	1.50	.00	.00	15.00	1.63	.00	.00	7.65
Difficulty Typing/Handwriting	.44	.00	.00	2.70	.24	.00	.00	1.52
Execution PS Strategy	.04	.00	.00	.53	.04	.00	.00	.72
MONITORING	**27.10**	**26.46**	**19.23**	**40.40**	**24.47**	**25.93**	**15.22**	**44.29**
Re-read to Monitor	1.64	1.41	.00	5.05	2.10	1.59	.00	6.94
Global Text	.84	.91	.00	2.50	.91	.72	.00	2.96
Local Text	8.08	8.30	4.28	11.21	7.01	6.70	1.30	16.43
Content	.50	.00	.00	2.63	.85	.67	.00	3.17
Language	7.30	7.97	3.15	8.77	6.23	6.00	1.30	14.12
Rhetoric/Organisation	.31	.00	.00	1.08	.69	.22	.00	4.43
Balance	1.32	.95	.00	4.30	1.33	.93	.00	7.86
Text Length	1.74	.68	.00	5.05	1.48	1.49	.00	4.35
Reacting to own Writing	2.07	1.63	.00	5.35	1.46	1.35	.00	4.97
Monitoring-Audience	1.32	1.09	.00	3.94	1.66	.82	.00	5.19
Checking the Time	1.25	1.04	.00	4.28	.41	.46	.00	1.76
Difficulty Monitoring	.50	.27	.00	2.02	.19	.00	.00	1.41
Monitoring PS Strategy	.23	.00	.00	1.01	.15	.00	.00	.79
EDITING AND REVISING	**8.99**	**6.98**	**1.83**	**18.75**	**8.97**	**7.80**	**.85**	**23.12**
Review Decision	.72	.00	.00	2.86	.93	.31	.00	4.35
Content Revision	2.03	1.11	.00	6.25	1.69	.86	.00	6.29
Language Revision	3.46	2.83	1.08	8.75	3.15	2.45	.00	9.83
Organisation Revision	.15	.00	.00	1.57	.15	.00	.00	1.48
Balance Revision	.82	.00	.00	3.57	.87	.57	.00	3.47
Typography Revision	1.42	1.23	.00	2.86	1.95	1.55	.00	6.21
Difficulty Revising	.22	.00	.00	.93	.13	.00	.00	.68
Revision PS Strategy	.17	.00	.00	.93	.11	.00	.00	.68

APPENDIX M:

Descriptive statistics for codes by computer ability group

	Low Computer Ability				High Computer Ability			
	M	**Med**	**Min**	**Max**	**M**	**Med**	**Min**	**Max**
MACRO-PLANNING	**19.93**	**19.89**	**7.34**	**38.53**	**17.50**	**16.58**	**6.06**	**32.77**
Reading Task	3.13	2.66	.00	10.42	2.06	1.69	.00	5.88
Task Conceptualisation	3.34	3.01	.92	8.93	1.66	1.55	.00	5.88
Construct Audience	1.44	1.00	.00	3.97	1.37	.63	.00	4.35
Construct Situation	3.83	2.59	.00	8.23	4.04	3.86	1.16	8.07
Goal Setting	5.28	3.16	.00	18.30	7.63	7.25	.51	15.49
Audience/Reader	.87	.40	.00	2.60	1.43	1.13	.00	5.00
Persona/Self	.60	.00	.00	2.16	1.51	1.65	.00	3.75
Meaning/Content	1.17	.82	.00	5.11	2.18	1.91	.00	5.77
Text/Form	2.63	1.83	.00	9.36	2.51	1.70	.00	6.72
Difficulty Macro-planning	2.48	.98	.00	16.07	.61	.00	.00	2.50
Macro-planning PS Strategy	.43	.00	.00	2.14	.15	.00	.00	1.25
ORGANISATION	**2.90**	**3.39**	**.00**	**6.25**	**1.99**	**1.27**	**.00**	**8.16**
Organising Message	2.27	2.47	.00	6.25	1.87	1.27	.00	7.48
Organise-Audience	.48	.27	.00	1.59	.11	.00	.00	.68
Difficulty Organising	.11	.00	.00	1.01	.00	.00	.00	.00
Organising PS Strategy	.05	.00	.00	.72	.00	.00	.00	.00
MICRO-PLANNING	**19.48**	**14.66**	**5.53**	**61.11**	**19.32**	**18.11**	**8.75**	**35.84**
Local Planning	7.74	6.89	1.79	18.25	6.96	6.94	2.35	11.54
Generating and Retrieving	5.17	4.29	1.70	18.25	7.35	6.21	2.11	15.65
Self-based Generating	3.30	1.50	.00	18.25	5.28	5.37	.00	10.20
Text-based Generating	.30	.00	.00	3.03	.62	.28	.00	2.52
Task-based Generating	1.32	.96	.00	4.17	1.19	.55	.00	5.00
Translating or L1 Use	.25	.00	.00	3.03	.26	.00	.00	2.50
Micro-planning Audience	4.24	2.26	.00	18.25	4.09	4.10	.49	6.94
Difficulty Micro-planning	1.29	.56	.00	6.52	.59	.00	.00	4.05
Micro-planning PS Strategy	1.05	.22	.00	6.52	.33	.00	.00	2.31
TRANSLATION	**22.43**	**24.36**	**.00**	**39.45**	**21.00**	**21.48**	**3.47**	**33.67**
How to Write	13.23	14.96	.00	28.44	13.11	14.11	1.43	21.47
Language	6.85	5.84	.00	18.35	7.39	8.52	1.43	14.12
Balance	4.40	4.63	.00	9.45	4.30	5.01	.00	9.43
Coherence and Cohesion	1.69	1.85	.00	4.29	.93	.73	.00	4.71
Layout	.29	.00	.00	1.73	.50	.00	.00	2.94
Translate-Audience	3.06	2.78	.00	9.79	3.50	3.72	.00	7.74
Difficulty Translation	3.99	4.12	.00	11.11	2.48	2.42	.00	5.91
Translating PS Strategy	2.16	1.52	.00	6.06	1.91	1.86	.00	4.40

	Low Computer Ability				High Computer Ability			
	M	**Med**	**Min**	**Max**	**M**	**Med**	**Min**	**Max**
EXECUTION	**2.25**	**1.25**	**.00**	**9.09**	**4.01**	**2.20**	**.00**	**17.50**
Controlling	1.29	.87	.00	5.35	1.09	.99	.00	3.36
Making Notes	.56	.00	.00	3.83	2.60	.84	.00	15.00
Difficulty Typing/Handwriting	.33	.00	.00	2.70	.32	.00	.00	1.52
Execution PS Strategy	.08	.00	.00	.72	.00	.00	.00	.00
MONITORING	**25.03**	**26.00**	**15.22**	**40.40**	**26.21**	**26.07**	**16.33**	**44.29**
Re-read to Monitor	1.57	1.41	.00	5.05	2.22	1.75	.00	6.94
Global Text	.83	.87	.00	2.14	.93	.63	.00	2.96
Local Text	6.79	8.08	1.30	11.21	8.17	7.39	5.03	16.43
Content	.69	.21	.00	3.17	.71	.63	.00	2.89
Language	6.05	7.69	1.30	8.77	7.34	7.06	1.89	14.12
Rhetoric/Organisation	.45	.22	.00	1.70	.60	.00	.00	4.43
Balance	1.22	.76	.00	4.30	1.42	1.08	.00	7.86
Text Length	1.96	1.53	.00	5.05	1.24	.89	.00	4.23
Reacting to own Writing	2.01	1.64	.00	5.35	1.45	.80	.00	4.97
Monitoring-Audience	1.92	1.96	.00	5.19	1.11	.60	.00	5.16
Checking the Time	.93	.68	.00	4.28	.63	.62	.00	1.92
Difficulty Monitoring	.42	.00	.00	2.02	.22	.00	.00	1.41
Monitoring PS Strategy	.19	.00	.00	1.01	.18	.00	.00	.96
EDITING AND REVISING	**7.97**	**6.95**	**.85**	**18.75**	**9.98**	**8.87**	**1.13**	**23.12**
Review Decision	.90	.00	.00	4.35	.78	.31	.00	2.89
Content Revision	1.55	.79	.00	5.51	2.13	1.10	.00	6.29
Language Revision	2.78	2.67	.00	6.25	3.79	2.98	.00	9.83
Organisation Revision	.13	.00	.00	1.57	.17	.00	.00	1.48
Balance Revision	.79	.00	.00	3.57	.90	.35	.00	3.47
Typography Revision	1.49	1.23	.00	2.90	1.94	1.55	.00	6.21
Difficulty Revising	.20	.00	.00	.93	.15	.00	.00	.68
Revision PS Strategy	.15	.00	.00	.93	.12	.00	.00	.68

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EXAMINING THE COGNITIVE PROCESSES ENGAGED BY APTIS WRITING TASK 4 ON PAPER AND ON THE COMPUTER

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