TRANSLATING UNDER TIME CONSTRAINTS IN AN UNDERGRADUATE CONTEXT: A STUDY OF STUDENTS' PRODUCTS, PROCESSES AND LEARNING STYLES

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Dipòsit Legal: T. 1066-2012

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DOCTORAL THESIS

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DOCTORAL THESIS

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Department of English and German Studies

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UNIVERSITAT ROVIRA I VIRGILI

Tarragona

2012

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May 31, 2012

I hereby certify that the present study *Translating under time constraints in an undergraduate context: A study of students' products, processes and learning styles*, presented by Kyriaki Kourouni for the award of the degree of Doctor, has been carried out under the supervision of myself and Dr. Maria González-Davies at the Department of English and German Studies of the Rovira i Virgili University, and that it fulfills all the requirements for the mention "Doctor Europeus".

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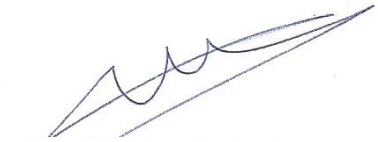

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Acknowledgements

I would like to thank my supervisors, Dr. Anthony Pym, Universitat Rovira i Virgili, and Dr. María González Davies, Universitat Ramon Llull, for their guidance and encouragement; for their perceptive and incisive comments; and for stretching beyond their supervisory role on several occasions. My thanks also go to Professor Arnt Lykke Jakobsen for his practical assistance and moral support, and for generously hosting me three times at the Center for Research and Innovation in Translation and Translation Technology (CRITT).

I would like to express my gratitude to the following scholars for their willingness to support me in various stages of the project: Dr. Andrew Chesterman, Dr. Richard Felder, Dr. Yves Gambier, Dr. Suzanne Göpferich, Dr. Marina Mattheoudakis, Dr. Ricardo Muñoz Martín, Dr. Ole Lauridsen, Dr. Franz Pöchhacker as well as Dr. Séverine Hubscher-Davidson and Dr. Astrid Jensen. Special mention goes to the late Christopher Scott-Tennent.

The following institutions and societies have funded my research: Aristotle University of Thessaloniki (travel and research grants), Panhellenic Association of Translators (travel grant), and the European Society of Translation Studies (Summer School Scholarship 2011). Universitat Rovira i Virgili and the Seiwert Institut GMBH Time-Management und Life-Leadership have also supported this study, providing software and access to personality tests, respectively.

I am indebted to the following colleagues and friends at Aristotle University for their support: Professor Karin Boklund-Lagopoulou, Chryssoula Papiopoulou, Daphne Moustaklidou, Katerina Gouleti, Tasos Tsirantonakis and Tasos Paschalis. I would also like to thank Konstantinos Tzanas for guiding me in the world of statistics; Lefteris Chrysopoulos for helping with technical issues.

I am grateful to the students who participated in the study. It is my honor to mention by name those who provided the corresponding consent, in Appendix A.

Dictionaries are of no use when trying to verbally express my feelings toward my extended family, both in Germany and in Greece, for standing by me in their unique, so valuable ways.

This work is dedicated to my father, Apostolos, and my students,
my inexhaustible sources of learning and inspiration.

It goes without saying that all mistakes, omissions or other infelicities that may be found in the thesis are my own doing, despite efforts to the contrary.

Abstract

The present experimental study examines the relation between learning styles and translation quality when the translation task takes place under time constraints. Translating under time constraints is a concept familiar to professional translators. The ability to cope with time constraints thus becomes of utmost importance within a training environment, when taking into account that translation graduates will have to face increasingly shorter deadlines in the current era of globalization. Further, in studying how students can learn and/or be taught to translate efficiently under time constraints, it may be relevant to look specifically at students' learning styles, since learning styles can be hypothesized to influence students' ability to cope with time constraints.

The study relies on pedagogical approaches to translation, favoring realistic or real-world criteria (González Davies 2004, 2005; Kiraly 2000; Ulrych 1995; Mackenzie 2004b, Klaudy 1995; Séguinot 2000, 2008). It employs product-based analysis as a starting point and it draws on research from the process-oriented translation paradigm (Hansen 2002, 2005, Jakobsen 2002, 2006; Jensen 2001; De Rooze 2003, Göpferich 2004, 2008). It takes advantage of elements from management theory and practice (Drucker 2002; Seiwert's concept of time ecology 2001). Finally, the study is complemented by the application of a model borrowed from Educational Psychology, the learning style model as developed by Felder and Silverman (1988/2002).

Within this framework, the thesis presents results from experimental work with a total of 84 translation students at the School of English, Aristotle University, Greece. It is based on data collected by means of keystroke logging, screen recording and retrospective questionnaires, as well as from the translation products themselves. Emerging product- and process-based performance patterns are checked for possible correspondence with dominant learning style dimensions. The visual/verbal dimension of learning styles, related to input modality, seems to correlate significantly with translation quality when the translation task takes place under a relatively convenient deadline. When available time decreases, however, the sequential/global dimension, related to understanding of input, seems to dominate and correlate with translation quality. In addition, empirical evidence suggests that participants undergo a state of cognitive "shock" when under increasing time constraints. These empirical findings have implications for a more learning-centred and

student-friendly approach to translator training and lead to suggestions for fruitful research synergies within authentic translation settings. The conclusions seem to indicate it is worthwhile favoring a learning environment which will take into account students' different learning styles.

Keywords

Translation Studies, translation pedagogy, process-oriented translator training, student performance, learning styles, translation quality, time constraints

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List of abbreviations used

BBF	BBFlashback screen recording and keystroke logging software program
COR	source text “The Effects of Coriolis”
CPD	Continuous Professional Development programs
CPM	Characters per minute
HCI	Human-computer interaction
IPDR	Integrated Problem and Decision Report
MOR	Management of online resources
PHOTO	source text “The Photoelectric Effect”
RETRO	source text “Retroviruses”
RQ	Retrospective questionnaire
SR	Screen recording
TAP	Think-Aloud Protocol
TS	Translation Studies
WATER	source text “Fresh Water: Not Here”
WP	Written Protocol
WPM	Words per minute

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Chapter 1. Introduction

1.1. Motivation for the study

The idea for the present study arose while training translation students at the School of English, Aristotle University, Greece. I noticed that certain students were producing excellent translations when given translation tasks for homework, but really problematic ones after timed in-class tests, and vice versa. I started reflecting on time as a variable in the translation process: How I could best help my students cope with it successfully? How could I help prepare them for the post-graduation world where time is money and often valued more than translation quality, since it is considered to be "a very important, if not the most important factor in the practice of professional translation" (Nord 2005: 212).

In an effort to relate pedagogical practice directly to the translation industry, and while wondering how to explain this phenomenon and actively deal with it from my position as a translator trainer, I came across a statement by Robinson that reminded me of what translation actually is, among other things:

> Translation is intelligent activity involving complex processes of conscious and unconscious learning; we all learn in different ways, and institutional learning should therefore be as flexible and as complex and rich as possible, so as to activate the channels through which each student learns best. (2003: 49)

A few pages later, I came across a note by him:

> Note that the connections between specific learning styles and preferences among language-learners, translators, and interpreters offered in this chapter are best guesses, not research based. The primary research in this fascinating branch of translation studies remains to be done. (ibid.: 60)

I was facing a genuine problem, evident in the classroom, with repercussions in professional life, and a gap in translation research. Feasibility for the study due to direct

access to students and the corresponding learning milieu further encouraged me to embark on this study.

1.2. General setting

The experimental part of the study was carried out during the academic years 2008-2010 at the School of English, Aristotle University of Thessaloniki, Greece. There is currently only one tertiary level state translation school in Greece, at the University of Corfu, awarding translation and interpreting degrees. In the rest of the country, translation-related teaching/training and research take place under the aegis of state foreign language schools/departments, such as our School of English, or in private translation institutes. Given the limited intake of students at the University of Corfu, the norm is that students wishing to study translation first get a degree in English, French, German or Italian Language and Literature from other state universities and then continue with a postgraduate degree in translation abroad. Aristotle University in Thessaloniki and Kapodistrian University in Athens have recently started offering interdepartmental postgraduate degrees in translation; so have certain private-sector institutions, also in Athens. Students enter the School of English in Thessaloniki after passing the Panhellenic Entrance Exams, a compulsory examination for all those interested in pursuing their studies at tertiary-level institutions, held every June. The School of English at Aristotle University is popular and competition for places is fierce. Only those with an average of 16/20 and above may hope to overcome the *numerus clausus*, with student intake ranging from 250 to 280 students per academic year, pending ministerial decisions. The undergraduate program is of four years' duration. During the first two years, students are expected to pass compulsory courses such as Linguistics, Semantics and Pragmatics but also surveys of English and American Literature. During their third year, students may opt for a specialization in Theoretical and Applied Linguistics, English Literature and Culture, American Literature and Culture, and Translation and Intercultural Studies. The present study actually focuses on third-year students partly because these students have made a conscious decision to specialize in Translation and Intercultural Studies. In addition, these students find themselves "between the familiar knowledge communities they already belong to and the one that they do not yet

belong to but are trying to join" (Bruffee 1999: 75) as they approach the threshold between academia and the workplace. During this stage of transition, with less than an academic year before entering the translation industry, students need to be aware of and prepared for the environment they will have to cope with as graduates. This is exactly the time to facilitate

> the difficult task of preparing the students in the course of an undergraduate degree for some of the challenges they will meet as professionals working in the translation industry. (Mackenzie 2004b: 37)

1.3. Research questions and aims

For many years, most empirical studies of translation, especially those concerning translator training, made use of product-based approaches. Then, Krings' seminal work in 2001 spurred a shift of interest toward cognitive processes involved in translation. A few years later, the wave of interdisciplinarity allowed findings and procedures from cognitive psychology, language learning/teaching and other disciplines to further consolidate the turn from the "what" to the "how" (Jakobsen 1999, 2002; Tirkkonen-Condit and Jääskeläinen 2000; Alves, 2003; Hansen 2002, 2005; Göpferich 2008, 2010). Many researchers, as well as those involved in training, acknowledged that "in translation, the process is as important as the product" (González Davies 2004: 68). Despite the shift toward process-oriented translation research, however, we are still a long way from process-oriented translator training because little has been written "about class dynamics" (González Davies, 2005: 67). The literature on translator training still "seems to lean towards a description of what happens in translation but not of what happens in the classroom" (ibid.), while the voices of the students, who will occupy a place in academia or in the translation industry, remain relatively unheard (González Davies 2004: 1). In much the same tone, Hubscher argues that there is a real need to design studies that "will bring translators' perspectives to the fore [in this case, future translators' perspectives, such as reactions and feelings], that will give them a voice, and thus involve them in the study of themselves" (2011: 8).

At this point,

> an interesting task for trainers might be to collect data from their *learners* in order to follow the optimal pathways that they used to reach their aim and find out which patterns lead to the best translation. (Lee-Jahnke 2005: 361, my emphasis)

This is precisely the modus operandi of the present study. It takes into account the realistic setting: the global demand for translator training, the way the translation industry is promoting time pressure, the need for additional empirical research on translation student (and future translator)-focused approaches, along with scarcity of research on both training and time constraints. It lays emphasis on the construction of methods for exploring translation processes with a view to assisting translation students within an academic environment, while respecting students' individual differences, and factoring in specific institutional conditions.

We have formulated the following research questions:

1. *What happens when translation students work under time constraints?*
2. *Are there any ways to help students learn to produce quality translations when they work under time constraints?*
3. *Do personal variables, such as learning styles, play a role within our pedagogical environment? To what extent?*

The resulting hypothesis is:

Learning styles correlate significantly with translation quality when the translation task takes place under time constraints.

As hinted at by the research questions, one major aim is to demonstrate that by diagnosing the learning styles of comparable students, we may predict who will most likely be able to cope with time constraints while translating and how, so that we, as trainers, may take appropriate remedial and therapeutic action before students enter the market. Another aim, of equal value, is to detect patterns of performance that would reveal optimal working approaches leading to translation products of high quality and again, use results in order to improve translator training by adequately preparing students for the professional world.

As stated above, the present study was conducted with an academic/pedagogical setting in mind. This framework has dictated to a great extent several aspects, such as the formulation of pertinent definitions, instrument design and even choice of methodologies.

At the same time, adopting this approach was not meant to create distance from translation research. On the contrary, a conscious effort was made to adhere to orthodox research principles while deviating as little as possible from authentic pedagogical practice. Echoing Jakobsen et al.:

> Like a lot of other experimental work in our field, our experiment was also riddled with uncontrolled factors […]. We are still searching for a good point of balance between experimental control and ecological validity. (2007: 229)

The concept of ecological validity has a threefold nature in the present context: at the micro-level, opting for those least-invasive methodologies that would not disrupt an authentic classroom; at a later stage, making efforts so that the ensuing empirical findings would reflect real-life situations both in or even out of the classroom, thereby linking pedagogical practice with professional translators and the general translation industry; creating synergies between pedagogical practice and translation research. Curzon's eloquent comment on second-language learning might extend to a translation situation like ours:

> *researchers* seek to know how different cognitive and personality variables are related and how they interact with learners' experiences so that they can gain a better understanding of human learning. *Educators* hope to find ways of helping learners with different characteristics achieve success […]. The *larger community* is also concerned because of the enormous impact […] in shaping opportunities for education, employment, mobility and other societal benefits. (2004: 57, my emphasis)

1.4. Rationale for research

1.4.1. Policy of inclusion

People react differently under time constraints. This is true of translation students as well: "All student translators are individuals in their own right and cannot be expected to show identical behavior patterns. Danks and Griffin call this phenomenon 'the person variables'

(1997: 170)" (cited in Hubscher-Davidson 2007: 46). We cannot provide (reliable) advice when we do not know where students/learners actually stand empirically, nor can we any longer afford "to fully answer questions related to translator training in the academia without more empirical research and reflection on what goes on in the translation classroom" (González Davies 2005: 68). Both comments seem particularly relevant when taking into account students' learning styles, an area rather untouched by the translation community. It is necessary to clarify at this initial stage that, although the present study aims at refining current pedagogical practice, it is not about who should become a translator and who should not. Neither does it promote the idea that those who handle time pressure effectively will automatically become good translators or the opposite. This thesis is about discovering learner's preferences and tendencies, addressing their needs, assisting them in the process of self-awareness, and catering for a smooth transition of *all* of them into the professional world; in essence, supporting their *own* decision to become translators, adhering to a policy of inclusion. The case may be that some students have to take time constraints into consideration when it comes to job decisions later on; they may opt for jobs/environments that suit them. Robinson's advice is merely one scenario among many others:

> There can be no doubt, however, that in most areas of professional translation, speed is a major virtue. I once heard a freelancer tell a gathering of student translators, "If you're fast, go freelance; if you're slow, get an in-house job." But translation divisions in large corporations are not havens for slow translators either. The instruction would be more realistic like this: "If you're fast, get an in-house job; if you're really fast, so your fingers are a blur on the keyboard, go freelance. If you're slow, get a day job and translate in the evenings." (2003: 29)

1.4.2. Working Framework

The study is based on research from the process-oriented translation paradigm (Hansen 2002, 2005, Jakobsen 2002, 2006; Jensen 2001; De Rooze 2003, Göpferich 2008). It is informed by student-focused pedagogical approaches in translation (Klaudy 1995; Ulrych 1995; González Davies 2004, 2005; Kiraly 2000; b 2004) with a slant toward

professionalization. It emphasizes the importance of time management and, in particular, the concept of time ecology as developed by Seiwert (2001). It calls on learning style theory from the field of Educational Psychology (Felder and Silverman 1998/2002) as a factor contributing to and providing an interpretation for participants' product and process performance.

Two sets of experiments, following the initial exploratory study, with two corresponding class units, were carried out; a total of 84 students participated, including students who participated in the initial exploratory study but excluding volunteers for small-scale trials who provided translation protocols at various stages. Data were elicited from qualitative assessment of the translation output, complemented by results from keystroke logging and screen-recording log files and pre/post-experiment questionnaires, including the Index of Learning Styles.

1.5. Structure of the thesis

Chapter 2, the literature review, focuses on prior empirical research involving the variable of time in Translation Studies (TS); attention is paid to the process-research paradigm that provides the link between products and people. Chapter 2 also highlights the connection between translation and management. It exemplifies the (inter)relations between translation competence, translation performance and learning, while drawing a distinction between the pedagogical and the professional aspect, especially as regards translation quality. It underpins the relevance of learning styles in the present context and includes a critical review of the research designs pertinent to the study.

Chapter 3 starts with the formulation and operationalization of the main hypothesis. It clarifies the reasons underlying choice of methodologies and instruments and it justifies manoeuvres affecting the research design and subsequent treatment of data.

Chapter 4 reports on the initial exploratory study that took place during the academic year 2007-2008. This pilot tested the texts to be used for the main study, definitions of key concepts, a variety of instruments and the overall feasibility of the experimental task.

Chapter 5 focuses on the main experiments, which took place during the academic years 2008-2009 and 2009-2010. It describes the experiment setting and the experiment

flow in detail. It discusses limitations and presents final decisions that provided the base for data management.

Chapter 6 presents data results. It provides a succinct view of the collected data, grouping them into three categories: product-related data, mainly related to product assessment; process-related data, including data on process phases and management of online resources; and participant-related data, including identification of students' learning styles (active/reflective, sensing/intuitive, visual/verbal, sequential/global).

Chapter 7, the data analysis, offers a synthetic view of data presented in Chapter 6 by means of inferential statistics with the purpose of testing relevant hypotheses, ultimately revealing correlations or potentially causal relations. It includes a critical presentation of findings.

Chapter 8 discusses the findings from Chapters 6 and 7. The participants' overall behavior as well as product- and process-based performance under time constraints are discussed, following a bottom-up approach. Interpretations of different reactions and working styles are offered.

Chapter 9 offers a compact view of the findings in relation to the research questions and hypotheses. It draws conclusions while delimiting areas of applicability and extrapolation and sketches paths for both training practice and future research.

Chapter 2. Literature Review

The literature review follows an internal thread linking the main variables of the present study, i.e. time, quality and learning styles. Translation is seen as a set of actions, where one *manages* time, one's own learning and, in effect, the quality of one's work. Prior empirical research involving the variable of time in Translation Studies (TS) includes studies falling within the process-research paradigm. This part of the review is divided into three sections. The first two are related to research on translation, and the order of presentation is chronological. The first section includes mainly early translation studies where researchers rather observe time in relation to translation speed and draw conclusions on task time distribution. In the second section, translation researchers seem to actively manipulate the variable at a deeper level, often using time as a (tight) deadline. These two sections are complemented by the brief third section on interpreting. The chapter moves on to present relations of interest between translation competence, translation performance and learning, while emphasizing the process of professionalization, especially as regards translation quality. The last part of the literature review focuses on learning styles. Following an introduction to the concept of learning styles, approaches to learning styles *within* Translation Studies are presented, covering a range from the more theoretical/general to the more empirical/TS-specific.

2.1. The concept of translation as a set of managerial actions

There are many voices in translation academia promoting the strengthening of links between academia and the workplace regarding translation pedagogy and translator training (among them Malmkjaer 2000, Kiraly 2000; Séguinot 2000; González Davies 2004, Samuelsson-Brown 2004; Kelly 2005; Lörscher 2005; McKay 2006; Gouadec 2007, Way 2008). As Ulrych argues:

> A professionally and educationally cogent training program for translators should present translating as an activity which takes place within a social context and

> should be based on a careful and up-to-date assessment of their multifaceted future profession. (1995: 251)

Translation departments can no longer ignore market requirements. They need to incorporate professional development features with the existing academic pathway (Cutler 2007: 5; also Kiraly 2000). A consequence of this realization is that *real-world* fragments increasingly infiltrate translator training, and management considerations are no exception. An ever-increasing number of scholars are responding in a similar vein. I would strongly agree with Mackenzie when she states that "from the translator's point of view, one of the critical skills involved in translation is the ability to realistically assess the time he or she will require to complete an assignment successfully" because this forms "the basis for the offer made to the client" (2004a: 161). Nord agrees that time is "a very important, if not the most important factor in the practice of professional translation" (1991: 155), along with Bayer-Hohenwarter and Risku, who stress that time pressure might be the criterion why lay people will assign a translation and not try to do it on their own (cf. Bayer-Hohenwarter 2008: 2). Kiraly insists that students should be able to manage the whole translation process:

> They must know when their own translation is ready to send off to a customer and when it still needs work; they must be able to determine how long a given translation will take to complete in order to meet ever-shorter deadlines; they must also be able to decide quickly and accurately whether or not they can even complete an offered assignment with the time and resources available. (2000: 162)

There are also those who fear that "young translators have to make the transition from student to unsupported freelance virtually overnight" (Fraser 2000: 119) if they are not given "at least a introduction to these realities" (Mackenzie 2004b: 33).

Mackenzie categorizes translators' skills in terms of management skills because quality in translation requires "management of the whole translation process, which in turn implies management of all its phases: client management, time management, resource

management, information management" (ibid). Séguinot takes a stride further by postulating that translation involves a managerial function:

> To explain translation as a managerial function is to define it as the interpreting of a task which directs selective attention to communicating the same information in another language within the constraints which are understood to apply in any given instance. (2000: 147; her emphasis)

Such a definition frees us from feeding the dichotomy of vocational versus educational training because it interlaces elements from both sides. Academic environments can provide future translators with at least a sampling of the real world, without alienating them from institutional educational goals. After all, quoting Neubert, "theory without practice is empty […] practice without theory is blind" (1989: 11).

2.2. The time variable in Translation Studies

Under the prism of translation as a set of managerial actions, the element of time is highlighted. In this part of the literature review, it is not my intention to provide an exhaustive list of works where time is simply mentioned but rather a) to provide a critical presentation of studies pertinent to stated research questions, and b) to stress that time is included among the "commercially relevant aspects of a translation project" (Hague et al. 2011: 258; see also Nord 2005, Kiraly 2000) and therefore, worth incorporating into a training context. The depth of analysis in the studies presented in this section fluctuates depending on the extent to which these works informed my research. It is worth noting that most empirical studies discussed below are fairly recent and seem to fall within the process-oriented research paradigm.

2.2.1. Time-related empirical studies

2.2.1.1. Measuring translation speed and task time distribution

The above view generated many studies based on the professional vs. non-professional axis (Krings 1986a; Tirkkonen-Condit 1989; Jääskeläinen, 1996 and 1999; Gerloff 1986/1988, Jakobsen 2002). Among other issues, these rather early studies dealt with the translation

speed, the amount of time allocated to translation processes and/or to the entire translation event.

Gerloff (1986/1988): Gerloff had twelve subjects in her study, in groups of four people, depending on the level of their proficiency: foreign language learners (L2: French), bilinguals with rather limited translation experience, and translation professionals. She asked them to translate a piece of 181 words into their L1 (English) and used Think-Aloud protocols (TAPs) to enrich her research design. The mean times indicate that students spend considerably *less* time translating than either professionals or bilinguals. Gerloff argued that good translators tend to spend a lot of time on their task. The relatively small sample was interpreted as an indication to work with a larger one for the purposes of the present study.

Jääskeläinen (1996, 1999): Jääskeläinen carried out an experiment very similar to the one by Gerloff. Subjects translated a text of 144 words into their L1, while thinking aloud. They were also divided in three groups, this time, however, on the basis of their end-product quality: good, mediocre, weak, although the initial grouping was related to translation experience as well: translation students, "educated laymen", professional translators. Jääskeläinen anchors this switch arguing that product assessment did not reveal a direct relationship between quality and experience. She found a positive relation between time and quality: the translations were better when subjects devoted more time to the task. In a second, related study, Jääskeläinen concludes that time spent on the translation task is not a causal factor guaranteeing successful performance. Rather, she claims, "success seems to be accompanied by extensive processing combined with experience" (1999: 124). In this respect, Jääskeläinen pins down a few consequences of experience, namely the fact that it sensitizes translators to problem-spotting and, depending on familiarity with the given task, translators may fall back on processes they have already automatized. Finally, her analysis of "processing" influenced the present study and guided me toward looking into specific aspects of the translation process, i.e. source-text reading before translating, management of (online) resources, and revision (cf. Chapters 3, 6, 7).

Jakobsen (1998, 2002, 2003, 2005): Jakobsen conducted a series of experiments in order to determine the effect of Think-Aloud Protocols (TAPs) on translation speed, revision and segmentation, using eight translators: four "semi-professionals" (final-year translation students) and four "professionals" (translators with some post-graduation

experience) (2002, 2003). Paradoxically enough, he found that the overall translation speed of professionals did not appear to be significantly greater than the speed of the semi-professionals when the analysis was based on entire translation events. After further breaking down the event into the three phases of orientation, drafting and revision, he was able to re-calculate results on the basis of both group and individual features. The results showed that professionals tend to draft faster than semi-professionals but they also tend to spend more time revising their work (2002: 191-2). Another result was that the text production speed in the final revision phase is much slower than in the other two phases. What is worth noting here is that even variations among semi-professionals were sometimes very considerable. Moreover, the think-aloud condition had a decelerating effect on translation speed to a great extent, by about 25% (2002, also discussed in his methodological study 2005: 183). This confirmed my initial intention to exclude Think-aloud protocols (TAPs) from the present study.

Englund-Dimitrova (2005): Englund-Dimitrova was interested in finding out how quantitative differences in translation experience correlate with postulated main cognitive translation processes and with the way implicit logical links in the ST are dealt with in the TT. She conducted an experiment where nine subjects, divided in four categories depending on translation expertise (two senior professional translators, two younger professional translators, two translation students and three students of Russian) translated a single text from Russian into their mother tongue, Swedish. Englund-Dimitrova used a combination of methodologies, including TAPs, computer-logging and video-recording. An interesting finding for my own research, despite the fact that it was based on a small sample, was that translation experience correlates with time spent for the task: students spend significantly more time on the translation task than professionals (contrary to Jakobsen 2003 above). This finding is important here because it confirmed empirically the need to include time-related exercises *during* training. Another finding that I took into account when dealing with participants' performance was that every participant in her study had translated in a mainly linear fashion (2005: 135). More importantly, Englund-Dimitrova states that the variety of process profiles did not lead to a clear relation between translation experience and one particular way of translating (2005: 238). She rather attributes solutions to "idiosyncratic behavior" which, from my perspective, could be linked to learning styles

(ibid.). She concludes that trainers should probably aim at raising students' awareness of their own individual approaches by tackling a translation task through more than one ways, an opinion which could very well by supported by learning style theories. On the other hand, it is unfortunate that there was no qualitative analysis of translation products to show if certain behaviors led to products of higher quality and, thus, of value in a training setting.

2.2.1.2. Imposing (tight) deadlines

Time was also strongly associated with the concept of a deadline, seen as time pressure or time constraints.

Hönig (1998), Hansen and Hönig (2000 and Hansen 2002), Hansen (2005, 2006a[1])[2]: Gyde Hansen conducted a series of experiments together with Hans Hönig including a total of 47 semi-professional translators (final-year translation students) from their respective institutions (Copenhagen Business School, Germersheim) in a variety of conditions, always collecting data based on the Translog keystroke logging program and its various functions. Students worked with the Danish-German language pair in both directions and, in certain cases, from English into German. Translog data was analyzed in combination with translation-quality assessment (Hönig 1998). Hansen and Hönig hypothesized that translators who translate well under time pressure translate well without time pressure too, but the result was that this is not always the case. Another finding was that "a long initial orientation phase does not necessarily result in a translation product of high quality" (Hansen 2002: 7). The results were attributed to "unfortunate habits" of the translators (ibid.). In another set of experiments, again on the basis of Translog data analyzed in combination with product evaluation, it was found that the length of the initial orientation phase and the revision phase as well as the position, number and length of pauses do not

[1] Hansen has published extensively in relation to time pressure in TS. Here, however, preference is given to presenting her major empirical works where the entire research design was analyzed, since these were considered to be the most pertinent in this case rather than to compiling an exhaustive commentary of her publications.

[2] Translations from German, Spanish, Italian and Greek are my own throughout the thesis unless otherwise mentioned.

correlate with translation quality. Despite the fact that several behavior patterns emerged, no relation with translation quality could be established, since the patterns were shared by translators with both acceptable and unacceptable translations (Hansen 2002: 41).

A few years later (2005), in another empirical investigation of the relations between individual profiles, processes and products within an experiment setting involving 80 semi-professional translators, Hansen took research a step forward. She examined what she calls *sources of disturbance*[3] (*Störquellen*; 2005, 2006a) in translation processes. These sources of interference become an important new concept as they cover a variety of cases previously unaccounted for. Hansen describes them as "sources of translation problems that are either overlooked in translation teaching or that cannot be coped with properly because of lack of time" (Hansen 2006b: 1 in English, 2005 in German) and as "causes of problems and errors which cannot be explained by deficient knowledge or skills be they social, communicative or linguistic" (Hansen 2006b: 4 in English, 2005: 17/303f in German). They are not errors in themselves and they cannot be explained away by the lack of competence in a certain area, as for example lack of social, communicative or linguistic competence (ibid.).[4]

Hansen also provides a much-needed justification of the use of time pressure in empirical studies by essentially arguing that time pressure brings to light other dimensions of self-awareness and control in translation processes (Hansen 2005: 75). According to Hansen and within the framework of her experiments, time pressure occurs when time for a task is sufficient for spontaneous translation but not enough for a translator to change their first rendition (ibid. 74). Her interpretation of this definition, however, seems too inflexible because the fact that translators were not allowed to look back to earlier text segments in

[3] Hansen has also used the term *sources of interference* (personal communication during the Eye-to-IT Conference, 2009).

[4] Sources of disturbance are for example, unfortunate attitudes, habits or strategies, different kinds of compulsive behavior, and fundamental misunderstandings. They include over-attention to detail, laziness of thought, presumptuousness or, conversely, lack of self-confidence, strategies that are not appropriate to the translation process at hand, although they have been shown to be useful in other situations, fear of interference and various reasons for lack of control (Hansen 2006b: 4).

her experiment does not necessarily guarantee the existence of time pressure (a similar concern is voiced by Göpferich 2008: 224), and certainly not at the same or even comparable degree. Moreover, Hansen makes a distinction between *collective* time pressure, i.e. time pressure experienced by entire groups (the one actually measured in the experiments of Jensen and De Rooze) and *individual* time pressure as used in her project (ibid. and Alves below). She underlines the fact that research results may be affected as people may be influenced by time pressure at different points because of their different working speeds.

In one of the project's five series of experiments based on translations from the Danish-German language pair in both directions, translation students were given a text to translate under time pressure without translation aids. Then the same text was given to the same students who could work under no time pressure, with translation aids, internet excluded. She argues that this design was worth the cost of possible re-test effect because the purpose was to reveal individual problems and sources of interference, not to focus on processes per se (ibid.). In fact, a comparison of the two texts showed how far students had worked beyond the first draft. It also showed problems most probably caused due to insufficient time, even though a possible effect due to the lack of resources may not be ruled out. These tasks provided Hansen with a number of strategies students had used for problem-solving, but also the ones they were still lacking. Most importantly, students could even see how many spontaneous *good* renditions from the first draft they had rejected in the second under no time pressure (2005: 76, my emphasis). This project revealed more than 20 sources of interference and led to the creation of a dynamic model of translators' qualifications and competences, even though there are practical questions concerning its application in training terms. Based on this, Hansen proposes submitting students "to individual translation competence profile tests that allow students to become aware of the *causes* of their errors" (2006a: 1, her emphasis). This last proposal led me refine student profiling for the current study.

Jakobsen (Sharmin et al. 2008): Jakobsen's most recent work, in cooperation with Sharmin, Spakov and Räihä, deals with time pressure per se in relation to text complexity in an experiment where the translator's fixations were analyzed with eye-tracking technology (Sharmin et al. 2008). Time pressure was found "to mainly affect fixations on

the source text" (ibid. 123) because "average duration fixation decreased significantly on the source screen under time pressure" (ibid. 125). As in many other studies, here Jakobsen advocates a combination of methodologies, in fact, an "archetype of triangulation strategies" and "essentially, a means of validating observational data" (1999: 11; see also Jakobsen 2006).

Jensen (1999, 2001): In her series of experiments, Jensen tried to locate effects of time pressure in the translation process of newspaper articles (Jensen and Jakobsen 2000). More specifically, she empirically investigated the effects of time on cognitive processes and strategies in translation. She had six informants divided into three categories according to their level of experience: two were non-professional translators, actually engineers; two were young professionals with two years of translation experience; two were experts with more than 10 years of translation experience. This was necessary in order for her to examine to what extent difference in experience is reflected while translating under time pressure (2001).

"Informants" that is, participants in Jensen's study, used the Translog computer logging program along with concurrent think-aloud protocolling. This led to the production of both quantitative and qualitative data to work on. Jensen's use of three time frames (15, 20, 30 minutes) in her initial studies (1999, 2000) and of four time frames (10, 15, 20, 30 minutes) in her main study (2001) helped me specify time frames for my own pilot study and subsequent experiments (cf. Chapters 4, 5). The main difference was that in my experiments the available time is consistently reduced on a basis of equally difficult texts, while in Jensen's study her "informants" were assigned a certain text of approximately 120 words for a specific interval as well, but they were not instructed to translate given texts in any specific order (2001: 86). The fact that all informants chose to translate the texts in "increasing temporal order" (ibid. 87) makes the situation not a study on time pressure exclusively but of increased time availability as well (even if all informants presumably experienced time pressure at least while translating the 10-minute text). It brings to mind the partially supported hypothesis by Hansen and Hönig (2000) above, that more time may lead to products of higher quality. It might have been worthwhile in Jensen's setting to investigate this hypothesis separately.

Jensen's analysis is based on Bereiter's and Scardamaglia's work on writing processes, namely the *Knowledge Telling* and the *Knowledge Transforming* models, in combination with Gile's sequential model of translation and concept of coping tactics (1995), adapted to translation. According to her

> analyzing behavior under time pressure presupposes that time pressure exists. However, the perception of time pressure may be felt at different time limits, though sensitivity to time pressure may arise mainly when the time available is felt to be at least potentially insufficient. (Jensen 2003: 81)

This working definition was retained in the pilot study (cf. Chapter 4) and it led me to include relevant questions in the post-experiment questionnaire (Appendix 3). Her findings demonstrate that the three groups showed considerable differences in the way they translated under time pressure when compared to each other (1999: 117). In her main study (2001), the results seem to corroborate that a) planning and problem-solving activities were reduced with increased time pressure, "signaling a more rapid and linear translation process" (2001: 176), b) expert translators use the Knowledge Telling model as a more permanent strategy since they "engage in less problem-solving, goal-setting and re-analyzing behavior vis-à-vis young professional translators" (ibid. 177). Moreover, it was found that the more experienced translators also changed their strategy, probably making use of "ready-made cognitive stock-in-trade" (Schilperoord 1996: 293 cited in Jensen 2001: 178) in order to cope with time pressure. In addition, although the translations were not qualitatively assessed, the coping tactics analysis indicates that change of time frame affected translation quality. This is a useful observation for the current study, even if the data elicitation method differs greatly.

The methodological strength of Jensen's work lies in the use of models. By using models that "can be developed in different ways to describe real-world variability" instead

of describing individual translation processes, there is an increased possibility of asking "scientifically meaningful questions that can be investigated empirically" (2001: 179).[5]

De Rooze (2003): De Rooze hypothesizes that time pressure affects the translator's task. He attempts to demonstrate changes concerning both translation processes and translation quality, partly replicating Jensen's initial experiments (1999). Much like Jensen, he assumes that pressure caused by lack of time will provoke a change in cognitive processes, and that the translator will be compelled to change strategies in order to strike a balance between the time necessary for a translation task and the time available (2003: 51). His research draws on Cognitive Science and Psychology (Maule and Svenson 1993). He also discusses relevant studies from the field of interpreting, especially simultaneous interpreting, since time pressure there is an everyday factor, a point Jensen had also mentioned *en passant*. De Rooze also continues the investigation on the student vs. professional axis in his final experiment. Methodologically, he rejects the use of TAPs but supplements use of Translog with retrospective questionnaires.

In an attempt to increase the validity of the experiments, much of De Rooze's design deviates from that introduced by Jensen (1999). A multitude of 4th year translation students at the University of Granada, registered for a course on specialized scientific and technical translation, were the participants, some 30 students every year for 4 years, from 1999 to 2002. The rather large number of 30 students per year was justified for reasons of statistical significance (De Rooze 2003: 47). For the final experiment, a group of professionals was also tested for reasons of comparison. The basic design was that two groups, each consisting of 15 students, would translate two texts under time pressure using Translog. Before the translation task itself, students would be given a text to type for about 10 minutes so that their typing speed could be measured. Then they would do a free translation of the second part of the same text for another 10 minutes in order to warm up to the main task and in order to become familiar with the texts to follow. After that, they were given two texts, significantly longer than the ones by Jensen, about 250 words each, to translate

[5] For a detailed discussion on Jensen (2001), see Göpferich 2008 (section "Űbersetzen und Zeitdruck", p. 218-225). Göpferich uses the unpublished version of Jensen's thesis of 2000.

in reverse order. This means that the first group translated text 1 in 15 minutes, while the second group was translating text 2 again in 15 minutes. Then the first group translated text 2 in 10 minutes, while the second group was translating text 1 in 10 minutes as well (De Rooze 2003: 58). After the translation task, students were asked to reply to retrospective questionnaires regarding time pressure, satisfaction and productivity.

It seems that there might be a mismatch concerning translation difficulty (also an issue in Jensen's experiments) and it is also questionable whether just two texts can produce reliable results since time pressure may begin to be felt at different points depending on the individual. De Rooze states that the time frame of 15 minutes was considered merely a *deadline* because a series of pre-tests conducted with a control group had confirmed that it was more than enough to finish the translation. The time frame set at 10 minutes, on the other hand, was less than the time the participants would actually need, so they would feel the time pressure (De Rooze 2003: 47). Nevertheless, the control group was small (6 students). As a result, their average speed might vary, possibly leading to a high standard deviation (the issue is not discussed in his thesis). As far as the quality aspect is concerned, a holistic scale adapted from Waddington (2001) was applied and potential error types were color-coded to facilitate the four evaluators. There were problems with different grading styles, as expected.

Another problematic issue would be the sample itself. De Rooze asked for volunteers, who became harder to find as academic years passed, as he himself admits (2003: 97). This is probably because the experiments required volunteers' physical presence for a long time and dedication with no other reward from translation teachers. One might wonder if there was a hidden bias in the sample, as regards the reasons which would drive students to volunteer toward the end, especially for the final experiment of the study. One significant finding was the negative correlation between translation quality and time pressure (2003: 100). One surprising finding was that 19.04% of the students produced better translations under the 10-minute time frame instead of the more relaxed 15-minute time frame, and 25.4% maintained the same quality (ibid. 88). Both Muñoz and De Rooze suggest that this might also be connected to some personality features (Muñoz 2006: 3). Both also comment on the fact that there was no significant correlation between this tendency and the students obtaining good grades in the program (ibid.). Without

disregarding empirical evidence supporting this fact and assuming the texts were equally difficult, it is not unlikely that only the *good* students, possibly those who were interested in translation or had a high grade (or would expect to get a high grade) in the courses, would be motivated enough to volunteer for a long series of experiments in a single semester. Finally, this study would have greatly benefited if results from Jensen's main study (2001) mentioned above and from Hansen's series of experiments (2002) had been compared and contrasted.

On the other hand, the reversed order of texts appears to be an interesting feature because it may help to confirm the equal level of text difficulty (cf. Chapter 3). Another useful feature was part of the retrospective questionnaire, which I also adapted for the present study (Appendix 3). Adaptation was necessary mainly because certain questions sounded biased as they were phrased in a negative form (De Rooze 2003: 52). The idea of a large, longitudinal study also sounded very appealing but it was not feasible with my resources.

Other results showed that, although certain individual participants performed better, the translation quality of informants seen as a group dropped by more than 15% when they had to translate more than 200 words per 10 minutes. Moreover, the findings show that participants tended to make spelling mistakes and/or typos immediately following a pause. This was interpreted as possible indication that reallocation of cognitive resources is not automatic and preoccupation with the latest problem takes some time to fade away (Muñoz 2006: 3).

Pym (2009): Pym presents a series of three process experiments-exercises he carried out in an actual classroom involving 19 postgraduate translation students with different linguistic combinations and diverse backgrounds as regards prior education and professional experience. The first experiment, on the use of online machine translation, came with a 12-minute deadline so that students would "work at a brisk pace" (2009: 40). This deadline was gradually extended so that students would finish the task. The second experiment, on translator styles (based on Mossop's categories, 2000) took place during a standard two-hour class. The third, and most relevant task to the present study, on time pressure, was a replication of the second task but students worked in pairs: every pair of students had to translate the same 200-word newspaper piece (or part thereof) of their

choice, using screen-recording software concurrently. Then they compared their products and performed a time-on-task analysis. This set of experiments did not purport to be an empirical investigation from the start, so no results are discussed here. Nevertheless, a hypothesis is singled out: "the faster the translation, the greater the blending of tasks" (ibid.: 152, my emphasis), implying a blurring of distinctions between different translation phases. According to Pym, such process activities constitute "stimulating" tasks favoring the self-awareness of students fulfilling "a definite pedagogical function" (2009: 141) but remain superficial "lousy experiments" and ineffective as vehicles of valid empirical findings (ibid. 135). For the purposes of the present study, it is worth noting that he raises the issue of the generalizability of process studies, acknowledging that the combination of the small number of participants with the high degree of variety typical of student performance may lead to many case studies that are hard to generalize from. It is his belief that lists of competences based on process studies will be "better suited to students' actual learning procedures" (ibid.: 153-154).

Muñoz (2009a, b): Muñoz presents two studies. In the first one he examines the performance of four subjects who had performed various types of tasks in respect to attention and typos. Muñoz set a specific deadline per task. Students were allotted one hour to complete their drafts, 30 minutes to revise their own translations and 30 minutes to revise other peoples' translations (2009a: 171 et passim). He states that "time constraints were established to cause stress in the subjects, in the hope that their behavior would be affected in a way that might yield more information" and suggests that computing of interventions happening in sequences might provide clearer results regarding possible effects of stress on typing and translating (p.167). In the second study, Muñoz asked 21 students to translate four texts "against the clock: subjects had to complete them in one hour, although they were told in advance they should finish their translations even if they took longer" (2009b: 96). He allowed for extensions in a way similar to Pym (2009), in this case, however, for the purposes of profiling students with respect to processing speed. In both studies there is a single, collective deadline. The role of the deadline might be described as more peripheral, in the sense that it is employed as means to increase richness of analyzable data. It did, however, further establish my belief that collective deadlines for

my own student groups would both suffice instead of individual deadlines and would provide meaningful statistical data.

Alves and Campos (2009a, b): Alves and Campos investigated the "impact of time pressure in conjunction with translation technology with respect to types of support" (Alves and Campos 2009a: 197). They analyzed the process performance of 12 professional translators, half working into their L1 and the other half into their L2, focusing on the types of support used, gradually introducing use of a translation memory system (TM) and time pressure as independent variables:

1. translations were carried out without any interference;
2. translations were carried out with the aid of a TM;
3. translations were performed under time pressure;
4. translations were rendered with the aid of a TM under time pressure (Alves and Campos 2009a: 192).

It was interesting that time pressure was established separately for each subject in that they "allowed 70% of the time spent by each individual translator in the analogous task carried out without time pressure" (p. 198). There was concurrent use of keystroke logging software and screen-recording software. Participants produced retrospective protocols after each task while watching their performance being replayed. Analysis showed that although documentation is an important source of support, "professional translators rely mostly on their own knowledge to solve translation problems" (p. 208), irrespective of technological support and/or time pressure. The study also indicated that time pressure affected mostly revision processes, by pushing translators to uncritically accept TM translation solutions. This indication of sensitivity with respect to revision processes pointed me toward paying more attention to the nature of revision.

Hvelplund (2011): Hvelplund investigated translators' allocation of cognitive resources during the translation process (distribution of cognitive resources, management of cognitive resources and cognitive load), focusing on the novice vs. professional axis, like many researchers in this category. In his experiments, 12 professional translators and 12 student translators each translated three texts that varied with respect to their levels of difficulty. They translated two of the texts under time pressure while one under no time pressure. As in Alves and Campos (2009), time constraints were established separately for

each participant (2011: 94-96). Hvelplund calculated two levels of time constraint per participant on the basis of time spent on a warm-up task: the heavily restrictive deadline was set at 85% of the time spent on the warm-up task, while the moderately restrictive deadline was set at 100% of the warm-up task time.

The results, based on an interesting combination of eye movement, keystroke and pupillometric data, seem to indicate that both groups allocate more cognitive resources to the target text than to the source text and may process source and target texts in parallel for short periods of time. The study did not identify changes in cognitive resource allocation as a result of differences in source text difficulty. This might be partially attributed to the fact that source text difficulty was established in terms of complexity, by a panel of three reviewers and through the use of seven readability indexes (2011: 88-89), but not of actual translation difficulty. It was also found that both professionals and students worked more intensively with both source text comprehension and target text production under time pressure. This finding was taken into consideration in terms of expectations during the analysis and the discussion of my own findings[6].

2.2.1.3. A note on interpreting

Translation and interpreting processes differ in several respects: Gile (1995) and Kussmaul (1995), for example, stress differences at the level of comprehension and production. By involving time constraints in an empirical setting, more overlapping areas may be discerned because time constraints are taken for granted in interpreting. In a way, time constraints bring translators' working styles closer to that of interpreters (cf. Englund Dimitrova 2005). This is the reason why my research draws on contributions and findings from research in interpreting when necessary, for example, by making use of Gile's coping tactics (1995; cf. Chapter 3) or commenting on Moser-Mercer's approach to adult learning theory and its relevance to training (2007; in this Chapter).

The task with the strictest deadline in the current research design might be considered as a variation of sight translation, "a special form of interpreting in the

[6] The thesis by Tangsgaard Hvelplund was defended in the second half of 2011.

simultaneous mode" (Pöchhacker 2004: 186) "a hybrid between written translation and interpreting in that the source text is written and the target text is spoken" (Agrifoglio 2004: 43). My intention is not to elaborate on the dynamics of this synergy, since it merits attention beyond the scope of the present study. There is, however, one empirical study to be mentioned with respect to this type of synergy, comparing written translation with sight translation, not so much for its findings (it was a pilot study testing methodologies) but for the question it poses, as it highlights the significance of the time variable in translation research once again: "Can translators improve their overall performance by adopting some of the techniques and strategies used for interpreters?" (Dragsted and I. G. Hansen 2007)[7]

2.2.2 Criticism of the studies presented

The empirical studies presented in sections above offer valuable insights for the purposes of the present study but it is evident that they also manifest infelicities in design and execution. Most comments in this section refer to empirical studies where tight deadlines were imposed by researchers who considered as a core variable.[8]

With the exceptions of Hansen, De Rooze and Hvelplund, most researchers worked with a small sample of participants, as is often the case in process studies, and this might limit the representativeness of results and subsequent extrapolation. Other researchers cannot be certain that experts spend more time on revision than do non-translators (Jensen 2000) when this finding arises from the performance of two subjects, however well analyzed they may be. Careful subject profiling is also necessary (a point also taken up in Muñoz 2009a, b) to ensure comparability as regards skills and expertise. Prior knowledge is limited to vague, surface-level characterizations of subjects as bilinguals, professionals, non-translators, etc.

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[7] For a discussion on sight translation tasks and cognitive translation processes, see Shreve et al. 2010 and 2011.

[8] Bayer-Hohenwarter (2008) provides an extensive discussion on the complexity of the requirements concerning research design and methods in time-pressure studies.

Time pressure itself seems to be another problematic concept. Bayer-Hohenwarter argues that fixed-deadline approaches, such as Hansen's "collective approach" or Jensen's, De Rooze's time frames for their groups, yield data of questionable reliability because they do not guarantee that all subjects feel the same amount of pressure (2009: 194-5; see also Chapter 3). In addition, Jensen examined time effects adopting a contradictory (time-consuming) methodology, TAPs.

Time *pressure* is a thorny concept that requires a lot more familiarity with research from psychology. It seems that it is not being well served in studies already discussed or, at least, it is not grasped and measured in its entirety. The term "time pressure" is retained in the present study in those cases when the original author used it, but we follow Muñoz when he switches from the psychology-laden term "time pressure" to the more neutral term "time constraints". The former points to extreme inter-subject variation, is associated with psychology and less than positive experiences. It invites methodologies such as saliva or cortisol analyses[9] that that may not be feasible in translation settings, much less in an authentic training environment like the one of the present study On the contrary, "time constraints" points to time frames and deadlines that translation researchers may actually measure and be objective about, and shifts attention to the translation event itself. In the current setting, the experience of time constraints by individual participants does not pose a problem; on the contrary, if reflected in actual performance, it might constitute a manifestation of learning styles.

Selection of source texts seems far from random, yet the issue of familiarity with the text type or the topic has been rarely touched upon, except by Jääskeläinen (1999) within the framework of routine vs. non-routine task analysis. In cases where more than one source text and more than one deadline were used, as in the cases of Jensen and De Rooze, there is no indication as to whether the texts were equally *difficult* (also discussed in Göpferich 2008: 220) so as to provide a stable basis for comparisons along different time

[9] For a discussion on such physiological objectivation methods, cf. Bayer-Hohenwarter 2009, who draws on corresponding experiments from interpreting by Kurz 1997 and Moser-Mercer 2003.

frames. Alves and Campos ensure that source texts are of similar linguistic complexity and density but the question of whether they were of similar *translation* difficulty remains.

As far as the present study is concerned, methodological considerations are addressed in Chapter 3. Irrespective of actions taken in this study or studies above, the fact remains that

> translation studies should look […] first and foremost at the constraining factors which, in certain cases, seriously handicap and reduce the role of the translator. […] Such factors are constantly present, and because of their presence, our conception of the translator should be significantly modified. (Hewson 2006: 57)

Paraphrasing Bayer-Hohenwarter, it seems attractive to combine the results of such studies in order to observe them and systematically analyze them from a single didactic viewpoint on the basis of methodological pluralism (2008: 18).

2.3. Time (and) Management

Since translation is viewed through the perspective of management and since time constitutes an important variable, it is necessary to see how time management as a theory may inform translation. The proposal in this section is simply one of many possible approaches, the core principle being that "theory is a tool, not a school you have to subscribe too" (Chesterman 2008, personal communication).

The market is rife with guides, books, seminar sessions concerning time management in various environments, from large multinational companies to freelance entrepreneurships. Many consultants, executives and gurus offer various tips on how to best take advantage of time, each one from their own angle, all of them acknowledging its importance in productivity. There are certain facts about time, however, that form common ground, are rarely disputed and could also be taken into account when dealing with translation. These are summarized by Drucker:

- Time is a resource that cannot be multiplied, rented out or sold.
- Time is completely perishable and cannot be stocked.
- Time is completely irreplaceable.

- Effective people know that time is a factor inhibiting their ability to perform.
- Nothing differentiates effective people more from average senior managers than their thoughtful handling of time. (2002: 78)

The perception of time is highly subjective and "people experience time through the occurrence of specific events" (Blount and Janicik 2001: 571). Dörner reports on two experiments involving decision-making in complex systems, one done under time constraints and the other not. The approach taken by successful participants was inversed in the two situations (1996: 102-3). In the experiment without time constraints, the participants were requested to act as mayors of an imaginary small town for a period of 10 years. "Good" participants made more decisions than "bad" ones. "Good" participants also asked fewer questions, whereas "bad" participants collected excessive information which led to uncertainty and decrease of decision making. In the time-constrained experiment, the participants had to learn how to operate a complicated machine under time constraints. This time, "good" participants behaved in exactly the inverse way, pretty much like the "bad" participants in the first experiment: the "good" participants were interested in gathering solid information before making fewer, cautious decisions (1996: 101), albeit with a clear focus. "Bad" participants, on the other hand, were reluctant to gather information by asking significantly fewer questions about the unknown machine, yet they were eager to act and made many more decisions. Examples such as these indicate that time may affect cognitive behavior as manifested in decision-making and problem-solving, two types of tasks translators are particularly familiar with. Unfortunately, "current understanding of time-related decision making is still rather limited" (Curlo et al. 2009: 793).

With the emergence of globalization, as reflected by *simship* (simultaneous shipment), it becomes more evident that clients not only want everything *yesterday*, but they also want *more* of it, often being adamantly against compromises regarding quality. Time management becomes, therefore, equated with speed management and, at its worst, with crisis management combined with multi-tasking (Seiwert 2001: 19).

Seiwert (ibid. 17) warns against this speed paradigm, as he calls it, because it increases pressure on the individual and drains people of energy. Focus is taken away from the individual to be placed on increasingly tighter deadlines. What he proposes instead is the *slowness* paradigm (*Langsamkeit Paradigma*), where time management takes the form

of time ecology (ibid. 18). Time ecology, as the teaching of a measured time economy, is put forward as an attempt to strike a balance between speed and slowness, while respecting natural time rhythms and measurements. The slowness paradigm strongly suggests that people will slow down to focus on what is meaningful and purposeful for a particular occasion, even if that may lead to compromising other aspects. In this respect, Seiwert's approach is reminiscent of functional approaches, such as the one advocated by Nord (1991, 2001, 2005).

Although Seiwert bases his findings and advice on the analysis of personality traits within the professional sphere that students in the present study have not entered yet, his approach might be applicable to translation within a pedagogical setting as well, if pedagogical efforts are geared toward preparing students for the professional world.

Time ecology reflects current management thinking but it is not a new concept: It has been known since Ancient Greek times, formulated by Chilon, one of the seven sages of the Ancient Greek world as "hurry thyself slowly" and it is echoed again in Ancient Rome by Caesar Augustus: "*festina lente*". It is mentioned here as a broad helpful framework to have in mind when dealing with time constraints. It is also one of the few management concepts already discussed in Translation Studies, under the name "minimax strategy", advocated by Jiri Levý (1967) and Krings (2001), who approach translation as a decision process. What is more, it is a simple, minimalist concept chiming in with the minimalist approach to translation competence discussed in the following section.

2.4. Managing translation competence and learning competence

Competence assumes a critical role in translator training and therefore receives a great amount of attention from translation scholars and trainers. Plenty of models have been proposed over the last decades (Delisle 1980; Krings 1986a; Lörscher 1991; Kiraly 1995; Neubert 2000; Kelly 2005; PACTE 2000-2011; Göpferich 2007, just to indicate the time span).

In the context of higher education, competence can be understood to mean "a transferable, multifunctional package of knowledge, skills and attitudes that individuals

need for personal fulfilment and development, inclusion and employment" (Working Group on Basic skills, entrepreneurship and foreign languages 2003:11).

In the context of the present study, Pym's definition of *translation competence* is used, as the

> ability to generate a series of more than one viable target text (TTI, TT2... TTn) for a pertinent source text (ST) [and] the ability to select only one viable TT from this series, *quickly* and with *justified confidence*. (2003: 489; my emphasis; first published in Pym 1991)

This minimalist approach was chosen among others because, although it was conceived with the professional framework in mind, it has already been successfully applied in recent empirical studies with a slant toward translator training (cf. Alves and Campos 2009a, b), in essence drawing these two aspects closer to each other. In other words, "this scholarly recognition plays a pivotal role in harmonizing translation pedagogy with the demands of the translation/localization industry" (Hague, Melby and Zheng 2011: 249). Kiraly also advocates that "the difference between the novice translator and the professional translator mainly revolves around knowing how best to solve a problem […] and evaluating a tentative solution to a problem (1995: 110), quite in harmony with the proposed definition. It seems that the student-centred approach of social constructivism is not really in opposition with this definition, nor is it anywhere near "a collision course with the current ideologies of planned competence-based teaching" (Pym 2009: 7).

Another reason for choosing this definition for the present study is that this is the only approach highlighting the variable of time: a) a "quick" TT selection implies a relatively high translation speed, and b) a "confident" TT selection rather eliminates the need for time-consuming revision(s). In addition, this definition is in agreement with time management criteria mentioned above. In accordance with Shreve (2006: 31, 36), it suggests that translation constitutes a problem-solving activity ("selection"), an aspect of significance in the present study as regards definition of quality and use of strategic procedures. It is also important that this minimalist approach chimes in with the Seiwert's minimalist time management model.

This flexible definition is now extended to match the framework of the present study. For this purpose, we are guided by Way, who argues that, in order for the definition to be functional, a) students should be certain of knowing what a viable text is, b) translator trainers should come up with ways to to train the students to do what Pym suggests (2008: 90).

These aims can be achieved through a variety of subcompetences, the "vital tools[s] in establishing specific objectives in translator training" (Way 2008: 91). In learning environments such as the one of the present study and beyond established translation competence models, it seems important to highlight the "learning-to-learn competence" (González Davies 2004: 3), as part of translation competence.[10] "Learning-to-learn" actually permeates all fields of study and it has recently been included as a key competence in the European Framework for Key Competences for Lifelong Learning:

> 'Learning-to-learn' comprises the disposition and ability *to organise and regulate one's own learning*, both individually and in groups. It includes *the ability to manage one's time effectively*, to solve problems, to acquire, process, evaluate and assimilate new knowledge, and to apply new knowledge and skills in a variety of contexts — at home, at work, in education and in training. In more general terms, *learning-to-learn contributes strongly to managing one's own career path*. (European Council/Commission 2010: 3; my emphasis)

This "learning-to-learn" competence seems particularly relevant within the framework of the European Standard for Translation EN:15038:2006 (discussed in Way 2008). The Standard stresses the need for continuous professional development programs (CPDs) and, as Way underlines, translator trainers are faced with the task

[10] There are, of course, other ways to work with the same definition, related to pedagogical approach, design and procedures. The learning competence is singled out because it is considered to be the most pertinent in the present setting, tying in with learning styles later on.

> of providing their graduates with the tools to ensure that they are capable of maintaining and upgrading their competences throughout their professional working lives (2008: 89)
>
> on top of their other tasks.

"Learning-to-learn" is especially meaningful within the framework of the present study because it binds (self-)management of learning with time management, while suggesting that managerial competence is inextricably intertwined with and permeates translation competence, irrespective of setting: one needs to manage learning, time and career path during their studies and long afterwards.

In addition, learning to learn points to adaptability and flexibility on behalf of stakeholders involved throughout this essentially long learning process. This approach is congruent with most student-centered training, where the trainer constitutes a facilitator (Kiraly 2000), the third party fostering "deliberate practice" (Ericsson 1993), hopefully providing trainees with opportunities toward learner autonomy and "reproducibly superior performance" (Alves 2011). In simpler terms, "the teacher presents, models, guides, counsels and, finally, lets go" (González Davies 2004: 7).

2.5. Performance and quality

(Translation) competence affects (translation) performance and both should form part of Translation Training. Since "we cannot observe competence directly, we have to infer its nature from performance" (Lightbown and Spada 2011: 196). This set of inferences, or "inferential enrichment" according to Shreve and Angelone (2010: 77), is drawn in our case through observation and analysis of entire translation events. This implies that both the process and the product are relevant, even if performance in a strictly professional

environment is usually associated with the product. This is where quality comes in, as a testing of performance, a means toward its evaluation. [11]

Quality is an elusive and dynamic concept. "It is a *moving target* which does not allow complacency but needs a continuous endeavour" (Lönnroth 2009: 3, my emphasis). "Experimental evidence of the interrelations between various components of quality as perceived by users adds yet another layer of complexity to a topic that is unique for its multiple dimensions" (Pöchhacker 2004: 157). To cap the fact that translation scholars and translator trainers have not reached a consensus about the object of translator training and how to develop translation competence, "this lack of general agreement extends to translation assessment, which scholars generally tie to translation competence, since assessment assumes a well-defined construct to be tested" (Hague et al. 2011: 244).

Bearing in mind that quality is a relative value arbitrarily attributed by interested parties, usually by the client, but in this case by the trainer, to the end-product, a definition that would require perfection in absolute terms was not desirable. Mackenzie acknowledges that "sometimes a linguistically less than perfect text is acceptable when speed is the main criterion" (2004b: 35), an issue that has to be taken into consideration when dealing with students translating under time constraints.

2.5.1. The process of professionalization and its relation to quality

"Professionalization is a process by which expertise is institutionalized" (Séguinot 2008: 2). This concept is useful because it suggests the nature of the relationship between pedagogical and professional quality. Pedagogical quality is built into the process of professionalization. It is seen as a precursor to professional quality, a critical stage leading toward it. Thinking of translator training in terms of professionalization helps to position pedagogical and professional quality along a continuum of gradual development in a non-static way as regards academic programs with both a pedagogical and a vocational orientation. "Pedagogical logic tells us that learning requires time and that the average

[11] Such comments on Pedagogy and Training warrant extensive discussion which, however, falls beyond the purposes of the present literature review.

student cannot have acquired the competence of an experienced translator" (González Davies 2004: 3). Within the microcosm of translator training, "it is important to realise that an expert's *strategies* and 'narrow context' translating process may only be reached *gradually*, and there may be different appropriate processes for each stage of the learning process" (Zabalbeascoa 2000: 121; his emphasis). The trainer is required to both monitor students' learning until they are ready to do so on their own and cast a look to check the remaining distance from the desired state of professionalization. We cannot really ask or expect (undergraduate) students to deliver professional quality, however the latter is defined. As the learning process advances, however, "the pedagogical and the professional […] should converge more and more until they coincide" (González Davies 2004: 33).

In this context, professional quality is defined as "the sum of a product's (or service's) properties and features assigning it the ability to satisfy expressed and consequently arising needs" (ELOT EN ISO 8402: 2008, my emphasis). Its precursor, pedagogical quality, includes the divergence in the interpretation of expressed needs and is defined as a feature of a translation which is coherent with course syllabus and corresponding learning objectives and complies with the assignment as to the audience and the degree of completion.[12]

2.7. Learning styles

2.7.1. The relevance of learning styles in the study

According to Grundy, trainers must "take seriously the status of students as learning subjects, not objects in the curriculum event. This will mean that learning, not teaching, will be the central concern of the teacher" (Grundy 1987: 69, cited in Orlando 2011: 295). This student-centred view is compatible with translation competence as described in the previous section and sets the tone for the discussion on learning styles. María Julia Sainz (1993: 135), citing Brundage and MacKeracher (1980), postulates that "the learner reacts to

[12] The discussion on quality continues in Chapter 3, where it is also shown how the stance presented in this section materialized methodologically for the empirical part the present study.

all experience as he perceives it, not as the teacher presents it", following adult learning theory (Vygotsky). As a result, their individual differences, one of them being their learning styles, might partially account for different reactions to be reflected in their performance under time constraints and prove particularly meaningful in an academic setting. Besides, translation students in any classroom are the main stakeholders in the learning process and we have a responsibility to "favor an adequate learning environment which will enhance students' potential and respect different learning styles as much as possible" (González Davies 2005: 71).

In the following sections, the nature of learning styles as they are perceived nowadays is touched upon. It is followed by a presentation of the model selected, accompanied by a justification of this selection. The approach by translation scholars is commented upon. The section ends with a discussion focusing on the criticism learning styles have received.

2.7.2. The nature of learning styles

Since the emergence of the term "learning style" in the early 1960s within the framework of Educational Psychology, a rather extensive body of literature has accumulated and many variations with corresponding classifications have been presented, assessed or even rejected (Felder and Silverman 1988/2002; Grindler and Stratton 1990; Jonassen and Grabowski 1993; Cassidy 2004). A full-blown review constitutes a great challenge: at the time of experimentation approximately 71 theories and corresponding typologies existed, along with instruments (the most recent reports to my knowledge come from Coffield et al. 2004a, 2004b). Examples of learning style models will be presented mainly in order to clarify how the particular model for the study was selected and to situate the concept of learning styles within the academia and training.

An important issue and legitimate question concerns the very nature of learning styles, namely whether they are innate or not, because the answer would determine implications for training and its effectiveness. Hadfield acknowledges the importance of this distinction and comments that the answer would determine "how far we should match teaching techniques and tasks to learning style and how far we should individualize

instruction for different types of learner" (Hadfield 2006: 371). In fact, Coffield et al, (2004b: 34) divides learning styles in five categories, "from those at one end who consider learning styles to be fixed, even genetically determined, to those at the other end who consider styles to be mutable and learners as having the option to move between styles."

Research is inconclusive: it is difficult to determine whether learning styles are innate or develop through experience and are thus sensitive in different ways to training interventions. It was nevertheless, necessary to have a working definition for the present study. Thus, learning styles are defined as:

> a pattern of thinking, perceiving, problem-solving and remembering when approaching a learning task. It is fairly stable and consistent over time and across a variety of learning situations. (modified from Cassidy 2004: 48)

In essence, learning style constitute characteristic psychological behaviors, including cognitive and affective ones and serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. (Keefe 1979, in Felder and Spurlin 2005: 104). They are even regarded as an application of cognitive style to learning situations (Cassidy 2004: 48) to the point that many researchers use these two terms interchangeably (Howles 2004: 4; also Ehrman et al. 2003). "Both operate without the individual's awareness and are assumed to be less amenable to change and conscious control" (Howles 2004: 4). Asadi and Séguinot comment in relation to translation that

> it may be that this preference is part of a person's make-up, but it is also possible that conditions of work influence the way a translation is produced [possibly, time constraints]. If these cognitive styles are innate, training that advocates one way of working through a translation task is not targeting professional behavior but more likely reflects a reaction to students' fixation with correspondences between words. (2008: 6, my addition)

On the other hand, "for those who believe that learning styles change and/or expand, Hall (2005: 46) suggests that instructors should make students aware of how they are currently processing information and sensitize them to approaches and strategies that would help

them expand their repertoire of styles. This view chimes in with translation scholars Hervey and Higgins who retort that "anyone may improve their performance through teaching and practice" (2002: 1).

Whatever one's position on the *nature* of learning styles, a learning styles model specifies a small number of dimensions that collectively provide a good basis for designing effective instruction (Felder 2010: 1) and proponents of learning style theory work on the principle that "optimal instruction requires diagnosing individuals' learning style and tailoring instruction accordingly" (Pashler et al. 2009: 105).

2.7.3. Classification of learning style models

There are many classifications of learning style models. The categorization presented in this section (Reid 1995) was chosen as a general prototype because its relevance to foreign-language learning settings makes it akin to translation and because it has been widely used as a reference. Reid (1995) classifies learning style models into three categories:[13]

1. sensory/perceptual: related to the physical environment where learning takes place; they involve using our senses to perceive data;
2. cognitive: related to thinking, problem solving abilities and the ability to organize information;
3. affective/ temperament: related to students' emotions, values and feelings.

This taxonomy is similar to the recent one proposed by Dunn and Honigsfeld (2006: physiological styles, cognitive styles, affective styles). Reid's own proposed model is perceptual and includes learning styles such as visual, auditory, tactile, kinesthetic, group and individual. Keefe's model (1979) draws distinctions between kinesthetic/psychomotor, visual/spatial and auditory/verbal styles. An example of a cognitive learning style is the

[13] Reid re-arranged the learning style classification in 1999 and added categories. The categories from her 1995 work are presented here because they are broader and they are linked with Cassidy's definition of learning styles chosen for the present study.

field dependent/field independent dichotomy (Witkin and Goodenough 1981): field-independent learners prefer to learn in highly regulated "artificial" settings, from textbooks and lectures (Robinson 2003); field-dependent students prefer natural contexts, the contexts in which "they would learn something without really trying, because learning and experiencing are so closely tied together"; they will tend to learn translation by translating (Robinson 2003: 57). The Bates-Keirsey Temperament Sorter is considered an affective learning style. The revised version refers to the temperaments as the Artisans, Guardians, Rationals and Idealists—Concrete Pragmatists, Concrete Cooperators, Abstract Pragmatists, and Abstract Cooperators, in accordance with the original Quadratic Systems Analogy (Keirsey 2009).

Learning style experts approach the concept of "learning more about how we learn" in different ways. This affects the aspects measured and corresponding instruments (Cassidy 2004; Reid 1995, 1999). Kolb's Learning Style Inventory for his Experiential Learning Cycle (1984), widely used in L1 and L2 studies, measures information processing; Myers-Briggs Type Indicator (Myers and McCaulley 1985), based on Jung's theory of psychological types, measures personality traits[14]; Dunn and Dunn (1992, 2003) measure perceptual and physiological aspects of learning styles.

2.7.4. Selection considerations

The high number of learning style models and my relative theoretical distance from the field made it impossible to check all of them in order to select one for the study. Instead, there was a turn away from "good and heartfelt idea[s]" toward models "based on strong research" (Ole Lauridsen 2008: personal communication) accompanied by validated instruments. This gesture alone greatly reduced the load. My search continued for a model adhering to the following criteria that is, a model:

- based on primary (original), rather than secondary or tertiary sources;
- with publications preferably from refereed research journals;

[14] "The MBTI assesses personality types but MBTI profiles are know to have strong learning style implications" (Felder and Brent 2005: 58). The MBTI is included in most learning style anthologies.

- with accurate and objective reporting;
- offering evidence of balanced and multiple sources, and
- supportive data to corroborate perceptions (ibid.);[15]
- already validated;
- already well-known and popular in experimental research literature;
- easily available.

The purpose was to find a reliable model with meaningful dimensions in terms of translator performance. As a result, models with dimensions such as "kinesthetic", which would be of limited relevance to translators, were not taken into consideration.

Models based on one or more either/or categories were excluded, e.g. "field dependent - field independent" (Witkin and Goodenough 1981) because viewing learners as two-dimensional entities seemed rather simplistic. Human nature is far more complex and there should be degrees, an element of gradation to account for tendencies in nuances of human behavior, even at the risk of running more complicated analyses. Another, practical, reason was that they might give correlations of limited interpretative potential in the study. At the other extreme, models with a high number of styles and, consequently, variables, were excluded because either the analyses would be highly complicated, for example the Dunn and Dunn model with a total of 28 categories (1999), or samples in individual dimensions/categories would not be numerous enough for statistical testing.

The Felder-Silverman model was chosen in the end because it meets the criteria above. The fact that it was developed for uses in the sciences made it more attractive. In addition, the instrument has been widely used; it has been validated on the basis of psychometric research (Zywno 2003; Litzinger 2007); it is easy to administer and score; and it is available free of charge for academic purposes, upon request.

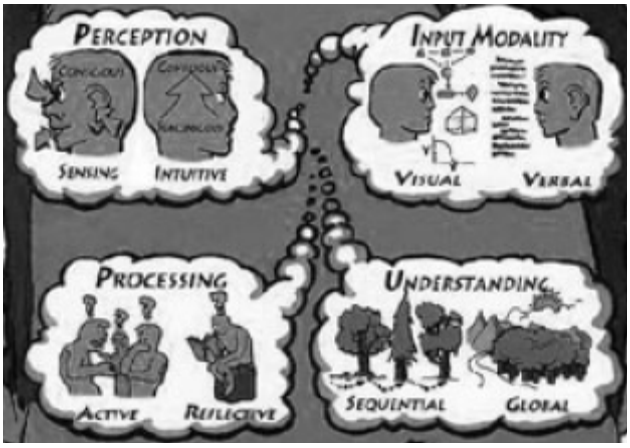
[15] I am grateful to Ole Lauridsen, mag. Art., Århus University, for his guidance and for providing this initial set of the first five criteria.

2.7.5. The Felder-Silverman learning style model

The Felder-Silverman learning style model was originally formulated in 1988 by Dr. Richard Felder, professor of Engineering, and Dr. Linda Silverman, an educational psychologist, for use by college instructors and students in engineering and the sciences (Felder and Silverman 1988/2002). It identifies four dimensions of learning styles: active/reflective, sensing/intuitive, visual/verbal, sequential/global. The corresponding instrument, the Index of Learning Styles, used in this study was developed by Richard Felder and Barbara Soloman to assess all four aspects (Felder and Soloman 2008). The following descriptions, based on Felder and Soloman (1993: 7-10) are used in this study[16]:

- active learners tend to retain and understand information by doing something active with, it i.e. discussing it or applying it or explaining it to others;
- reflective learners tend to think about new information;
- sensing learners tend to learn facts and solve problems by well-established methods
- intuitive learners tend to discover possibilities and relationships;
- visual learners remember best what they see (pictures, diagrams etc.);
- verbal learners get more out of words, written and spoken explanations;
- sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one;
- global learners tend to absorb material almost randomly without seeing connections.

Figure 2.1. Felder's model of Learning Styles (adapted from Felder and Brent 2009)



Felder's model combines elements from other models and theories (Felder 1988, Felder and Spurlin 2005 et passim). It is considered a Jungian model: the sensing/intuitive dimension is one of four dimensions of the Myers-Briggs Type Indicator (MBTI) which, in turn, is based on Jung's theory of psychological types. The active/reflective dimension corresponds to the same dimension in Kolb's model and is related the extravert/introvert type of the MBTI. The visual/verbal distinction is based on cognitive studies of information processing (Felder and Spurlin 2005: 103). The sequential/global dimension is considered analogous to left-brain dominant/right-brain dominant types and is associated with coding schemes in cognitive processing studies (ibid. 104).

Felder and Robinson emphasize that learning styles "are not a series of categorical straitjackets" (Robinson 2003: 57; see also Felder 1988). Felder's learning style dimensions are continua. The ensuing "*learning style profiles suggest behavioral tendencies rather than being infallible predictors of behavior"* (Felder and Spurlin 2005: 104, their emphasis). These learning style preferences may be mild, moderate or strong. People may be active sometimes and reflective at other times, more sequential or global, etc. depending on the task. Felder explicitly warns students that demonstrating a preference for a dimension of any learning style in his model does not constitute an excuse for them not to study or a justification for low scores, thus indirectly highlighting students' personal responsibility. He also warns teachers against using the instrument to determine their students' career paths. Student preferences are not "reliable indicators of what [students] are and are not

capable of doing […] people with every possible learning style can succeed in any profession or endeavor" (Felder and Spurlin 2005: 105). This last point is in harmony with the policy of inclusion set out in Chapter 1.

2.7.6. Learning styles and Translation Studies

The general impression is that the Translation Studies community empirically ignores or avoids learning styles. Scholars do not seem to be aware that one of the factors behind findings regarding (student) translators' performance that may not be accounted for nor easily interpreted after exhaustive analyses of products and processes might be learning styles. In 2.2.1.2 above, Hansen attributes differences in students' performance to vague "unfortunate habits"; De Rooze's suspects that differences in students' performance might be connected to (equally vague) "personality features". In their discussion of human translator types, Carl, Dragsted and Jakobsen (2011) acknowledge the existence of individual particularities and subsequent need for research.[17]

In a second group, and from a theoretical perspective, Chesterman (1998) compares communication, translation and learning strategies, paving the way for the synergetic approach adopted in the present study. Then there are scholars who call for more research and empirical action (Robinson 2003 cf. Chapter 1; Dam and Jensen 2009; González Davies 2004).

Dam-Jensen and Heine (2009) consider the application of process research methods, such as logging and screen capture, in the didactics of translation. They end their discussion stressing the usefulness of learning style theory in the translation classroom, with an explicit invitation to the type of research undertaken in the present study:

> We would like to point out that we consider the methods described here in combination with learning concepts a field that deserves to be studied further. An important issue to study is the way in which learners' text production strategies bear

[17] Individual features are not used as synonyms of learning styles. Learning styles might be *one* set of individual features pertinent to translation out of many.

> resemblance to or match problem solving strategies known from learning research. This will enable us to carry out such studies in the future, in order to ensure that our students benefit from the research undertaken in the overlapping fields of writing and *translation process research and learning styles theory*. (2009: 21, my emphasis)

González Davies advises that learning styles be taken into consideration in order to improve student performance, and assumes that the student's learning style will include translating style (2004: 37). She uses the term "student type" as a synonym for learning style. She presents three classifications. She draws on:

1. Ellis (1985) who recognizes four categories: active, passive, experiential and studial;
2. Campbell (1991) who focuses on disposition (risk-taking vs. prudent, and perseverant vs. capitulating) and proficiency (developmental skills);
3. Reid (1999), who presents a more elaborate taxonomy than the one mentioned in the previous section, including the seven multiple intelligences[18], perceptual learning styles, field independent / field dependent (sensitive) learning styles, analytic / global styles, reflective / impulsive learning styles.

Robinson elaborates on learning styles and dedicates a whole section to them, justifying his view of the translator as a learner. He draws on Eric Jensen (1995), who defines areas in which individual learning styles differ: context, input, processing, and response and classifies learning styles accordingly. For example, *processing* includes the following styles: contextual-global, sequential-detailed/linear, conceptual (abstract) concrete (objects and feelings) (Robinson 2003: 69-71). It is interesting that he provides examples through the prism of translation but claiming that

[18] It is worth noting that Gardner himself, who first presented the Multiple Intelligences theory in *Frames of Mind* (1983), considers the equation of intelligences with learning styles, common in the middle 1990s, a confusion and misinterpretation of his theory (2003: 8).

> [w]hen contextual-global translators and interpreters become theorists, they tend to build loosely knit, highly intuitive theories based on the translator's subjectivity (see Robinson 1991, Pym 1993) and/or activity as guided by target-cultural purpose (see Reiss and Vermeer 1984, Holz-Mänttäri 1984 […] (ibid.:69)

sounds like an arbitrary personal assumption. It is mentioned here as an example of translation scholars' attitude to present opinions without support by research in translation as conclusions.

Sewell's comments also sound arbitrary. They are not backed up by empirical evidence either. She examines communicative teaching methods in relation to translation and focuses on learning styles and introversion/extraversion. She assumes that

> [t]aken in their purest form, the two language-learning "methods" each assume an undifferentiated learning style, with all students responding positively regardless of their individual psychological make-up. On reflection, however, communicative methods would seem to favour risk-taking, extraverted personalities and high levels of interaction, whereas translation seems to favour reflection, introverted personality traits and low levels of interaction. (2004: 159)

The third (small) group comprises two empirical studies, by Hubscher-Davidson[19] (2007) and Asadi/Séguinot (2005), that could be treated as learning style studies. Both follow the process research paradigm. Hubscher-Davidson examines personality traits using the MBTI (cf. note nr.12), while Asadi/Séguinot use cognitive styles.

Hubscher-Davidson focused on how attitudes and behaviors manifest themselves during the process, and how they can be explained and understood by relating them to translators' personalities (2007: 51). Her aim was "to find links between behaviours, translational aptitude and the quality of the end product" (ibid.). The study builds on theoretical work by Reiss (2000) on translator types and temperaments and Barboni on

[19] Cf. Hubscher-Davidson (2007) for a similar observation on scarcity of research related to personality types and translation.

translator behavior and psychoanalysis (1999). Hubscher-Davidson laments that their assertions lack empirical testing and support. She complements data from questionnaires, product assessment and TAPs with results from the Myers-Briggs Type Indicator. This instrument is quite popular in learning style literature because, although it measures personality traits, "its profiles are known to have strong learning style implications" (Felder and Brent 2005: 58). She also relies on Felder's early work related to the Myers-Briggs Type Indicator MBTI. The MBTI includes 16 personality types as a result of the combination of its various traits but there is a possibility that certain types are not represented. Hubscher-Davidson admits that not having representatives of every type in her sample was considered a weakness. Her findings, based on research with a total of 53 postgraduate students as subjects (20 students in her main experiment), indicate a link between personality-related behaviour and performance because

> students who seemed more successful in their attempts, i.e. produced high-quality written patterns, showed certain affective qualities or abilities, such as confidence, sensitivity, creativity, imagination […]. On the other hand, it was noted that low-quality translational patterns seemed to result from attitudes of negativity, self-doubt, anxiety, a lack of successful strategies, mismanagement of time, and a bottom-up approach. (2007: 306)

Another finding of interest to the present study is that the students who spent more time on the translation task were also the ones who produced high-quality products.

Asadi and Séguinot (2005) examined the performance of nine professional translators who worked in the same company. The researchers used screen recording, concurrent and retrospective TAPs and retrospective interviews. They acknowledge that the data did not point to clear-cut translation styles but they were able to discern patterns and then deal with groupings of patterns (2005: 526). The data led them to two cognitive approaches as regards translation production, "two production styles" (ibid.). For Asadi and Séguinot, a) "prospective thinking" is reminiscent of the style used in precomputer translation where professionals would take in large chunks of text and read ahead for comprehension before beginning to type, whereas b) "on-line or on-screen thinking"

reflects current work conditions. These styles were also evident in terms of distinct revision strategies: the prospective thinkers mostly made changes of a light nature while drafting, while the on-screen thinkers "made extensive use of online revision to make syntax changes and changes to lexical choice in addition to spelling corrections" (2005: 531). In essence, they employed online revision as a shortcut tool and this gave them "the ability to produce text segments quickly and make changes as they go" (ibid.).

Asadi and Séguinot do not specifically mention learning styles; they use the often interchangeable term "cognitive styles".[20] What is worth noting is that they propose their own categorization following actual experimentation with professional translators, thereby linking the concept to translator styles. They also indirectly support the use of learning styles in the present study when they call for timely research and intervention before people become translators, while still in academia in the present case, because

> recent work has shown that people come *already formed* to their tasks as translators, that is, they bring with them cognitive styles as well as habits that may have served them well in particular situations. (2005: 524, my emphasis)

2.7.7. Criticism of learning styles

The concept of learning styles has been much contested for various reasons. On the one hand, there is evidence of external disbelief. Certain scholars are reluctant to use learning styles because, despite results from psychometric research, they doubt their validity even when they acknowledge the existence of individual learner differences (Howles 2004: 8). This may be due to the high number of highly questionable models and non-validated instruments. It might also be attributed to the fact that there is the lurking danger of over-interpreting results (Felder and Soloman 2008: 4) at the cost of hard scientific evidence or

[20] "The terms *learning style* and *cognitive style* are closely related and are often used interchangeably. Both operate without the individual's awareness and are assumed to be less amenable to change and conscious control" (Howles 2004: 4).

because the concept of learning style appears to be based on an incomplete paradigm (Howles 2004: 14) as will be explained below.

A recent criticism is provided by Paschler et al. (2009) who tested the instructional relevance of learning styles. They claimed that if the "meshing" hypothesis is valid, that is, if the best way to provide instruction is in a format that corresponds to the preferences of the learner, then there should be robust empirical validation in the literature. They reviewed a large part of the literature to find any published empirical research based on actual teaching of people in their preferred learning styles, one which would also demonstrate that "the instructional method that proves most effective for students with one learning style is *not* the most effective method for students with a different learning style" (2009: 105). They found "only a few fragmentary and unconvincing pieces of evidence" (2009: 116) that met their standards. Pashler et al. concluded that the literature fails to provide adequate support for applying "learning-style assessments into general educational practice" (ibid.), despite work in many university and non-university environments alike.

In response to these findings, Felder (2010)[21] admitted that like all models in the physical, biological, and social sciences, learning styles are incomplete (2010: 1). Nevertheless, they constitute "potentially useful representations of reality, and should be judged by how well they characterize and interpret observations and inform professional practice" (ibid.). According to Felder, the usefulness of learning styles in instructional design lies beyond and independently of the meshing hypothesis: "*the point of identifying learning styles is not to label individual students and modify instruction to fit their labels"* (Felder and Spurlin 2005: 105; their emphasis), nor to "match teaching style to learning style but rather to achieve *balance*, making sure that each style preference is addressed to a reasonable extent during instruction" (Felder 2010: 3; see also Felder 1996, Felder and Brent 2005). In addition, learning styles are congruent with most well-documented practices in effective pedagogy. Trainers may well work outside the "coherent and persuasive framework" of a good learning style model (Felder 2010: 4). They may choose to diagnose learning styles in cases where "the goal includes increasing metacognitive

[21] Felder's learning style model was not among the ones reviewed by Pashler et al.

awareness (understanding of how they learn and how others may learn differently)" (ibid.), as, for example, in the case of translation students within the framework of the "learning-to-learn" competence.

On the learning style experts' side, there is "internal confusion". Hadfield admits that the concept of learning style is rife with problematic areas, however "unconsciously appealing or intellectually satisfying this pizza-cutting approach to personality might be" (2006: 369). She presents four weakness of existing theories and their models:

> First, it seems depressingly reductive to classify humanity into only four (or even thirteen) fixed types. […] Secondly, the theorists are by no means agreed on the polarities or how these should be combined to form types.[…] Thirdly, many of the theories overlap and intersect in confusing ways. […] Lastly, there is much confusion over terminology. Different terms are used with apparently identical or very similar meanings. The global-analytic differentiation, for example, seems much the same as 'global–sequential', 'wholist–partist', 'holist–serialist', 'gestalt–analytic' or 'intuitive–analytic'. In contrast, the same word may be used with different meanings. 'Intuitive', for example, is used in Jung, or Myers-Briggs' (1985, 1998) adaptation of Jung, to mean relating to the internal, ideational world, not the world of fact, and is opposed to Sensing: an emphasis on factual, practical external reality.[22] (ibid.)

One last point, and actually one that learning style theories and Translation Studies have in common, is that many theorists "invent their own words, sometimes, it would seem, unnecessarily"[23] (Hadfield 2006: 370) with adverse consequences as regards clarity and credibility.

Methodologically speaking, the fact that identification of learning styles is mainly based on self-reports may be considered a drawback. A careful examination of the relationship between a person's identified learning style and actual performance must take

[22] These two examples were included because they are particularly relevant to the model chosen for this study.

[23] For a relevant discussion as regards Translation Studies, cf. Zabalbeascoa 2000, Chesterman 2008.

place (cf. Kratzig and Arbuthnott 2006: 32) before sound conclusions may be reached. It is with this logic that the present project leans heavily on translation process research and inferential statistics.

2.8. Chapter summary

The presentation of empirical investigations by translation scholars shows an increasing interest in time-related translator performance over the last decade (Table 2.1).

Table 2.1. Overview of time-related empirical research presented in the study

Time as speed and/or Time as task duration	Time as deadline
- Gerloff (1986, 1988)	- Hönig (1998)
- Jääskeläinen (1996, 1999)	- Jensen (1999, 2001)
- Jakobsen (1998, 2002, 2003, 2005)	- Hansen and Hönig (2000)
- Englund-Dimitrova (2005)	- Hansen (2002)
	- De Rooze (2003)
	- Hansen (2005, 2006a)
	- Jakobsen (Sharmin et al. 2008)
	- Pym (2009)
	- Muñoz (2009a, b)
	- Alves and Campos (2009a, b)
	- Hvelplund (2011)

Most studies fall within the process-oriented paradigm. Other common denominators include the fact that most of them focus on the novice vs. expert axis and they strive for triangulation, combining a great range of methodologies such as questionnaires, think-aloud protocols, keystroke logging, screen recording, video recording and eye-tracking. The time variable itself occupies various positions: from a rather peripheral one when used as a mere

single deadline to the most central, in studies dealing with time constraints. It plays an important role in the present study, where translation as a managerial action is linked to a minimalist approach to translation competence.

Translation competence as defined in this context includes the "learning-to-learn" competence thanks to which trainees may assume responsibility for their learning and maintain it long after graduation and the "symbolic death" of the trainer (Orlando 2011: 297). In an academic setting, this implies attention to both aspects of performance, process and product, and constant monitoring of the process of professionalization through quality assessment.

In such academic settings, focus is shifted to the learner. It is exactly in this framework that attention to personal variables, in the form of their learning styles in particular, is called to supply answers that could improve translator performance. Learning style theory is fairly straightforward but there seem to be more models than necessary, with many not based on strong research, factors which partially justify confusion and mistrust. The only way to proceed is by sticking to valid and reliable tools.

Chapter 3. Methods and instruments

In this chapter, the specific research questions of the thesis are reiterated and the main variables of the hypothesis are operationalized. Moreover, experimental features are presented in this order: from participant-based features to task-based features to methodological choices and ensuing instruments. In essence, this presentation asks who translated what, how and why.

3.1. Research questions and hypothesis

As already mentioned in Chapter 1, translating under strict deadlines is a professional reality rather recently recognized in terms of empirical treatment and rarely dealt with systematically in training contexts. From a trainer's perspective, it becomes of utmost importance to assist and prepare trainees to face and effectively manage time constraints. In our case, where trainees are undergraduate translation students, the following questions arise:

1. *What happens when translation students work under time constraints?*
2. *Are there any ways to help students learn to produce quality translations when they work under time constraints?*
3. *Do personal variables, such as learning styles, play a role within our pedagogical environment? To what extent?*

The theoretical relevance of learning styles for the present study has already been established in Chapter 2 but it needs to be empirically validated. The following hypothesis has thus been formulated for this thesis:

Learning styles correlate significantly with translation quality under time constraints.

In other words, the intention is to relate translation and time management phenomena to learning styles, always within a pedagogical setting. The hypothesis may sound "intuitively reasonable" (Williams and Chesterman 2002: 46), especially to trainers. It implies a certain distance from causality, in accordance with the general character of the

present study which, in turn, dictates decisions concerning definitions of variables and choice of methodologies and instruments. In Bruner's words (1990: xiii):

> [a]re not plausible interpretations preferable to causal explanations, particularly when the achievement of a causal explanation forces us to artificialize what we are studying to a point almost beyond recognition as representative of human life? (cited in Jääskeläinen 2000: 72)

3.2. Definitions

In order for the hypothesis to be tested, the key concepts have to be defined. In our context, *learning styles* are considered to be

> a pattern of thinking, perceiving, problem-solving and remembering when approaching a learning task. They are fairly stable and consistent over time and across a variety of learning situations. (modified from Cassidy 2004: 48)

They include a range of psychological behaviors, including cognitive and affective ones. They are also regarded as an application of cognitive style to learning situations (Cassidy 2004: 48).

A broad definition of quality is taken from the Hellenic Organization for Standardization as "the sum of a product's (or service's) properties and features assigning it the ability to satisfy *expressed* and consequently arising needs" (ELOT EN ISO 8402: 2008). Adjusting this definition to translator training by operationalizing expressed needs, *quality* is defined as a feature of a translation which, in our pedagogical context, is coherent with course syllabus and corresponding learning objectives [24] and complies with the assignment as to the audience and the degree of completion.

This definition takes into account the point in time in the learning process. It suggests that a quality performance also presents evidence of problem-spotting and

[24] The specific course description and syllabus may be found in Appendices B.1, B.2.

problem-solving. It is related to professional quality as defined by ELOT, as it can be assumed that professional translators (ie. paid translators with more experience and full-fledged skills) would deliver better results in less time and would reach more appropriate strategic decisions in terms of quality vs. quantity (Bayer-Hohenwarter 2008: 8, also citing Krings 2001: 279 and De Rooze 2003: 92) to satisfy expressed guidelines at the request of the client.[25]

Time constraints are difficult to pin down, as perception of time is highly subjective. If we apply Jensen's idea about time pressure to fit time constraints and if participants acknowledge time constraints "when the time available is felt to be at least potentially insufficient" (2001: 81), the concept becomes elusive for measurement purposes and consequent experimentation: how can one be sure a participant actually experienced time constraints and to what extent? For the purposes of the present study, there is a distinction between time constraint, which is defined as an objective limitation of time or deadline, and the (subjective) experience of time constraint. These two are considered as distinct variables and treated separately. This is why I considered working with a variety of deadlines as a mean value. The initial time frames were the same as those set by Jensen, i.e., 30-20-15-10 minutes, and they were tested with 10 students during the Winter semester of 2007 and 25 students during the Spring semester of 2009 following interim trials, as will be explained below. Opting for a collective fixed deadline is open to criticism of the type mentioned in Chapter 2. It is to be argued, however, that, it constitutes a feasible, working approach in classroom settings, where it is not possible to carry out further objectivation. In addition, although the participants were given the same deadline for the same text, they were retrospectively asked to rate presumed time availability and level of stress.

[25] There is always the possibility that some undergraduates may deliver products that would satisfy quite demanding clients.

3.3. Participants

3.3.1. Background

The participants for the experiments were 84 students from the School of English Language and Literature, Aristotle University of Thessaloniki, Greece, in their third year of studies, from my course "Scientific and Technical Translation Workshop", during academic years 2007-2008 (C2008, the pilot study), 2008-2009 (first main experiment C2009) and 2009-2010 (second main experiment C2010), as well as a few comparable students for interim trials. Table 3.1. shows that a total of 109 participants collaborated for the present study.

Table 3.1. Overview of experimental tasks and student participation[26]

	Academic year 2007-2008		**Academic year 2008-2009**		**Academic year 2009-2010**	
	January 2008	**May 2008 Pilot (C2008)**	January-February 2009	**May 2009 (C2009)**	spring semester 2010	**May 2010 (C2010)**
Number of participants	10 students	**30 students**	10 students (total)	**25 students**	5 students from C2009	**29 students**
Main features and/or aims	piloting 4 time frames	- 4 texts; hand-written translations - testing: translation difficulty, instruments, overall feasibility	- selecting process software (keystroke logging and screen-recording software) -piloting revised instruments	- 4 texts; *typed* translations -inclusion of process software, instruments on measurement of skills -change of assessment grid	piloting revised retrospective questionnaire	-3 texts -similar to C2009 -hypothesis testing
Detailed information		in chapter 4		in chapters 3, 5, 6		in chapters 3, 5, 6, 7

These students seemed to be appropriate participants for this study because they shared a relatively homogeneous profile:

1. they had all attended the prerequisite course "Translation Methodology" (Appendix B.3.);
2. they had all attended the prerequisite course "Computer Literacy";
3. they had all attended another translation workshop apart from mine;
4. they were familiar with major web search techniques for translation purposes;
5. they were expected to be familiar with the type and style of texts to be used, as a result of attending the "Scientific and Technical Translation Workshop";

[26] During February 2009, 90 students filled in the Index of Learning Styles. They are not included in this table because results were not analyzed for the purposes of this study (see 3.3.3).

6. their mother tongue was Greek;
7. they had not worked as professional translators in the past, i.e. they had not translated outside the educational setting nor had they received money for any translation-related work.
8. they belonged to the same age group: 20-22 years old.[27]

My initial intention was to ask for volunteers, their only reward being the knowledge they would acquire about themselves from the experiment. I decided to offer a reward, adding 1 extra mark to their final course grade, because a) they would be required to work hard, b) I wanted to attract students of all performance levels. Although the eventuality of sampling only the most competent students would have its merits, preference was given to a naturally-arising mixed-ability group of students.

In the end, 84 students participated, although it is not clear whether they did so out of interest or curiosity in the experiment, because of the extra mark, or for any other reason. Having rewarded them, the term "volunteers" sounded inappropriate. The term "subjects", commonly found in research settings, was also abandoned in favor of the term "participants" because

> the latter denotes a form of reflective and collaborative inquiry which involves participants in their real-life context and makes them protagonists, rather than subjects, in a process aimed at enhancing their practices in a given social setting - classroom settings being an obvious case in point (Pöchhacker 2004: 63)

One reason in favor of working with third-year students was that they had already acquired some basic knowledge about translation in practice, since they had attended the course "Translation Methodology" before attending my course. They had been presented with the metalanguage of the discipline and they could be expected to express themselves concretely when describing their own actions. The fact that they were in the middle of their program of study implied that they were already active and conscious agents within the

[27] The variables "familiarity with topic" and "level of English" were factored in at a later stage (see 3.3.2 on skills and 3.4.1 on text selection).

framework of a learning/teaching process. The fact that they were at an early stage of their translation studies, on the other hand, might suggest that they were not given the time to form a working routine or many (efficient or inefficient) automatizations and it was assumed that they had received approximately the same amount of translator training exposure (PACTE 2005: 611). Thus, I might be able to detect relatively original responses and approaches as regards a given translation task and have a clear view of their profiles. As a result, future students at this level would be more likely to benefit from any findings from this study, in the form of teachers making timely interventions of a preventive rather than a therapeutic character. These participants, as well as students in the years before them, had had limited training in time constraints during the course: a translation speed test based on an exercise proposed by Robinson (2003: 36).

It is worth mentioning that the decision not to follow the expert vs. novice paradigm, unlike Jensen (2001) and De Rooze (2003), was taken rather early in the research and was mainly due to insufficient financial resources for paying (a high number of) professionals for their contribution.

The list above shows that there had been an effort to control variables like age, professional experience, participants' academic performance before the actual experiment. All three classes, C2008, C2009, C2010, were natural, that is, they were the students registered for the elective course "Technical and Scientific Translation Workshop" as per School of English regulations or rather, the vast majority thereof who wished to participate. Data from participants who a) were much older than the average 3rd year student (> 21-22) or b) had been working as translators in the past, i.e. they had received money for their translation work, were excluded from the analysis. Thus, participants belonged to the same age group and they were assumed to enjoy the same (zero) level of translation-related professional experience and expertise. In addition, it was assumed that all three classes were of similar academic potential, since no significant difference among them was found on the basis of the grade average of students just before the beginning of the course. This method for estimating class dynamics was chosen because the students' grade average until the course (and, in this case, experiment) was the only figure available regarding academic performance. Students could have provided a list of grades from their linguistics or

literature courses, but it would have been in vain due to the complex groupings of compulsory courses.

The above situation implies that the views and opinions of one group might actually resemble those of another group on average. It also implies that any findings from one group might be easily extrapolated to another group or even to many similar future classes of the course "Technical and Scientific Translation Workshop", within reason.

3.3.2. Skills

3.3.2.1. Language skills

Two instruments, both measuring linguistic skills, were added in C2009 and C2010 for two reasons, so as to fine-tune participants' profile and control the factor of language competence, both in L1 (Greek) and in L2 (English).

The test for assessing English language skills was the pen and paper version 1 of the "quick placement test" (QPT) by Oxford University Press (2001). "It assesses Reading, Vocabulary and Grammar" (ibid. p.2) and questions are in multiple-choice format.

The particular test was chosen because it is a reliable, validated instrument, also used for screening students in their 1st year of study in the School of English. It can also be marked very quickly using the available overlays. It consists of two parts: Part 1 is addressed to students "who are Intermediate or below" and Part 2 for "higher ability students". It can be completed within 30 minutes. The structure of the test is such that it helps to ensure that whether a student takes one or both parts, "he/she will be awarded the same band score" (2001: 8).

The test for assessing Greek language skills was the free, online version of the "Greek Placement Test" offered by a private institution in Greece, the Hellenic American Union to non-native speakers of Greek. The test is validated and the (concise) online version consists of 60 multiple-choice items. The maximum time allotted is 60 minutes for the whole test. It was used in the study due to lack of any similar instrument by official Greek sources.

3.3.2.2. Computing skills

The fact that students at the School of English, Aristotle University, had attended the compulsory course "Computer Literacy" did not guarantee homogeneity regarding their computing skills. The course had only a pass/fail grade, so it was not possible to measure difference in levels. This, combined with lack of reliable and freely available tests, led me to use relevant information from the diagnostic sheets[28] students would fill in at the beginning of their course, Scientific and Technical Translation Workshop, since all participants for the purposes of the present thesis were actually students of this same course.

3.3.2.3. Typing skills

Another issue that needed to be addressed before the set of experiments during Spring semester 2009 (C2009) was students' lack of (touch-)typing skills. I found a simple freeware program with touch-typing exercises and tests for both Greek and QWERTY keyboards. This was distributed to students/experiment participants (C2009, C2010) for practice so as to control the typing-speed variable.

The first step was to differentiate between typing speed and translating speed, as the latter includes pauses for several reasons, such as reflection. Literature related to writing/typing was studied. According to sources such as Brown (1988) and general practice, speed is counted in words per minute (WPM). In typing, an average of 5 keystrokes equals one word. These days, characters per minute (CPM) has become another popular unit for measuring typing speed, especially in localization contexts.

At this point, there is a need to take a look at some figures in order to have a clear view of what writing/typing speed means. First of all, despite general assumption that handwriting is a relatively homogeneous process, the type of task affects handwriting speed. Apparently, writing a memo corresponds to an average of 31 WPM and copying a text corresponds to 22 WPM (Brown 1998: 78). As far as typing is concerned, professional

[28] The diagnostic sheet was a one-page questionnaire, handed out to the students during the first class meeting, in order to glean information about students' background and course expectations.

(touch-) typists work at a speed of 50-70 WPM (Ayres and Martinás 2005: 94). The transcription rate of average PC users is set at 33 WPM but may drop down to 19 WPM when text is composed on the spot. Two-finger typists may reach a speed of 37 WPM for memorized text (Brown 1988: 118). Apart from translation speed polls at ProZ (2005), the results of which were not accessible in their entirety, or similar threads (ProZ 2006), little has been published about typing speed in relation to translation tasks (for example, Allen 2004). Most of the times, there is a reference focusing on the productivity aspect, i.e. in IT/manuals, an eight-hour working day produces 2,500 words (ProZ 2006), which is of little use in this study. The above information was taken into consideration for the actual treatment of the typing speed variable, described in detail in chapter 6.

3.3.3. Learning styles

Learning styles were identified through the use of the Index of Learning Styles, an instrument based on the learning styles model by Felder and Silverman (1998/2002) already mentioned in Chapter 2.[29] It identifies four aspects of learning styles: active/reflective, sensing/intuitive, visual/verbal, sequential/global. This same instrument was used with all participants in C2008, C2009, C2010 experimental tasks.

On top of this and before the start of the registration period for spring semester 2009, I had asked all students from the School of English who were eligible to register for my elective course "Scientific and Technical Translation Workshop", ie. a total of 90 students, to fill in the Index of Learning Styles by Felder and Soloman. The aims behind this decision were:

- to check whether the four dimensions of learning styles were associated in a way meaningful for my experiment , so as
- to reduce the corresponding 8 categories of the chosen model for facilitation of manipulation and statistical treatment, in order

[29] The instrument is available free of charge for academic purposes at http://ncsu.edu/felder-public/ILSpage.html, upon request.

– to locate those students who fell into the new categories and isolate them in such a way that would ensure there would be comparable numbers of representatives of each style in my group of future participants (Jakobsen 2009, personal communication).

This was an attempt to strengthen the main hypothesis, namely that "learning styles affect translation quality under time constraints", by arguing that not all styles affect translation quality in the same measure. Having comparable numbers of representatives of each style would pave the way for identifying the learning style that facilitates the best performance under time constraints. This scenario, however, would entail deviation from an authentic pedagogical context, considering that, in many cases, trainers do not choose their students. At the same time, there was no prior feasibility study to determine an appropriate sample size. In addition, the whole endeavor might not bear meaningful results given that the chosen learning style model is multidimensional: its four dimensions, each spreading along a continuum, provide a great number of combinations and this would impede the search for "comparable numbers". Practically speaking, there was no further attempt to manipulate the group of participants by selecting students in advance and the registration process for my elective course took place as usual, within the authentic institutional framework. The results were not analyzed for the purposes of the present study; they were announced to students, along with instructions for scoring and interpretation of results.

3.3.4. Participant-related instruments

Questionnaire 1 (background questionnaire) tested in the C2008 pilot study was modified to exclude items considered peripheral in relation to the main study and it was piloted on five third-year translation students (Appendix D.1.).

Another instrument, Questionnaire 2 (the retrospective questionnaire), was also piloted after the initial C2008 trial, this time with five third-year students from my own course. This testing was carried out because the modifications were both more substantial and more related to course content. The questionnaire had been enriched with a tool borrowed from process-oriented research, namely a modified version combining elements

from Integrated Problem and Decision Reports (IPDRs) and Written Protocols (WPs) (Appendix D.2.).

An IPDR, introduced by Gile, is a type of "diary" that accompanies a translation. It consists of notes about the "problems" that the translator encountered in the task, the tentative solutions considered, the resources consulted and the reasons for adopting a particular solution in the end (2004: 10). The tool was devised in the context of translator education and has been recently used specifically for research purposes (Tirkkonen-Condit & Jääskaläinen 2000, Hansen 2005, Pavlović 2007), along with other similar instruments, such as González Davies and Scott-Tennent's' Written Protocols or WPs (2005: 165). A reason in favor of this IPDR-WP combination was that its use would enhance ecological validity because it was already included among course components and students were expected to be familiar with it.

Since the IPDR-WP is yet another self-report questionnaire, a further, process-based, tool was necessary for the purpose of triangulation. This issue is discussed in 3.5.1.

3.4. The task

3.4.1. Text selection

Familiarity with topic and style was a variable that needed to be controlled as much as possible. Since the participants came from my own "Scientific and Technical Translation Workshop", texts of a scientific and technical nature already dealt with in class were considered appropriate candidates. This approach would guarantee at least a minimum degree of familiarity shared by all participants, which could counterbalance differences due to varying extramural experience.

My initial thought in 2008, while preparing for the pilot study (cf. Chapter 4) was to present students with different sections of the same long text. However, there was the risk that they would familiarize themselves with vocabulary and style and this "learning effect" might contaminate results with respect to time. Jääskeläinen (2000) mentions a doctoral thesis by Matrat (2000: 75-76) where the source texts were actually paragraphs from a single text but it was not clear how this guaranteed the same level of translation difficulty

since a text may have both easy and difficult parts in terms of translation. Selecting four different texts for the tests, following Jensen's approach (2001), was taken into consideration in an effort to reduce this effect. In addition, the use of four time frames and corresponding texts would corroborate the assumption that, eventually, participants would be challenged to finish on time. Four texts of relatively equal translation difficulty had to be found, the rationale being that empirical validity would be jeopardized if students were given an "easy" text to translate in 30 minutes and a "difficult" one to translate in 10 minutes. The question comes down to rating the texts, given that "even an ostensibly simple text can present problems to the translator" (Pym 1993: 65) and, as a result, that feeling of "equal weight" in the current pedagogical context becomes harder to achieve.

Word frequency and sentence-length formulas from neighboring disciplines were considered (SMOG, Flesch-Kinkaid, etc.). It was found, however, that these tools were not sufficiently translation-friendly: they focus on the source text and predict ST comprehension effort, but they do not take into account production effort, i.e. they ignore a large part of the translation process, which is only natural since they were not designed specifically for translation environments. In essence, they assess reading difficulty, a concept which does not necessarily equate with translation difficulty.

One option was to turn to *Skopos* theory, frequently used in training settings. However, although some researchers (Reiss 1971; Nord 1991, 1997) have already employed various text classifications for use in the classroom, the literature on text selection criteria for tests, exams or, in this case, experiments remains rather limited.

Nord's model for translation-oriented text analysis (2001) seemed to offer a direction for my quest for text-selection criteria. Nord herself stresses that while her model is intended to be applicable to translation teaching, it is also designed to provide criteria for the selection of text material for translation classes, the systemization of translation problems and procedures (2001: 140). The model also caters for the distinction between translation problems and translation difficulties. Translation difficulties may be hard to pin down because of their subjective nature: what is difficult for an individual translator A may not seem difficult for translator B, since more often than not they do not share either the same linguistic, translational or cultural competences. The model acknowledges four categories of translation difficulty: a) text-specific difficulties, b) translator-dependent

difficulties, c) pragmatic difficulties, and d) technical difficulties. Translation *problems*, on the other hand, are general, objective or at least intersubjective. They are to be solved on the basis of translation competence: "Translation problems will always remain problems, even when a translator has learnt how to deal with them rapidly and effectively" (Nord 2001: 64). Nord also warns that there is no exhaustive list of problems but there are types, similar to those of translation difficulties. Thus, problems may be

- pragmatic: when contrast between source text (ST) and target text (TT) situation exists;
- cultural: when differences between source and target cultures appear;
- linguistic: when the cause of the problem lies in language differences;
- text-specific: when problems arise between the source and the target text (2001: 158-160).

The above taxonomy was useful for text selection and had been taken into account when I was collecting course material. Nevertheless, the task of finding equally difficult texts in terms of translation on the basis of the above and other categorizations remains hard to achieve mainly because, although categories may help researchers and trainers number translation problems, they do not delineate their degree of difficulty, not even among problems belonging to the same category. Another limiting factor was that translation difficulty could only be predicted up to a point because many difficulties are detected at the time of translation proper and this may depend on the experience as a whole (Lagarde 2009: 134). In an effort to maintain the authentic setting and at the same time adhere to the individual differences paradigm, even from the stage of the C2008 exploratory study it was decided to reverse the situation and move away from researcher-set criteria toward student-based ones. This was a shift toward less arbitrary text categorization but also toward meaningful subjectivity: if students who had translated a certain number of texts themselves were to rank these same texts that other (comparable) students would have to translate, it would be reasonable to expect that such texts would be ranked in a similar way by all student groups involved. Consequently, such texts would be both useful in a training context as well as acceptable from an empirical perspective. The approach might even underpin ecological validity because, instead of introducing or imposing a further probably complicated formula for text ranking, the responsibility for this

kind of decision-making is passed on to students themselves, including them in their own training process.

With this in mind, I decided to make use of material already available from my "Scientific and Technical Translation Workshop" courses during academic years 2005-2007. Students from these earlier courses and participants for all experimental tasks were comparable groups because they shared all the features mentioned in 3.2.1 above. Consequently, there was an opportunity to extrapolate results from one group to another within an ecological setting without jeopardizing the pilot study.

The previous students had been exposed to various topics and text types. At the end of the course and before their compulsory final exam, they had to submit a portfolio of their translations. This portfolio was accompanied by a modified version of Integrated Problem and Decision Report, a type of "diary" that accompanies a translation (Gile 2004). Students were asked to identify difficulties experienced while translating each text and the way they had dealt with the difficulties, essentially using metalanguage they had learnt in the "Translation Methodology" course mentioned above. They were also asked to rate the portfolio texts in terms of translation difficulty on a scale from 1 to 5: 1 implied students had found a given text very easy to translate, while 5 would be the number assigned to the most difficult text they had translated. The purpose behind the text collection and subsequent ranking was to create a pool of interchangeable texts for training purposes. This could be applied to a research setting closely related to training.

I initially selected four texts (Appendix C) that the previous students had rated to be of "medium" translation difficulty, i.e. texts assigned number 3 on the scale.[30] I predicted these texts would offer all participants an opportunity to comment on their experience, providing sufficient material for the larger study. All four texts came from Curt Suplee's encyclopedia book for National Geographic: *The New Everyday Science Explained* (2003). Some features pertinent to the study were that:

- the texts are authentic, i.e. I did not intervene in order to plant problems etc.;

[30] Four texts were used in C2008 and C2009 tasks but only three made it to the C2010 set of experiments, as will be explained below.

- the texts come from a single source, providing homogeneity of register;
- as already mentioned, participants would be familiar with their type and style because they had worked on encyclopedia articles during the course;
- the texts follow the "lemma" format of an encyclopedia, i.e. a variety of topics necessary for this study to counteract any possible "learning effect" is guaranteed;
- the entries themselves are relatively short and thus unlikely to exhaust the students or require modifications.

One last positive feature was that these texts are not ephemeral, unlike for example news articles, so it could be assumed that participants would find relevant documentation sources. This suggests again that they were appropriate for use in this study. Methodological replication by other researchers or trainers is easily feasible. Researchers and trainers should note, though, that student groups sharing another mother tongue might react in a different way, i.e. they might experience different translation difficulties and rank the chosen texts in a different manner.

3.4.2. Task guidelines

Nord's functionalist approach was applied in drafting task guidelines. What Nord provides us with is a set of WH- questions that can be used for the formulation of task guidelines to accompany all four texts chosen for study (2001: 144):

Who transmits

to whom

what for

by which medium

where, when, why

with what function

on what subject matter

does s/he say

what (what not)

in what order

using which non-verbal elements

in which words

in what kind of sentences

in which tone

to what effect?

As Kelly points out, "the functionalist approach gives solid theoretical cover to the thorny issue of the translator's *license* with the original, which students have considerable difficulty with" (2005: 164). Students are presumed to experience less confusion if their choices are oriented by clear instructions. I used a simplified version of the WH- set of questions, tailored to our needs to draft task guidelines (Table 3.2). This way, I expected that participants would know which direction to go. The task guidelines contained information about the intended text function and the target-text addressees but not, for example, the medium, since the experiment had already defined that parameter. I ended up using the same guidelines for all four texts (the same for all C2008, C2009, C2010 tasks) so that, while time was gradually reduced, participants would not be tempted to lose their "sense of direction". I tried to avoid additional difficulties resulting from the type of task assigned, as advised by Ulrych (1995: 253).

Table 3.2. Task guidelines

Task:
You are asked to translate the following text from English into Greek.
Your commissioner:
The Greek newspaper "*Καθημερινή*".
Your status:
You are working as a junior translator for them.
Target readership:
The newspaper is addressed to the educated general public. The text you deliver will be included in the Sunday edition, in "*Επιστήμη*" (Epistimi/Science) section.
Source:
The text is taken from Curt Suplee's book *The New Everyday Science Explained*, a National Geographic edition (2003).
Situation:
The text you deliver will be included in "*Επιστήμη*" (Epistimi/Science) section as is because there is no time for proofreading/editing.
Deadline:
Please check your group code.

3.4.3. The experiment setting

The experiment was conducted in the computer room of the Faculty of Philosophy (20 computers). Additional information and differentiations between the C2008 pilot study and the C2009 and C2010 experiments are discussed in detail in Chapters 4 and 5, respectively.

There was no contact among participants during the experiment. The room setting guaranteed that they were not able to look at each other's computer screens. They were advised not to distract their fellow participants.

3.5. Process-related methodologies and instruments

3.5.1. Inclusion of process analysis

On the research side, triangulation, the combination of different methodologies in a single research study, as underlined by many researchers (Jakobsen 2006, O'Brien 2008, Alves 2003, Hansen 2006b, etc.), was a *sine qua non* if one were to corroborate conclusions in the

present setting. Its necessity was already emphasized above, for example in order to confirm participants' self-report data on their performance. On the pedagogical side, there was the intention to strive for events that would also leave something of value for the university classroom *per se*, both in the form of easy replication by other trainers and direct benefits for the students. In other words, there was a conscious turn toward ecological validity. As a result, the search for a tool that would help converge these two lines of action started.[31]

3.5.1.1. Methodologies and software programs

According to the available Translation Studies literature, the main methodologies used to capture translation process were (and still are) keystroke-logging, screen-recording and eye-tracking, with many researchers opting for a combination of at least the first two (for a detailed analysis, see Göpferich 2008). As far as keystroke logging is concerned, Translog seems to be the most commonly used software program and, at a lesser extent, Inputlog. Camtasia (now Camtasia Studio) dominates experimentation based on screen recording, although Pym (2009) also mentions BB FlashBack. Finally, software programs compatible with Tobii eye trackers, like Clearview and lately Tobii Studio, appear in most of the studies that include eye-tracking. With the exception of Tobii Studio, all these tools were considered for the present study.

As far as eye-tracking is concerned, Clearview is commercial software provided by Tobii Technologies. It registers eye movements over various forms of stimuli including web pages and Windows desktop and it is Windows-based (Duchowski 2003: 104). It generates a large amount of data, among others a data file where eye position is logged per millisecond. The number, sequence and frequency of eye fixations is also recorded and presented in the form of gaze plots and hotspots.

[31] The exclusion of another process methodology, TAPs, because of its decelerating effect on translation speed was discussed in Chapter 2.

In terms of screen-recording technology, Camtasia (Studio) is a commercial software suite for recording, editing and sharing screen videos. It runs in the background and records every type of screen activity, such as internet searches.

BB FlashBack Screen Recorder is also commercial software. It comes, however, in various versions. The simplest one, BB FlashBack Express, now comes as freeware. This freeware version is fully functional as far as recording is concerned but offers no annotation or editing options and has limited file sharing features (Blueberry software website, 2011). It generates one video file, where keystrokes are also displayed if the function "capture keystrokes" was selected before the recording process.

Another methodology is keystroke logging. There are two main popular programs. The first is Translog, a computer program offered as freeware for academic research purposes. It was originally conceived for research purposes and developed by Arnt Lykke Jakobsen and Lasse Schou from the Copenhagen Business School with the ambitious aim to "increase the power and accuracy of direct observation" (Jakobsen 1999: 9-10). Translog keeps a log of all keyboard activity, including mouse actions, while typing a translation. Thanks to Translog, researchers can study the typing process itself in real-time as well as

> all the editing that goes into writing a translation, how much time is spent on what translation tasks, and the connection between time delay and information processing. (ibid. 9)

Translog offers audio recording and play-back functions. It may also be used in conjunction with eye-tracking software.

The second frequently-used keystroke logging program is Inputlog. Inputlog is another freeware program that enables researchers to log and analyze writing processes in Windows. It was created by Mariëlle Lejiten and Luuk Van Waes with the support of the University of Antwerp. It records keyboard and mouse activity in several Windows-based programs and plays back the recorded session at different speeds. It may integrate speech recognition data (Dragon Naturally Speaking, Nuance). Added benefits of Inputlog include a) identification and logging of all the windows that the writer opens in different programs: for example, it logs the URL of websites during internet searches, and b) XML-based

output files. Thus files may be exported to SPSS for statistical analyses (Leijten and Van Waes 2006, Van Waes et al. 2009: 41-44).

3.5.1.2. Selection considerations with respect to process software

The School of English had a Tobii 1750 eye tracker and Clearview software available for research purposes. There were limitations on its use as it was often booked by staff and doctoral students of the School and I would have to spend a considerable amount of time with the 54 participants (at the time of these trials, during 2009, there were only 25) who would have to translate four texts each. After dealing with the practical issue of room availability, however, there was the complexity and the load of the eye-tracking data generated by the program, what Sharon O'Brien refers to as "data explosion", acknowledging the challenge (2009: 97). What would be feasible for a group of researchers seemed too daunting a task for a single person.

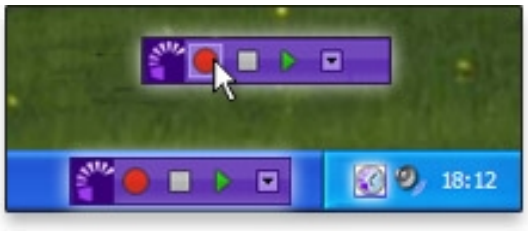
Another consideration was that, according to the hypotheses of the study, I would have to use eye-tracking software concurrently with a keystroke-logging program, which is another large set of data difficult to handle. Adding to this the increasing distance from an authentic pedagogical setting, from possible direct class applications and benefits, and considering possible effects of the process itself to participants, I decided to exclude eye tracking altogether from the study and instead try to combine a keystroke-logging program with a screen-recording program.

Ten students experimented with Translog, along with a trial version of BB Flashback screen recorder. From that same group, five also experimented with Inputlog, along with a 30-day trial version of Camtasia. Later on, all ten students experimented with BB BlashBack alone. The difference this time lay in that the "capture keystroke" option was enabled. As a result, the program functioned as both a screen recorder and a keystroke logging tool.

Students were later asked to evaluate the three alternatives to, essentially, the same methodological approach. All of them ranked BB FlashBack as more user-friendly, more pleasant and less invasive, many commenting that a) they were translating like they would at home or in the School's computer lab, b) the program was unobtrusive, and the timer on

the BB FlashBack bar (Figure 3.1, the only trace of the software because BBFlashback runs in the background) actually helped them keep track of time during the exercise.

Figure 3.1. BB FlashBack taskbar



Translog and BB Flashback scored higher than Inputlog and Camtasia. According to some students, although they enjoyed watching the play-back of their sessions with all programs, they felt less than comfortable "jumping in and out of the program" during the translation process (referring to Translog and Inputlog). This came as a surprise because Translog in particular seem to cater for ecological validity. Many participants in Jakobsen's experiments had indicated that a) "they forgot they were part of an experiment", b) they "felt that writing a translation in Translog was very similar to writing an ordinary translation" (Jakobsen 1999: 15). In addition, Translog

> also turned out to be popular as an educational aid and was utilized as a new means of teaching translation in a process-oriented manner. Colleagues both at CBS and abroad (e.g. Don Kiraly and Hannelore Lee-Jahnke) eagerly grasped this opportunity for introducing a new approach to translator training. (Mees 2009: 23)

The negative reaction from the Greek students could be attributed to the fact that our group consisted of undergraduate students whose computing skills were much below ECDL[32] level. Another reason could be that, although they did not spend much time becoming acquainted with Translog (it took approximately one class meeting i.e. three

[32] European Computer Driving Licence, a digital literacy certification program indirectly endorsed by the European Commission.

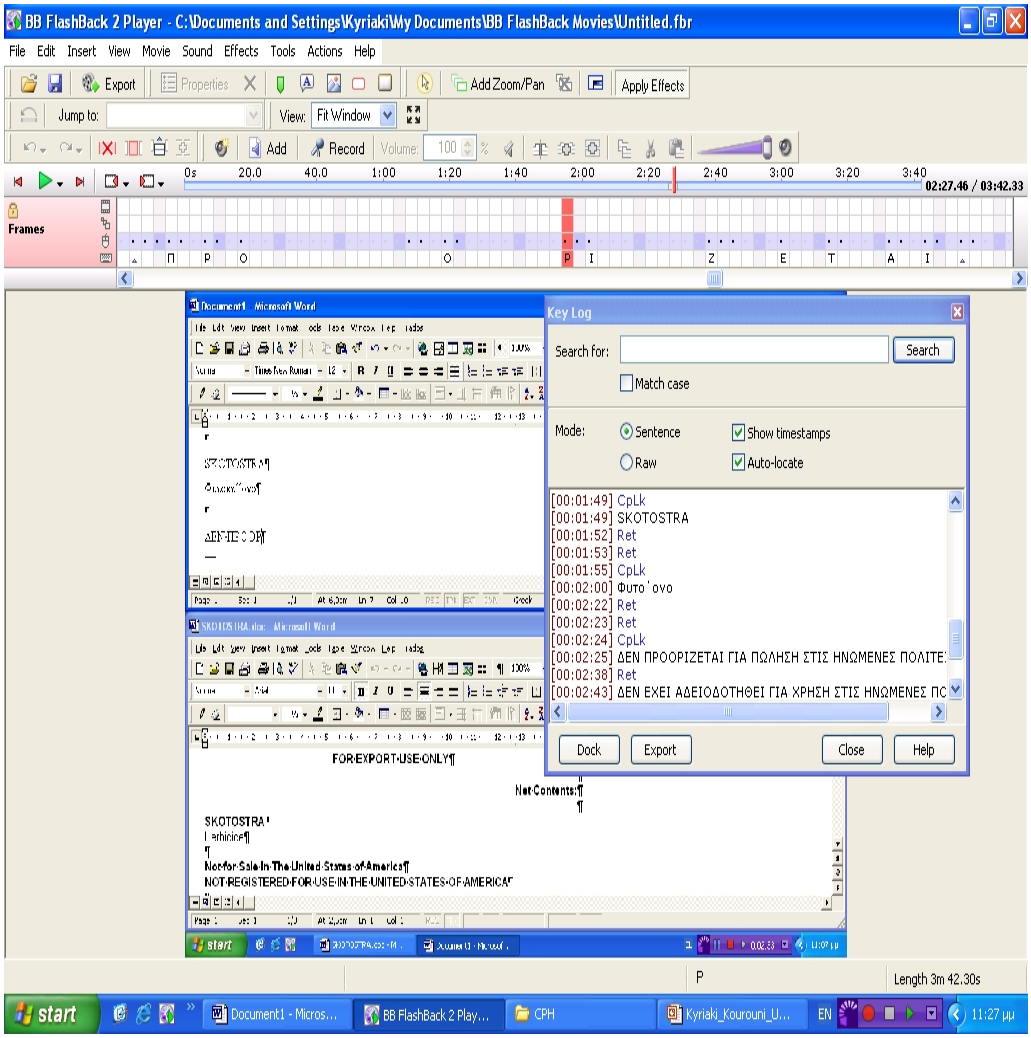
hours), the time spent until they started using BB FlashBack in this second trial, this time on its own, was significantly less (approximately 45 minutes).

Although students had shown a preference for BB FlashBack as a stand-alone tool, I still had to examine whether BB FlashBack video plus Translog files or BB FlashBack video files (with activated keystroke logging function) would serve my specific research needs better. The widespread use of Translog within the translation research community meant that at least a part of experiment results and findings derived from the study would be easily juxtaposed, interrelated or even extrapolated (for a list of publications based on Translog data, see Schou Lasse et al. 2009: 43-48). On the other hand, it also meant that I would need an additional program (a screen recorder) to make up for activity taking place outside Translog, such as consultation processes. I would have to work on two logs per student per text in order to cross-reference data. This implied 100 video files and another 100 Translog files at the time (for 25 participants). In addition, the size and complexity of Translog files should also be noted.

The BB FlashBack keystroke logging function is much simpler and it would certainly not suit a researcher investigating, for example, pause behavior. For the purposes of the study described above, however, it would, first of all, cover the need for triangulation: data from either students' products or retrospective questionnaires can be cross-referenced against *either* screen activity or text production activity. An added bonus is that this happens on the basis of a single file. As a result, data management is greatly simplified and triangulation is not hampered.

In BB FlashBack, users can actually open the Key Logging Window and view a display of keys pressed while the movie was recorded (Figure 3.3.). Each item comes with its own timestamp, always in relation to the start of the movie. Users can toggle between two views: a) raw, where all key presses are shown in a sequence, and b) sentence, grouping together keystrokes into words for enhanced readability. A time-saving element in terms of the study described in the beginning is the search function: users can search for a specific word in the Key Logging Window and jump to the frame in which it was typed (BB FlashBack Help File 2011). Finally, keystroke logging data can be exported, in either raw or sentence format, to XML.

Figure 3.2. BB FlashBack Sentence key log sample



Carefully weighing the available options, I decided to sacrifice direct comparability of findings and fine(r)-grained keystroke analysis in favor of ecological validity, and possible benefits for actual classroom practice and participants themselves. By bringing the experiment closer to the natural student (working) environment, the aim was to strengthen "the relationship between scientific enquiries and the world of everyday life" (Halverson 2009: 85).

One cannot expect all experimental research to have a direct practical application in the translation classroom, nor all classroom events to provide generalizable results. The

ideal would be to have a "one-fits-all" power-tool or at least to strive for software flexibility and inter-operability.

> Unfortunately, the observation software currently available on the market is not tailor-made for cross-usage and there are hardly any systems to be found that can provide combinable data. Combinable and trianguable data "at a click" would be desirable in both classroom settings and research proper – since very often one method used and evaluated alone cannot give insightful results. Today, however, triangulation is still a hands-on rather than an automatized job. (Dam-Jensen and Heine 2009: 16)

BBFlashback appears to be in harmony with the objectives of the present study and it does seem that researchers and trainers can enjoy a valid experiment along with immediate didactic benefits with one single tool. The selected software for process-data collection is not promoted as the single perfect solution; its limitations with regard to other tools and combinations thereof are recognized. On the other hand, it reflects a conscious effort for "synergetic refinement" (Jakobsen 1999: 11).

3.5.2. On translation phases

There are various classifications regarding translation phases or task-time distribution, such as the ones by Robinson (2003) and Gouadec (2007). Recently, however, most researchers seem to follow the three-phase model proposed by Arnt Lykke Jakobsen (2002), even if the nomenclature differs slightly (Table 3.3.):

1. Orientation phase or phase 1: "the time delay between the appearance of the source text on the screen and the typing of the first text production key" (Jakobsen 2002: 192)
2. Drafting phase or phase 2, lasting "from the first text production keystroke until the first typing of the final punctuation mark (or equivalent keystroke)" (ibid. 192-3), and
3. The end revision phase, phase 3, lasting "until the translator decides that a translation is ready to be submitted as finished" (ibid: 193).

Table 3.3. Recent variations on the three-phase translation model

Jakobsen (2002)	**Göpferich (2010)**	**Carl (2010, on Machine Translation)**
initial orientation phase	orientation or pre-phase	skimming
middle drafting phase	translation or main-phase	drafting
end revision phase	revision or post-phase	post-editing

I have modified Jakobsen's model by splitting phase 1 into two (Table 3.4) and using the following definitions to determine the phases of the translation process for the purposes of the present study. The main reason for splitting phase 1 into two (Preparation and Planning; Table 3.4.) in this particular *training* context was to avoid false orientation phases. Several participants were average PC users. A single, long orientation phase would place those who were looking into online resources and those struggling with their computing skills under the same umbrella.

1. Phase 1: Preparation, which lasts from the moment participants are given the go-ahead to open their source text files until the moment they type their first text production key. It may include actions such as resizing source-text and target-text windows and opening browsers.
2. Phase 2: Planning, which refers to time delay between the typing of the first text production key and the typing of the first text production key *in the target file*. It includes accessing potentially useful websites or even looking for source-text key terms but before writing anything in the target text file itself.
3. Phase 3: Translation, following Göpferich above. It lasts from the first text production keystroke in the target file "until the first typing of the final punctuation mark (or equivalent keystroke)" (Jakobsen 2002: 192-3). It is almost identical to Jakobsen's middle drafting phase, but, as the name suggests, emphasis is placed on

the translating process itself, irrespective of whether this phase results in a complete product or not.

4. Phase 4: Revision, which is considered to be a distinct phase. Under normal working conditions, Jakobsen's definition of the "end revision phase" would suffice: it lasts "until the translator decides that a translation is ready to be submitted as finished" (ibid: 193). However, a) on the basis of pilot C2008 findings where participants had delivered but did not think of their products as finished (cf. Chapter 4), and b) for the general purposes of the present study, revision lasts either as per Jakobsen's definition *or* until the expiry of the deadline, whichever comes first and irrespective of whether the participant considered the translation ready for submission or not.

Table 3.4. Proposed four-phase translation model for undergraduate training contexts

3-phase model (Jakobsen 2002)	Initial orientation phase		Middle drafting phase	End revision phase
proposed 4-phase model	Preparation	Planning	Translation	Revision

3.6. Product-related methodologies and instruments

3.6.1. The raters

3.6.1.1. Profile of raters and selection process

Two external raters were selected in a way that would minimize bias. The following five criteria were applied:

- The selected raters had not taught any of the participants;
- they did, however, have at least 5 years of experience working with this particular type of student, i.e. 1) students who study translation within a foreign-language department and, as a result, are considered to be foreign language students by many, and 2) students who study at undergraduate level.

- It was necessary that raters had prior teaching experience at both undergraduate and postgraduate level in order to be sensitive to the different levels of knowledge that students would be expected to have.
- It was also necessary for them to have professional working experience in translation outside academia, so as to offer a more practical perspective.
- Another feature sought was prior collaboration with me in similar circumstances e.g. exam marking, in an effort to minimize unexpected discrepancies.

The assessment grid was sent to the raters, along with instructions and the 157 translations grouped in four large files, one per topic. It should be noted that both C2009 and C2010 translations were sent to the raters. the purpose in this situation was to solidify inter-rater agreement by investing in as a large a sample as possible.

Raters were advised to grade translations per topic/text in order for them to be able to provide short comments concerning their impression of the group as a whole. A short discussion took place before the assessment, during which explanations concerning quality criteria and examples were provided to the raters. One randomly-selected translation was used as a pilot in order to test the assessment grid and facilitate homogeneity in grading. With this purpose in mind, raters were asked to discuss every case marked with more than two points difference between them. From a practical perspective, both raters would be compensated for their work after safe receipt of their grids and comments.

The two selected raters stopped working on the project soon after accepting it, due to conflicting schedules. Other candidates matching the above-mentioned desired profile were contacted. At the same time, the amount of compensation increased. Some candidates rejected the offer on remuneration grounds; others initially accepted but rejected the project after the final warming-up discussion or after receiving the translations; still others started working on the project but discontinued without offering any explanation.

Beyond solidarity and ethics issues, the assessment process became extremely time/cost-consuming and counter-productive. After a period of five months, following contacts with a total of 11 potential raters, it was decided to compromise on the number of raters for reasons of feasibility, yet adhere to the initial selection criteria. Since results from a single rater would not suffice in terms of objectivity, I decided to include results from my own assessment of the material as a second-best strategy, despite initial plans. It was

considered that the necessary ethical distance would be guaranteed by the fact that I had not been involved in any way with participants' translations after the process of anonymization, that is, for a period of 16 and 5 months concerning C2009 and C2010, respectively.[33]

In the end, all necessary material was sent to Rater 1. We evaluated a sample translation together in order to test the way we would proceed and in order for me to confirm the clarity of the criteria. We assessed translations per topic and text, that is, a maximum of 54 translations per day, in parallel. Although we did not share the same physical space, we made arrangements so that we would start, take breaks, and finish with comments at approximately the same time. Rater 1 was provided with marking guidelines. There were a few questions regarding interpretation of criteria during the rating process, but no discussion with an aim to reach consensus took place after rating. The reason behind risking inter-rater agreement was that any possible differences in grades might be systematic and reflect or highlight tendencies due to the different starting position of the raters in relation to C2010, such as familiarity with course content. Despite the fact that I had not dealt with participants' translations for a long period of time, it still remained a fact that I had taught the course where participants came from and I might still be biased, systematically assigning lower or higher scores for a specific criterion. It was thought that any findings ensuing from inter-rater agreement tests might even guide future researchers in translator training as regards bias.

3.6.1.2. Statistical calculation of inter-rater agreement

The Intraclass Correlation Coefficient (ICC), an index of the reliability of the ratings for two or more raters, was used for the C2009 and C2010 translations. It is employed when the intention is to collect most of the data using only one judge at a time. ICC showed that there is a strong overall agreement between Rater 1 and myself for all criteria concerned (Table 3.5, criteria 1-4, $p<0.001$). This meant that C2009 and C2010 grades for four of the

[33] It may be argued that C2009 texts could have been assessed earlier. In such a scenario, there would be no guarantee that the same raters would be involved. Even if the same raters were to work on both C2009 and C2010 sets, there might be an increased risk of discrepancy in results due to the time lapse between the two sets of assessment.

five quality criteria (Formal Correctness, Terminology/Vocabulary, Accuracy/Message Transfer, Textual Flow) would be the result of raters' grade average. Even in cases where the Intraclass Correlation Coefficient tends to have a value on the low side, the high sample (N=157) helped corroborate the strong statistical significance ($p<0.001$ for all cases). This was the main reason for including C2009 translations in the assessment in the first place. Following this clear validation of inter-rater agreement, the C2009 translations were not included in any further analyses because the software glitch described in Chapter 5 prevented them from being directly comparable vis-à-vis C2010 translations.

Table 3.5. Inter-rater agreement per criterion per time frame

Tasks	Criteria	Rater 1	Rater 2				
		Mean1	Mean2	Overall Mean	Std. Dev. 1	Std. Dev. 2	ICC*
30' N=50	FCorr	6.59	6.69	6.64	1.16	1.41	0.878
	Term/Voc	6.33	6.17	6.25	1.26	1.27	0.791
	Acc/MTr	6.43	6.24	6.33	1.41	1.43	0.802
	TFlow	6.65	6.56	6.60	1.31	1.41	0.813
20' N=54	FCorr	6.72	7.22	6.97	1.036	0.965	0.722
	Term/Voc	6.26	6.70	6.48	1.18	1.08	0.798
	Acc/MTr	6.67	6.80	6.73	1.06	1.02	0.703
	TFlow	6.78	7.20	6.99	1.21	0.99	0.822
15' N=53	FCorr	7.00	7.17	7.09	0.81	1.11	0.713
	Term/Voc	6.58	6.72	6.65	0.97	1.08	0.707
	Acc/MTr	6.60	6.77	6.69	1.08	1.09	0.742
	TFlow	7.13	6.92	7.03	0.83	0.92	0.690

*$p< 0.001$ in all cases.

3.6.2. Qualitative assessment

3.6.2.1. Translation quality criteria

Product assessment (N=157) for C2009 and C2010 was based on four rater-dependent criteria on a scale out of ten, following substantial conceptual modifications taking place after the C2008 study. Both C2009 and C2010 translations were assessed in order to have a larger sample for subsequent testing related to inter-rater agreement.

Quality was originally defined as "camera ready work, i.e. work readily available for publication" for the purposes of the C2008 pilot (for a relevant discussion, see Chapter 4). It described high quality, however, and it would be associated with a less flexible approach, not in tune with a pedagogical perspective. The definition in 3.1. above, where quality is considered to be "a feature of a translation which, in our pedagogical context, is coherent with course syllabus and corresponding learning objectives and complies with the assignment as to the audience and the degree of completion", was now based on the expectations of third-year students. It was fine-tuned and reformulated to be consistent with course learning aims and syllabus, thus further positioning the study within the pedagogical realm.

The assessment instrument had to be modified as well along three axes, and a balance had to be negotiated among them: the pedagogical, the empirical-scientific and the professional. The twin assessment scale employed in the C2008 study, adapted from González Davies (cf. Table 4.1), was teacher-friendly. It covered both numerical/pedagogical and professional/holistic assessment and it used the numerical marking scale out of 10, also the current practice in Greek tertiary institutions, while being compatible with the definition of quality as stated in the C2008 study and above. From a pedagogical viewpoint, and since a pedagogical definition of quality was chosen for the C2009 and C2010 product assessment instead of a professional one, I now wanted the assessment grid to be more related to course-specific reality because it would then be applicable and replicable without further modifications in class and become transparent to students, thus enhancing ecological validity. This was compatible with the fact that participants were not expected to work as professionals at the current stage of their studies. After the pilot and as regards the empirical-scientific aspect, assigning an overall mark out of 10 per product was seen as inadequate because this numerical marking had provided weak correlations in the pilot. There was a need to break this single mark into meaningful criteria that might reflect differentiations in terms of learning styles later on. Moreover, a single grade might encourage rater subjectivity ("curving" grades depending on the batch of translations at hand) more that if it were broken down in specific criteria. At the same time, it might yield insufficient information restricted to surface-level overgeneralizations regarding translation products. Statistically speaking, the pilot had shown that there would

be an uncomfortably high number of variables to work with while essentially having two instruments and running two analyses (numerical and holistic) in parallel. As a result, I opted for four quality criteria which would be easily understood by the students but kept the marking scale out of 10, assuming that these four criteria would reflect participants' time-constrained performance in a more accurate manner.

The quality criteria were based on the set of revision parameters proposed by Brian Mossop (2001: 99-113, based on Chandler 1993) and already used by Kevin Costello (2010: 12) in postgraduate training: formal correctness, terminology/vocabulary, accuracy/message transfer, textual flow.[34] The grouping of parameters was modified as well (Table 3.6). Although both Mossop and Costello focus on professional revision, it may be argued that these same factors actually apply to translation quality in general, on the assumption that the smaller the need for revision, the higher the quality of the translation is considered to be (see also Kiraly 1995).

[34] Mossop's and Costello's "Group D: Problems of physical presentation" was excluded as it did not present a challenge in the current setting.

Table 3.6. Modifying Mossop's professional revision parameters

PROPOSED CRITERIA				
ACCURACY – MESSAGE TRANSFER		TEXTUAL FLOW	TERMINOLOGY VOCABULARY	FORMAL CORRECTNESS
Mossop's Group A	Mossop's Group B		Mossop's Group C	
Problems of meaning (Transfer) Accuracy: Does the translation reflect the message of the source text? Completeness: Have any elements of the message been left out?	Problems of content (Content) Logic: Does the sequence of ideas make sense? Is there any nonsense or contradiction? Facts: Are there any factual errors?	Problems of language and style (Language) Smoothness: Does the text flow: Are the connections between sentences clear? Are the relationships among the parts of each sentence clear? Are there any awkward, hard-to-read sentences? Tailoring: Is the language adapted to the users of the translation and the use they will make of it?	Sub-language: [Is the style suited to the genre?]* has correct terminology been used, and does the phraseology match that used in original target-language texts on the same subject? Idiom: Are all the word combinations idiomatic? Does the translation observe the rhetorical preferences of the target language?	Mechanics: Have the rules of grammar, spelling, punctuation, house style and correct usage been observed?

*Questions of style are assessed under "Textual Flow"

Mossop's work is to be used in class or "as a basis for professional development workshops" (Mossop 2001, cover). Subjectively-measured criteria themselves were kept down to four in an attempt to keep the grid as simple as possible. Completion was formally added as fifth quality criterion according to the revised definition of quality, as advocated by Orlando (2011: 302) and in a way similar to Ehrensberger-Dow's and Künzli's error scheme categories (2010: 129 note). Completion consisted of a percentage reflecting how much text had been translated, calculated on the basis of translated source text word count (Table 3.7). [35]

Table 3.7. C2009 and C2010 quality criteria

C2009 and C2010 Quality Criteria

Formal Correctness: (spelling, punctuation, grammar, syntax)	Terminology – Vocabulary	Accuracy – Message Transfer	Textual Flow: (incl. cohesion, coherence, fluency)	Completion (per ST word)
Out of 10	Out of 10	Out of 10	Out of 10	%

Despite the arbitrary nature of scales, this approach yields useful information for application both in class and in research. The quality criteria are consistent with the pedagogical setting and syllabus because they reflect material familiar to students that was already dealt with in class; it is to be assumed that students would tend to work having a similar frame in mind. Students do receive an overall grade but, when they see their specific grades concerning Formal Correctness [36], Terminology-Vocabulary, Accuracy-Message Transfer, Textual Flow, they gauge possible areas of improvement and they may determine the amount of effort *each* one of them needs to invest in their performance en route toward translator competence. Trainers may become aware of general tendencies in class and adapt training accordingly. The yardstick is admittedly pedagogical quality. Nevertheless, there is no reason why the scale may not be used in professional

[35] Completion as a quality criterion is discussed in detail in 3.6.1.2.

[36] I would like to thank Professor Göpferich for suggesting the term "Formal Correctness" as a substitute for the less transparent term "Mechanics" I had borrowed from Mossop (2001) and Angelelli (2009: 40) and the term "Textual Flow" instead of the more limited term "Fluency" (personal meeting, spring 2011).

environments since several aspects overlap, although expectations may differ. For example, both trainers and clients would expect to receive typo-free translations with correct punctuation and grammar (Formal Correctness). Both trainers and clients would expect appropriate use of terminology but corresponding demands would probably differ in intensity. From yet another perspective, product-oriented researchers may acquire a wealth of quantifiable and statistically flexible data with the proposed scale.

3.6.2.2. The issue of incomplete translations

Quality was assessed on the basis of five criteria: four were rater-dependent (1-4) and one (5: Completion) was objectively measured by word count, given that many participants had not delivered complete translations. The problem of fairly evaluating products of *varying degrees* of completion arose.

From a rater's point of view, assigning a maximum of 5/10 for a perfectly rendered yet half-translated piece would be easy, but having a rater (or even a trainer) calculate a mark if only 30% or 85% of the source text were translated would prove highly problematic. With a view to reducing this type of subjectivity, Rater 1 and I evaluated the material *present*, disregarding lack of completion. In other words, two perfectly translated lines of a text would be assigned the highest mark possible, in this case 10/10, for criteria 1-4 within the grid; a complete translation with occasional weaknesses would receive a lower grade.

Rater 1 already knew that the study involved time constraints but she was not provided with the specific time frames; the way the products were presented prevented me from seeing the exact time frames too. By not considering this variable, the aim was to minimize mark fluctuations due to leniency. On the other hand, Rater 1 was advised to take into consideration the general level of undergraduate students, while being as realistic as possible in her grading, in terms of professional expectations. Appendix E.3 shows all (raw) grades awarded by Rater 1 and myself on a scale out of 10, along with word counts and the corresponding percentages of completion.

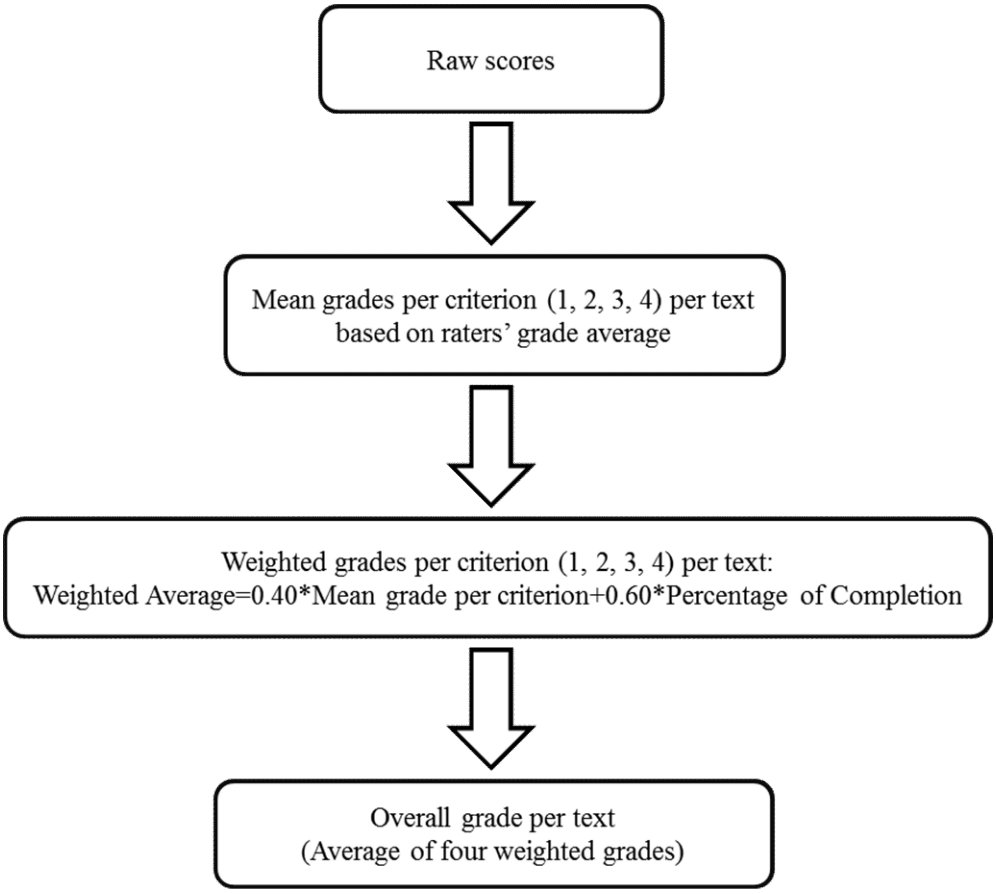
As for completion per se, in an authentic class setting, it could be calculated out of 10, as just another (equal) quality criterion, to provide students an indication of yet another area they may have to work on. However, for the purposes of the present empirical study,

completion works as a criterion for time too. Having completion as an equal quality criterion would, in essence, penalize those who put effort into complying with task guidelines under set time frames (Table 3.2), thus striving to deliver a complete product. For example, completion as an equal quality criterion would rank complete translations of medium quality (criteria 1-4) *under* half-translated products of high quality (same criteria 1-4), contrary to task guidelines.

The imbalance had to be leveraged in terms of final product-ranking. Consequently, on top of counting the source text words missing from each incomplete product, thereby calculating the percentage of completion, I used a statistical weight before presenting the final qualitative ranking to make sure that complete translations would appear at the top of the list, thus also avoiding direct (and subjective) involvement by me and Rater 1 in this respect. What this statistical weight meant was that criteria 1-4 would count for 40% of the final grade, while criterion 5, completion, would count for more, 60%, in order to see whether an 8 out of 10 in, for example, Accuracy, was really an 8/10 in relation to the whole text.

For example, one participant received an average grade of 6/10 for Formal Correctness, a grade of 5/10 for Terminology/Vocabulary, a grade of 6/10 for Accuracy/Message Transfer and another 6/10 for Textual Flow by the two raters and finished her translation, that is, she received 100% for degree of Completion. Since criteria 1-4 count for 40% of the final grade and Completion counts for 60%, her weighted grades would be 8.4/10, 8/10, 8.4/10 and 8.4/10, respectively. Finally, the average of all five criteria is calculated to provide a single overall grade per text per participant, again on a scale out of 10; in the case of this specific participant, that grade would be 8.3/10. Those students who strove to complete their translations adhering to task guidelines are "rewarded" thanks to the statistical weight of 60% in favor of the completion criterion, even if they provided a text of compromised quality as regards criteria 1-4. Figure 3.3 illustrates the function of the statistical weight and the process of grading.

Figure 3.3. Use of the statistical weight in the grading process



This approach facilitates data management of participants' product-dependent performance from various angles (per criterion, per time frame, etc.). It also covers all possibilities mentioned below and facilitates clear data processing:

- complete translation (criterion 5) and good quality (criteria 1-4)
- complete but low quality
- not complete but medium quality
- not complete but good quality
- not complete and low quality (González Davies 2011: personal communication)

In Chapter 6, these results are recast in smaller tables for added clarity. C2010 results are presented per quality criterion: Formal correctness, Terminology/Vocabulary, Accuracy/Message Transfer and Textual Flow. Mean grades, that is, participants'

calculated grade averages out of 10, are presented first. Then the fifth criterion of degree of Completion is calculated and "embedded" within each criterion to create a set of four *weighted* grades. This offers a prediction of what the final grade for a specific criterion might have been had the participant finished the translation.

3.6. Participant-driven and problem-specific data collection

Following product evaluation per se and corresponding participant comments, there was a need to shift attention vertically toward more specific performance variables, such as key translation problems. Analysis of work on certain problems might provide a justification for product-quality fluctuations in relation to time and might also reflect differences in individual features, such as learning styles.

A problem was defined for the purposes of this study as any non-automatic translation, i.e. any incidence where participants had "stumbled"[37] on an item, be it a term or a phrase or any other aspect of a textual nature (syntax, style, etc.) and had stopped to reflect about their next move. This implied that an item that is a problem for one participant might not seem problematic to another and, in this sense, it corresponds to Nord's usage of the term "difficulty" (2001). The majority of problems would become visible when looking at screen-recording files, although an exhaustive list and consequent analysis was beyond the scope of the study. Another point to be repeated is that the texts were authentic, i.e. there were problems relevant to course objectives but no "planted" problems to rely on, a parameter which increased the challenge in problem selection. Nevertheless, the use of authentic texts was in tune within the wider, largely authentic pedagogical setting and might serve as a guide in less-than-ideal situations for both trainers/trainees and researchers alike.

Participants were asked to report on a maximum of five problem areas, presenting those of greatest difficulty in their retrospective questionnaires (Appendix D.2). This reporting would overcome the inherent subjectivity of problem selection if I were to choose

[37] This metaphor stands close to Leppihalme's description of "culture bumps" (1997).

potential problems. It would also be meaningful in terms of pedagogy because, in a training environment, it would provide the trainer with a list of potential issues to work on for the maximum benefit of trainees, especially in combination with an IPDR or a WP. The creation of such a list by the participants for the participants themselves was chosen over the more traditional tactic, where the teacher compiles a list of the most frequent "unsuccessful" translations found for discussion in class, which means that comments are made on the *final* solutions and might not address the root of *students'* difficulties and even ignore decent attempts from the students.

Going back to data collection, both the C2009 and C2010 retrospective questionnaires were used for the selection of problems so that the most representative problems would be chosen, although only C2010 data were considered for subsequent analyses. C2009 participants had provided scant information in relation to pertinent items (see Chapter 5) in their retrospective questionnaires and semi-structured interviews had taken place soon after the experiments to prevent data loss[38]. The C2009 interviews were transcribed and answers were also included for problem selection. Distinctive notes were included so that data from different sources and classes would not be mixed. Two lists (one for C2009 and another for C2010) were drawn per text, including all problems mentioned by students. Certain problems were erased from the initial list when, after juxtaposition with the rest of the questionnaires and interviews, it was found that they were located in text areas the participant did not have time to translate.

3.7. Between product and process: the case of procedures

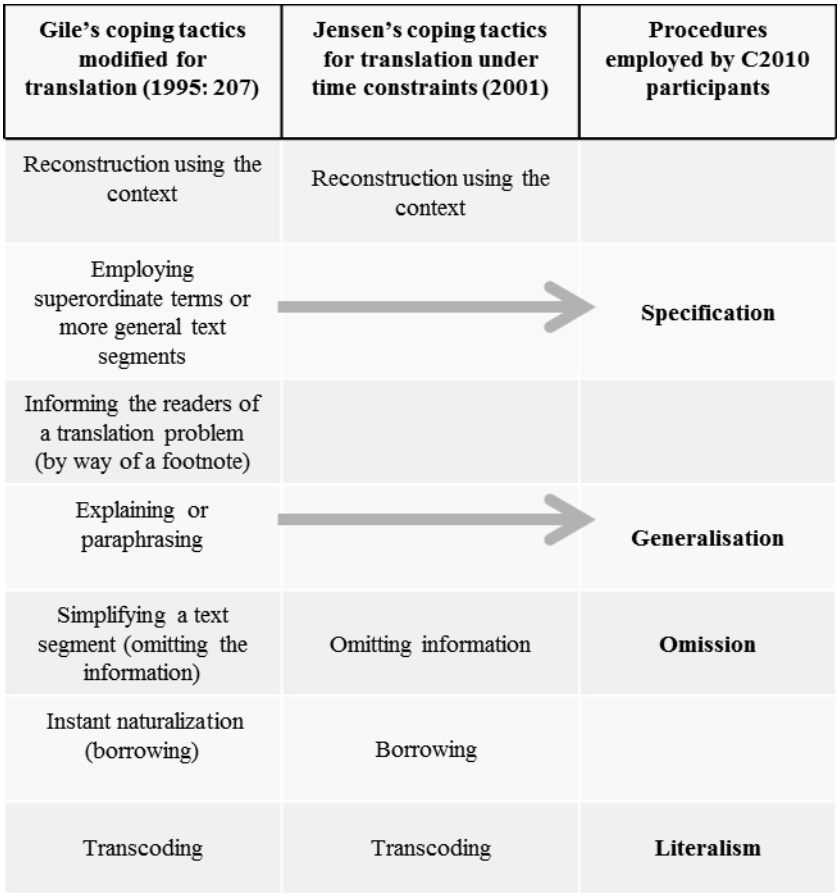
Another specific performance variable, procedures, was examined mainly because the choice thereof might reflect differences in learning styles. Procedures constitute a smaller and less clear-cut subcategory, albeit of importance for both pedagogical and professional practice and for the purposes of the present study. The term is borrowed from Pym (2009) and it is also used in González Davies (2004). Many researchers call them "strategies"

[38] Participants answered orally the same items they had not answered in writing.

(Krings 1986b; Gerloff 1986; Séguinot 1989; Lörscher 1991, 1996; Jääskeläinen 1996; Chesterman 1998); others, like Gile (1995, 2009) call them "(coping) tactics". "Procedure" was chosen over other terms because it has the potential to become an umbrella-term: it is considered to be a simple, neutral word from everyday life labeling a set of steps leading to a specific result for the purpose of specific problem-solving (modified from Scott-Tennent et al. 2001: 23). A successful procedure leads to a desired result, however this is defined, but a procedure is neither successful nor unsuccessful on its own: its ad hoc contextualization assigns it with a positive or negative value. "Procedure" is also flexible as a term because it encompasses sets of steps taken consciously or intuitively as well as nuances in-between ("potentially conscious" plans or procedures as cited in Lörscher 1991 and Krings 1986b), depending on the situation. In this respect, "procedures" deviate from Scott-Tennent's et al. original definition of "strategies" as "the steps, selected from a consciously known range of potential procedures, taken to solve a translation problem which has been consciously detected and resulting in a consciously applied solution" (ibid.). The reason is that this definition excludes *intuitive* solutions that, in tasks analyzed for this study, might reflect differences in learning styles.

In this context, procedures are not considered a clear-cut category because, although they are product-based, they describe a process. I worked from Gile's set of coping tactics in simultaneous interpretation and, in particular, the set of reformulation tactics (1995: 197-201) for a classification and selection of pertinent procedures for this study because the translation tasks for this project included time constraints, echoing similar issues in interpretation. I also worked from Jensen's further modifications (2001) because my project was closely related to Jensen's. Figure 3.4. presents the two lists, by Gile and Jensen, as well as the list of procedures used in this study.

Figure 3.4. List of procedures



Gile's coping tactics modified for translation (1995: 207)	Jensen's coping tactics for translation under time constraints (2001)	Procedures employed by C2010 participants
Reconstruction using the context	Reconstruction using the context	
Employing superordinate terms or more general text segments	→	**Specification**
Informing the readers of a translation problem (by way of a footnote)		
Explaining or paraphrasing	→	**Generalisation**
Simplifying a text segment (omitting the information)	Omitting information	**Omission**
Instant naturalization (borrowing)	Borrowing	
Transcoding	Transcoding	**Literalism**

One modification in relation to Gile's coping tactics is that I reduced procedures down to four, as Jensen did for her project, but data led to a different set categories from the one used by Jensen, confirming initial expectations that course participants at this level (beginner) would either avoid translation of items or adopt rather conservative approaches, reminiscent of Faerch and Kasper's reduction strategies (1983). The following points were taken into consideration for this study:

1. Omission includes all types thereof, such as instances of strategic omission or avoidance, accidental omissions because participants left a gap for later processing but forgot to come back to translate it, etc. Cases where participants had not reached that part of the text are not counted as omissions, however.

2. Literalism is synonymous with word-for-word or segment-for-segment translation. It coincides with Gile's "transcoding" since, in most cases, it is near-isomorphic. For

example, “low pressure pocket” is rendered as “τσέπη υψηλής πίεσης” (“pocket of low pressure”, where the literal word for “pocket” is used).

3. Specification: an expression of a statement or text in other words; a restatement, rephrasing, rewording. The difference in relation to Gile’s “paraphrasing” is that it does not necessarily include explanations. It rather implies specificity in this setting. For example, “threshold frequency” is rendered as “οριακή συχνότητα” (a near synonym of “threshold” is used to mean “near set limit”)

4. Generalisation: a roundabout way of expressing something; circumlocution (ibid.). It is considered to be the other side of specification because it is also a form of restatement. It feels more vague, however: corresponding translations are usually rendered in significantly more words than in the original. For example,

“Coriolis effect” is rendered as “το φαινόμενο απώλειας ικανότητας προσανατολισμού” (“the phenomenon of losing the ability of orientation”).

3.8. Summary

In this chapter, I have defined the main variables for this study - learning styles, quality and time constraints – in an operational manner. Efforts to ensure a highly homogeneous group of participants were highlighted and the necessity to use texts of similar *translation* difficulty was justified. A single, low-cost and simple-to-use software tool was selected for process analysis with the intention of strengthening ties between authentic the classroom environment and research laboratories, compensating for any loss in granularity. Professional revision parameters were turned to quality criteria and a product-ranking model was developed to factor in the incomplete translations by the participants. Finally, a student-driven list of problems and a set of procedures to solve them were compiled in view of further analysis which might reveal differences related to participants’ learning styles.

Chapter 4. Pilot study (C2008) and findings

In this chapter, the initial exploratory study carried out during academic year 2007-2008 (C2008) is presented, along with its preliminary findings. The pilot study covers the need for additional background information which, if included in Chapter 3 would risk becoming a disorientating deviation. Second, this chapter provides an opportunity to demonstrate the process that led to the full-fledged experiments analyzed in Chapter 5.

4.1. Aims

The 2008 study prepared the ground for examining the relation of learner styles with translation quality under time constraints within a pedagogical setting. Its aims were the following:

1. to clarify the relation between translation quality and time, testing whether change in task time affects translation quality;
2. to test definitions of key concepts;
3. to test a variety of instruments in order to choose the most appropriate ones for the main study;
4. to check whether and how such experimental tasks could be carried out in the given environment from a practical viewpoint.

Learner-style theory was later employed in a highly exploratory manner and the following aim was added:

5. to group participants into categories on the basis of their learning styles so that variables that might prove of interest for the main study would emerge.

This exploratory study, hereafter called C2008, was carried out during the Spring semester of 2008 with the academic/pedagogical setting in mind. Additional effort was invested to make it as ecologically sound as possible, meaning that it was hoped that its experimental findings would reflect real-life situations in the classroom.

4.2. C2008 definitions of pertinent concepts

The following definitions were used in the pilot study:

Time pressure[39] occurs when time for a task is sufficient for spontaneous translation but not enough for a translator to change their first rendition (Hansen 2005: 74).

Time ecology is a measured time economy, and is put forward as an attempt to strike a balance between speed and slowness, while respecting natural time rhythms and measurements (Seiwert 2001: 18).

Quality work is defined as camera-ready work, i.e. work readily appropriate for publication. "Readily appropriate" is operationalized by including the (overriding) criterion of finishedness and the criterion of efficiency as related to the need for revision (or lack thereof).

Learning style: an innate pattern of thinking, perceiving, problem solving, and remembering when approaching a learning task (Cassidy 2004: 48).

It is worthwhile noting that many of the definitions were modified for the main experiments for example, the definition of quality (cf. Chapter 3) and the definition of "learning style" (cf. Chapters 2, 3).

4.2.1. The rationale behind quality and assessment for C2008

I had paid attention to De Rooze, who defines quality in relation to productivity, after Katzan, as the sum of product or service attributes which reflect a certain capacity to satisfy a series of necessities (De Rooze 2003: 252, our translation from Spanish). De Rooze

[39]The term 'time pressure' was used for the purposes of the pilot study instead of "time constraints', the term used for the main experiments and throughout the thesis for reason analyzed in Chapter 2.

further restricts this definition for his study, making quality a concept based on professional acceptability and degree of necessary revision according to the scale set out by Waddington, to be discussed further below (ibid.). The concept of "professional acceptability" alone, however, was too vague for this study.

Klaudy seems to confirm this definition of quality when she states that "the only correct criterion for quality assessments of students' translations is the amount of time required to transform them into print-ready texts" (1995: 202). Klaudy's view is supported by many scholars such as Schmitt (1997), Kiraly (2000) and Nord (2005).

In a similar tone, Kiraly admits that, in practical terms, his view of quality is based on how much time he has to spend making necessary changes to meet his own criteria of acceptability before he can send the job on to the client (2000: 158). He emphatically stresses, "[t]he less time I have to spend editing, the better the job" (ibid. and for more information cf. ibid. 160-161). Moreover, Schmitt provides an example regarding efficiency: a wrong term that has been used consistently and can thus be corrected by a mere search-replace procedure of the text processing program, may be considered less serious a mistake than an inappropriate sentence structure reproduced from the source language which does not conform to target-culture style conventions and can only be corrected by restructuring the whole paragraph (1997: 307).

From yet another perspective, Klaudy mentions that "it is very difficult to find trainers who are teachers and revisers at the same time or have experience both with teaching and editorial work" (1995: 204). Klaudy's comment calls for attention to the teachers/assessors themselves, since not all of them have the skills or experience to provide the same kind of (appropriate) feedback. Besides teacher competence, speed also plays an important role. I would again agree with Kiraly when he points out that all this merely embodies "an acknowledgement of the intersubjective processes underlying real-world translation work" (1995: 159).

These intersubjective processes explain the existence of varying assessment types and the high number of assessment scales. These include the scales by Hönig (1998), House (1997), Chesterman (1998) and Kussmaul (1995), although according to Kiraly's definition above they are to be taken as "evaluation processes" (2000: 141).

House's model (1997, 2000), according to Rothe-Neves (2003) demonstrates a scientific approach, where the quality of the target text (TT) is presented as a degree of similarity of the TT in relation to that of the source text (ST) (2003: 117). Her model, however, was directed towards translation as an L2 classroom auxiliary exercise, and this might pose limits if it is ever used as a tool to investigate translations as an end (ibid. 116).

Nord's early scale seemed a likely candidate because it was designed for didactic purposes within the framework of translation teaching. Based on the assumption that "it is unlikely that there will be any texts which present only a specific set of translation problems" (1991: 171), she lists systematically all translation problems contained in a text (a total of 100) and subtracts "a 100 per cent limit of possible points" (ibid. footnote). The problem with this and similar approaches was that they are distanced from the real-world criteria for translation quality assessment I wished to include and develop, and it would be very time-consuming. On the other hand, assessment without reference to the source would constitute an undesired extreme because it would call for comparisons with translations by professional and that would compromise the feasibility of this study.

Waddington's work (1999) proved to be of great value because it provided a variety of scales. In fact, De Rooze used a model proposed by Waddington (2001), albeit slightly modified. While Waddington proposed a holistic mark based on five pre-established criteria bands, ranging from complete to very deficient information transmission, De Rooze deleted the middle band for more convenient distribution of results, since he used external evaluators. The scale was flexible as the holistic mark corresponded to a range of numerical marks and, therefore, there was no need for conversion. De Rooze, however, was examining the novice vs. expert paradigm. A scale with more marking options and one that would easily be applied in class would provide for a more accurate picture of student performance in an ecological manner. I would, however, agree with Waddington on another issue, as his results seem to corroborate that there is the possibility that translation quality can be grasped in a more reliable way by combining analytical assessment methods with holistic ones, but not by the use of the latter in isolation (2001: 32).

Rothe-Neves (2003) focuses on how to provide empirical information that allows a researcher to compare translations on the basis of quality. She constructed an elaborate quality scale using external evaluation and appropriate statistical tools to investigate

reliability, however, the path of external evaluation was not an option for the purposes of the pilot study. Based on Ransdell and Levy's scale for empirical research on writing quality (1996) and Stolze's list of questions by clients of translation services (1997), this scale seemed a good tool for research purposes but it did not seem teacher-friendly for use in a pedagogical setting.

In the end, the scale suggested by González Davies was used (2004: 33-34) for the C2008 pilot study because it was efficient, fast and easy to apply in a training environment with a high number of translations. She proposes a twin assessment scale, that is, students can be assessed both numerically and holistically at the same time. The numerical marking would cover the pedagogical aspect, while the holistic marking would reflect the professional aspect (cf. 4.7.2).

4.3. Participants

The participants for this background study were 30 students from the School of English Language and Literature, Aristotle University of Thessaloniki, Greece, in their third year of studies, from my course "Scientific and Technical Translation Workshop". They were divided into two groups of approximately equal academic ability on the basis of their general grade average up to that point, as stated in their diagnostic sheets for the course. The diagnostic sheets were the only evidence related to their general academic performance at that time. Each group consisted of fifteen students. These students seemed to be appropriate participants for this study because they shared a relatively homogeneous profile (cf. Chapter 3).

Although the sampling of only the most competent students would have its merits, preference was given to a naturally-arising mixed-ability group of studentsin order to simulate an authentic class setting. In the end, all 30 students in C2008 participated, as indicated in Table 4.1.

Table 4.1. C2008 grade average breakdown (3rd-year students)*

Grade (out of 10)	Participants	%
5-6	5	16.6
6-7	13	43.3
7-8	8	26.6
8-9+	4	13.3.

*Based on students' approximations from their diagnostic sheets for the course.

4.4. Text selection

The criteria concerning text selection have already been discussed in Chapter 3. For this pilot study, I had initially selected *four* texts (Appendix C) that groups of comparable students who had attended the same course in preceding years had rated as of "medium" translation difficulty. These students had assigned a "3" on a five-point scale, where "1" corresponded to a very easy text and "5" corresponded to a very difficult text *they had already translated*. I predicted these texts would offer all participants an opportunity to comment on their experience, providing sufficient material for the larger study.

4.5. Task guidelines

Nord's functionalist approach was applied in drafting the task guidelines for the pilot, as discussed in Chapter 3. The initial task guidelines for the pilot were the ones used for the main experiments as well and are repeated here for reasons of convenience (Table 4.2).

Table 4.2. C2008 Task guidelines

Task:
You are asked to translate the following text from English into Greek.
Your commissioner:
The Greek newspaper "*Καθημερινή*".
Your status:
You are working as a junior translator for them.
Target readership:
The newspaper is addressed to the educated general public. The text you deliver will be included in the Sunday edition, in "*Επιστήμη*" (Epistimi/Science) section.
Source:
The text is taken from Curt Suplee's book *The New Everyday Science Explained*, a National Geographic edition (2003).
Situation:
The text you deliver will be included in "*Επιστήμη*" (Epistimi/Science) section as is because there is no time for proofreading/editing.
Deadline:
Please check your group code.

4.6. The experiment setting

The experiment was conducted in the computer room of the Faculty of Philosophy (20 computers). Students had access to the internet and to the same hard-copy dictionaries (general and specialized, monolingual and bilingual). The computers were only used for internet access, while the translations were to be *hand-written*. One reason for this was to increase the homogeneity of the groups and minimize or even eliminate typing speed as a variable, since many students were very slow typists, despite the fact that this feature distanced the experiment from professional reality. Another reason was that software that could have been used to monitor the translation process was either unavailable or called for system's administrator rights, a requirement that could not be met at that stage.

There was no contact among participants during the experiment. The room setting guaranteed that they were not able to look at each other's computer screens. The participants were advised not to distract their fellow participants.

As mentioned, the participants were divided into two groups of comparable academic level, on the basis of their stated grade average. Each group consisted of 15 students. On

day 1, group A participants were provided with information regarding the nature of the experiment. Then group A participants were asked to start filling in the pre-test questionnaire, based on Pavlović (2007), concerning their background (Appendix D.1). When everyone had finished, they opened the first package, which had been placed in front of them. The first package on the first day included the task guidelines and the first text to be translated (T1). After this first set of tasks had been completed, they took a short break. When back in the computer room, they started working on the second package, which included task guidelines, the second text to be translated (T2), and questionnaire 2, including modified elements from De Rooze's questionnaires (2003, Appendix D.2). On day 2, group A followed the same procedure as regards texts 3 and 4. After filling in questionnaire 2, participants were handed the Felder and Soloman *Index of Learning Styles* and the corresponding scoring sheet. Group B followed the same procedure a few days after group A. The text order was reversed, however, in order to statistically test the equal difficulty of the texts. Table 4.2 summarizes the flow of the experiment. The design with the four different time frames resembles Jensen's in her main experiments. The purpose was to make sure that all volunteers would feel time pressure at some point.

Table 4.3. C2008 Experiment flow

	Group A		Group B	
	Pre-test quest.		Pre-test quest.	
Day 1	Text 1	30’	Text 4	30’
	Text 2	20’	Text 3	20’
	Quest. 2		Quest. 2	
Day 2	Text 3	15’	Text 2	15’
	Text 4	10’	Text 1	10’
	Quest. 2 ILS		Quest. 2 ILS	

4.7. Data organization

4.7.1. Data collection

The pre-test questionnaires were collected and checked to confirm whether consent for the experiment had been given: all participants had signed their consent. The questionnaires were also checked in order to ascertain whether students had worked as translators in the past or if there were significant differences regarding experience in general, since that meant that their output would be excluded as incomparable. All students met the criteria set out in 3.2.1.

A total of 120 translations (30 students x 4 time frames) were collected and anonymized to avoid possible personal bias during assessment. Each participant was assigned a unique identification number depending on the group they belonged to; participants from group A had numbers 1.1 to 1.15 and participants from group B had numbers 2.1 to 2.15. These numbers appeared on the translations. In the final list of students who participated in the present study, participants from group A were assigned numbers 1 to 15 and participants from group B numbers 16 to 30, respectively.

The translations were then grouped according to topic. They were reshuffled so that translations from group A and group B on the same topic would be mixed. Translations of

each text were assessed in one sitting, reshuffled and checked again for possible marking deviations.

4.7.2. Assessment

Before going any further, it should be recalled that, for the pilot study of C2008 only, quality was defined as camera-ready work, i.e. work readily available for publication. "Readily available" was operationalized by including the criterion of translation completion. This definition was revised (cf. 3.1) after the C2008 data analysis, as it was considered to be distant from present students' reality, essentially describing "high" quality. It lacked flexibility in terms of gradation and did not account for incomplete translations.

An adapted version of González Davies' twin assessment scale was used (described in detail in González Davies 2004: 33-34) for the C2008 pilot study because it was efficient, related to the C2008 definition of quality, fast and easy to apply in a training environment with a high number of translations. The twin aspect of the scale meant that translations were assessed a) numerically and b) holistically at the same time. The numerical marking in this case covered the pedagogical aspect (Table 4.4), while the holistic marking reflected the professional aspect.

Table 4.4. (Pedagogical) Numerical marking system by González Davies (2004: 34)

PROBLEM	MARKS*
Source Message:	
a. Not transmitted	minus 1 or 2
b. Incomplete without hindering message	minus 0.25 or 0.5
Source Text Comprehension: register, coherence, cohesion, syntax, vocabulary, word order, cultural references, etc	2 or 3 errors = minus 1
c. Transfer skills:	
d. Suitable application of translation problem spotting and solving skills	
e. Resourcing skills	
f. Appropriate completion of the translation commission.	suitable solution = plus 1 or 2 unsuitable solution = minus 1
Target Text Legibility: register, coherence, cohesion, syntax, vocabulary, word order, cultural references, conventions of presentation, etc	2 or 3 errors = minus 1
General impression	plus 1, no change, or minus 1

* General guidelines depending on the kind of error or on positive solutions. Total: 10

The complementary holistic marking includes three broad categories: 1) acceptable translations (AT), 2) acceptable translations which must be improved (ATI) and 3) unacceptable translations (UT). According to González Davies, these three categories are defined as follows:

> a. This translation transmits the source message, conforms to the target language conventions, and keeps to the assignment. It would be accepted with few or no changes. Acceptable translation – AT.
>
> b. This translation contains errors which could hinder the understanding of the text or which do not transmit part of the source message adequately. Acceptable translation, but must be improved – ATI.
>
> c. This translation contains several errors which imply a lack of comprehension of the source text. Problematic legibility of the target text. No evidence of problem

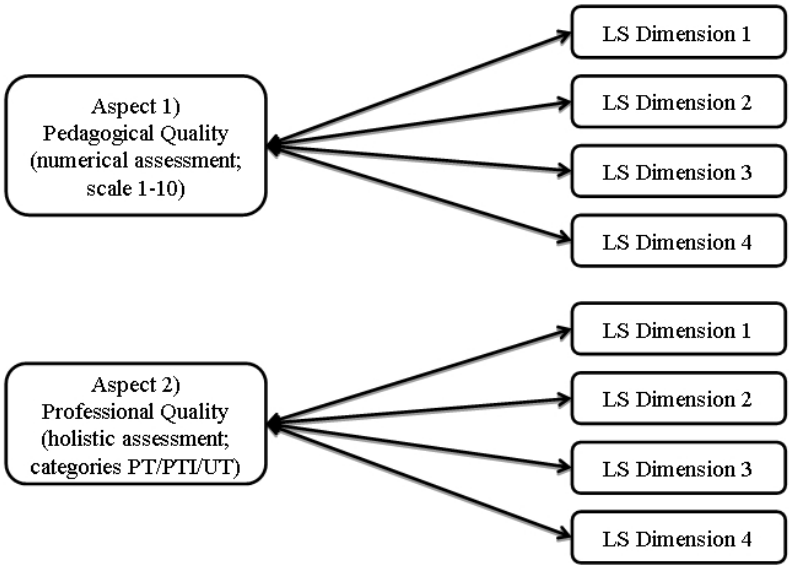
> spotting and solving, either with or without the help of strategies. Unacceptable translation – UT. (2004: 34.)

I re-named the categories above to include: a) publishable translations (PT), b) publishable translations in need of improvements/revision (PTI), c) unpublishable translations (UT) so that they would match task guidelines and be transparent to C2008 participants. Translations were characterized as UT when they were not complete or, in case of completed translations, when revision would take a considerable amount of time, disproportionate to the translation task.

As a result, marking according to two scales, the pedagogical/numerical scale and the professional/holistic scale was carried out. All resulting data were then analyzed with the SPSS 14.0 statistical tool. The Felder-Soloman questionnaires on learning styles were marked by C2008 participants themselves as per Felder's instructions concerning the pen and paper version (Felder and Spurlin 2005), then also checked by me before the data were used for statistical analysis, along with the quality-related data mentioned above. Data from retrospective questionnaires were analyzed at the end.

The grades awarded according to the assessment scale adapted from González Davies had to be made appropriate for statistical analysis. The numerical marking system (x/10) reflecting the pedagogical aspect of translation quality assessment, and the holistic marking system (PT, PTI, UT), reflecting the professional aspect, had to be treated as distinct variables. Similarly, all four continua provided by the Felder-Soloman ILS report form reflecting four dimensions of learner styles were treated as four separate variables and, therefore, analyzed separately against the time-quality factors (Figure 4.1).

Figure 4.1. Relating pedagogical and professional quality with learning style dimensions



4.8. C2008 profile and product-related performance overview

The frequency distribution per learning style dimension is presented in Table 4.4. The table indicates that very few C2008 participants, if any, occupy the extremes of all four dimensions. The majority of participants seem to concentrate around the center of each scale: numbers reach up to 60% for Dimension 1 and 63.4% for Dimension 4 (Sequential/Global). This implies that these participants are relatively balanced and might benefit from most teaching environments (Felder and Soloman 1993; Felder and Brent 2009).

Table 4.5. C2008: frequency distribution of learning style dimensions

	Dimension 1			Dimension 2	
actref1	Frequency	%	senint1	Frequency	%
very strong active	-	-	very strong sensing	-	-
moderate active	4	13.3	moderate sensing	9	30.0
fairly active	3	10.0	fairly sensing	11	36.7
fairly reflective	15	50.0	fairly intuitive	5	16.7
moderate reflective	7	23.3	moderate intuitive	4	13.3
very strong reflective	1	3.3	Very strong intuitive	1	3.3
Total	30	100.0	Total	30	100.0

	Dimension 3			Dimension 4	
visvrb1	Frequency	%	seqglo1	Frequency	%
very strong visual	3	10.0	very strong sequential	1	3.3
moderate visual	10	33.3	moderate sequential	5	16.7
fairly visual	7	23.3	fairly sequential	11	36.7
fairly verbal	5	16.7	fairly global	8	26.7
moderate verbal	5	16.7	moderate global	4	13.3
very strong verbal		--	Very strong global	1	3.3
Total	30	100.0	Total	30	100.0

The 30 C2008 participants produced a total of 120 translations of varying quality in relation to the pedagogical aspect (numerical marking). When the four time frames are not taken into account, 80.9% of the products are almost evenly spread within the 6-9/10 range, grade 7/10 being slightly more frequent (24.2%). Product-based performance given in table 4.6 seems proportional to participants' overall academic performance, presented in 4.3. (for a comprehensive list of C2008 results, cf. Appendix D.3).

Table 4.6. Numerical marking (Pedagogical aspect)

Grades	Frequency	%
1	1	0.8
2	1	0.8
3	2	1.7
5	11	9.2
6	23	19.2
7	29	24.2
8	24	20.0
9	21	17.5
10	8	6.7
Total	120	100.0

On the other hand, the observed frequency distribution in terms of publishability (Table 4.7) shows that half the C2008 participants did not produce a publishable translation, irrespective of time frames. The relative lack of convergence between the two sets of assessment already provides a hint that, although the majority of participants delivered rather satisfactory translations from a training viewpoint, they still have to work on the professional aspect of their performance (González Davies 2004: 33; 2011: personal communication).

Table 4.7. C2008: Holistic marking/Publishability (Professional aspect)

Categories	Frequency	%
PT	18	15.0
PTI	41	34.2
UT	61	50.8
Total	120	100.0

4.9. Testing text sequence

4.9.1. The (pedagogical) numerical aspect

Although all four texts had been ranked by groups of earlier students as texts of equal ("medium") translation difficulty, statistical analysis was also carried out to test the sequence of texts between Group A and Group B. A two-way ANOVA was employed in order to identify any patterned relation between mean grades (i.e. raw scores regardless of learning style factors) with respect to text and time variables. The mean grades per text and time are presented in table 4.8.

Table 4.8. Dependent variable: numerical grades

	Time	Mean	Std. Deviation	N
text 1	Group B 10'	7.47	1.36	15
	Group A 30'	7.67	1.11	15
	Total	7.57	1.22	30
text 2	Group B 15'	7.40	2.26	15
	Group A 20'	7.40	1.06	15
	Total	7.40	1.73	30
text 3	Group A 15'	6.47	1.60	15
	Group B 20'	7.40	1.30	15
	Total	6.93	1.51	30
text 4	Group A 10'	6.33	2.26	15
	Group B 30'	7.60	1.81	15
	Total	6.97	2.11	30

The results from Group A were tested against the results from Group B (numerical grades only) in order to test the sequence of texts, since the texts had been provided in reverse order to Group B. The ANOVA revealed no significant differentiation due to the text used ($F=1.583$, $p=0.210$). Similarly, there is no significant differentiation in (numerical) grades when the same text is delivered to be translated in two different time frames ($F=2.070$, $p=0.131$). Finally, numerical grades of Group A versus Group B were not found to differ significantly when the variable of text combined with the variable of time was taken into account ($F=1.376$, $p=0.257$), i.e. the average (numerical) grade was not affected by the interaction between change of time *and* change of text.

Thus, all four texts used in C2008 exploratory study may be considered to be of equal weight for the purposes of the general study and may be used interchangeably. No statistically significant difference was found regarding mean grades for text, time or interaction between text and time.

4.9.2. The holistic aspect (publishability)

Each text had been translated under two different time frames. Each text was also tested with respect to both these time frames and publishability, which was the second aspect of quality. The results indicate a significant effect of time on this aspect of quality when time is reduced by a third (30 minutes vs. 10 minutes) for the same text: $p=0.001$ when text1 is translated in under 30/10 minutes, while $p=0.046$ when text 4 is translated in under 30/10 minutes. At the same time, however, this test further corroborates that texts 2 and 3 are interchangeable as far as the 20 minute and the 15 minute time frames are concerned (Table 4.9).

Table 4.9. Dependent variable: holistic grades

		Publishability			
Text 1	Time	PT	PTI	UT	Total
	Group B 10	2	2	11	15
		13.3%	13.3%	73.3%	100.0%
	Group A 30	2	12	1	15
		13.3%	80.0%	6.7%	100.0%
	Total	4	14	12	30
		13.3%	46.7%	40.0%	100.0%
Text 2	Time	PT	PTI	UT	Total
	Group B 15	3	8	4	15
		20.0%	53.3%	26.7%	100.0%
	Group A 20	1	7	7	15
		6.7%	46.7%	46.7%	100.0%
	Total	4	15	11	30
		13.3%	50.0%	36.6%	100.0%
Text 3	Time	PT	PTI	UT	Total
	Group A 15	1	4	10	15
		6.7%	26.7%	66.7%	100.0%
	Group B 20	3	1	11	15
		20.0%	6.7%	73.3%	100.0%
	Total	4	5	21	30
		13.3%	16.7%	70.0%	100.0%
Text 4	Ttime	PT	PTI	UT	Total
	Group A 10	1	3	11	15
		6.7%	20.0%	73.3%	100.0%
	Group B 30	5	4	6	15
		33.3%	26.7%	40.0%	100.0%
	Total	6	7	17	30
		20.0%	23.3%	56.6%	100.0%

The testing of text sequence produced some interesting initial findings regarding the relation of task time and average quality. In general, Table 4.7 seems to indicate that when

the first aspect of quality *on the average* (numerical grades) is seen as time decreases, there is only a slight compromise. For example, Group A scored 7.67/10 on the average when they worked with a 30-minute deadline and 7.40/10 on the average when they worked with a 20-minute deadline. The results for Group B are similar: they scored 7.60/10 when they had 30 minutes at their disposal and exactly 7.40/10 when they had 20 minutes. An additional ANOVA including the numerical grades of both groups in relation to all four time frames confirms that the slight differences in numerical grades do not reach statistical significance (Table 4.10).

Table 4.10. Relating numerical grades to time frames

Time	N	Mean (Grades)	Standard Deviation	Std. Error	Lower Bound	Upper Bound	Min.	Max.
10	30	6.90	1.918	0.350	6.18	7.62	2	10
15	30	6.93	1.982	0.362	6.19	7.67	1	10
20	30	7.40	1.163	0.212	6.97	7.83	5	9
30	30	7.63	1.474	0.269	7.08	8.18	5	10
Total	120	7.22	1.676	0.153	6.91	7.52	1	10

Grades	Sum of Squares	df	Mean Square	F[40]	p
Between Groups	11.633	3	3.878	1.394	0.248
Within Groups	322.733	116	2.782		
Total	334.367	119			

On the other hand, the second aspect of quality, publishability, reflecting the professional perspective, seems to be quite compromised on average when task time decreases. For example, under the 10-minute time frame, 73.3% of translations from Group A and exactly 73.3% of translations from Group B as well were characterized as unpublishable (UT) (Table 4.8). Since, however, publishability depended partly on completion and completion in turn was seen in a binary mode (that is, irrespective of its

[40] F is an indicator on the basis of which p values are calculated.

degree) only for this C2008 exploratory study, the categories above may show that the translations were not complete but not how much text was missing. As a result, they can only be interpreted as rough estimates.

4.10. Learning-style-based analysis

4.10.1. Testing pedagogical aspect of quality (numerical marking) per learning style dimension

Factorial analysis of variance was employed in order to test the dependent variable numerical marking. Text and time were the independent variables and all four learner-style dimensions (Dimension 1: active/reflective, Dimension 2: sensing/intuitive, Dimension 3: visual/verbal, Dimension 4: sequential/global) were treated as covariates, each one of them separately.

Numerical marking was analyzed using a factorial analysis of variance with two factors: text (4 different texts), time (4 different time frames) and the first dimension of learner styles according to the model by Felder (active/reflective learners or Dimension 1, regarded as a covariate). The analysis revealed that the main effects due to the text ($F=1.584$, $p=0.210$), time ($F=2.071$, $p=0.131$) and the first learner style dimension ($F=1.036$, $p=0.311$) as well as the interaction between these two qualitative factors (text and time, $F=1.750$ $p=0.179$) are not statistically significant. This means that the average grade was not affected by text and time parameters nor by the combination of text and time (Table 4.11).

Table 4.11. Active/Reflective dimension; dependent variable: numerical grades

DIMENSION 1	Mean score	Standard Deviation	N
Moderate active	7.38	1.54	16
Fairly active	6.58	1.56	12
Fairly reflective	7.23	1.74	60
moderate reflective	7.25	1.73	28
very strong reflective	8.00	1.15	4

Tests of inter-subject effects for the dependent variable *numerical grades*

Source	F[41]	p
Active/Reflective	1.036	0.311
Text	1.584	0.210
Time	2.071	0.131
text * time	1.750	0.179
text * time * actref1	-	-

Results from numerical marking were analyzed using a factorial analysis of variance with two factors: text (4 different texts), time (4 different time frames) but, this time, using the second dimension of learner styles (sensing/intuitive learners or Dimension 2) as a covariate. This analysis revealed that effects of text (F=1.62, p=0.203), time (F=2.11, p=0.125) and the interaction between text and time (F=0.346, p=0.708) are not statistically significant (Table 4.12). There seems to be an effect on numerical marking due to the second learner style dimension, however, the p value is marginal (F=3.413, p=0.067). Table 4.11 shows similar mean scores between moderate sensing and fairly intuitive participants as well as between fairly sensing and moderate intuitive participants. The only difference spotted is a rather low mean score of 6.25 (std=0.96) for extremely intuitive participants. Although this result may have led to the marginal p value, it is not considered to be

[41] F is an indicator on the basis of which p values are calculated.

significant because it is caused by one single "very strong intuitive" participant (1 participant x 4 texts) who acts as an outlier in this case.

Table 4.12. Sensing/Intuitive dimension; dependent variable: numerical grades

DIMENSION 2	Mean score	Standard Deviation	N
moderate sensing	7.94	1.35	36
Fairly sensing	6.75	1.91	44
Fairly intuitive	7.50	1.39	20
Moderate intuitive	6.75	1.57	16
very strong intuitive	**6.25**	**0.96**	**4**

Tests of inter-subject effects for the dependent variable *numerical grades*

Source	F	p
Sensing/Intuitive	3.413	**0.067**
Text	1.617	0.203
Time	2.115	0.125
text * time	0.346	0.708
text * time * sensint1	-	-

Numerical scores were analyzed for a third time using a factorial analysis of variance with three factors: text (4 different texts), time (4 different time frames) and the third dimension of learner styles (visual/verbal learners or Dimension 3). This analysis revealed that the main effects due to a) the text ($F=0.125$, $p=0.882$) b) visual/verbal learners or Dimension 3 ($F=1.004$, $p=0.410$) are not statistically significant. Time ($F=9.716$, $p=0.026 < 0.05$) and the interaction between the three variables ($F=2.333$, $p=0.039 <.05$), however, *were* statistically significant (Table 4.13). Apparently, the more time participants have and the more verbal they are, the more likely it is that they will achieve a higher numerical score, unlike those participants who seem to occupy positions toward the other end of the same learner style dimension and tend to be more visual (Appendix D.4.).

Table 4.13. Visual/Verbal dimension; dependent variable: numerical grades

DIMENSION 3	Mean score	Standard Deviation	N
very strong visual	6.75	1.14	12
Moderate visual	7.45	1.84	40
Fairly visual	6.89	1.52	28
Fairly verbal	7.55	1.27	20
Moderate verbal	7.15	2.11	20
Total	7.22	1.67	120

Tests of inter-subject effects for the dependent variable *numerical grades*

Source	F	p
Visual/Verbal	1.004	0.410
Text	.125	0.882
Time	3.797	**0.026**
text * time * visvrb1	2.333	**0.039**

The numerical assessment was analyzed one last time using a factorial analysis of variance with three factors of a) text (4 different texts), b) time (4 different time frames) and c) the fourth dimension of learner styles as a covariate (sequential/global learners or Dimension 4). The analysis showed that the main effects due to the text (F=1.57, p=0.212), time (F=2.05, p=0.133), the learning style (F=0.186, p=0.667) and the interaction between these text * time (F=1.45, p=0.239) are not statistically significant (Table 4.14).

Table 4.14. Sequential/Global dimension; dependent variable: numerical grades

DIMENSION 4	Mean score	Standard Deviation	N
very strong sequential	9.25	0.96	4
moderate sequential	6.65	2.16	20
Fairly sequential	7.27	1.77	44
Fairly global	7.09	1.30	32
Moderate global	7.38	1.36	16
very strong global	7.75	0.96	4

Tests of inter-subject effects for the dependent variable *numerical grades*

Source	F	p
Sequential/Global	0.186	0.667
Text	1.572	0.212
Time	2.055	0.133
Text * time	1.451	0.239
Text * time * seqglo1	-	-

4.10.2. Testing the professional aspect of quality (holistic marking) per learning style dimension

Another set of four factorial analyses of variance was carried out for the dependent variable of holistic assessment (publishable translation-PT, publishable translation in need of improvements-PTI, unpublishable translation-UT). Text and time were the independent variables and each single learner style dimension was again treated as a covariate.

Holistic assessments were analyzed using a factorial analysis of variance with three factors: a) text (4 different texts), b) time (4 different time frames) and c) the first dimension of learner styles (active/reflective learners or Dimension 1). This analysis showed that the main effects due to the learning style ($F=0.020$, $p=0.889$) and the interaction between time and text ($F=0.935$, $p=0.935$) were not statistically significant. On the contrary, time ($F=9.50$, $p<0.001$) *was* found to be statistically significant. The main

effect due to the text is marginally significant (F=2.66, p=0.074) but it is treated as non-significant because half of the participants had translated a different text, since the texts were provided in reverse order (Table 4.15). As a result, it was not a *single* text that caused this value.

Table 4.15. Act/Ref: Tests of inter-subject effects for the dependent variable *publishability*

Source	F	p
Active/Reflective	0.020	0.889
Text	2.664	**0.074**
Time	9.504	**<0.001**
Text * time	0.935	0.396

Holistic assessment was analyzed using a factorial analysis of variance with three factors: a) text (4 different texts), b) time (4 different time frames) and c) the second dimension of learner styles (sensing/intuitive learners or Dimension 2 as covariate). This analysis revealed that the main effects due to the text (F=2.67, p=0.074), the second learner style dimension (F=0.394, p=0.532) and the interaction between time and text (F=1.107, p=0.334) were not statistically significant. Time was found to be a statistically significant variable (F=9.536, p=0.001) and text was found to be marginally significant (Table 4.16). It seems that Dimension 1 and Dimension 2 share the same pattern when holistic marking is taken into consideration.

Table 4.16. Sens/Int: Tests of inter-subject effects for the dependent variable *publishability*

Source	F	p
Sensing/Intuitive	0.394	0.532
Text	2.673	**0.074**
Time	9.536	**<0.001**
text * time	1.107	0.334

Holistic marking was then analyzed using a factorial analysis of variance with three factors: a) text (4 different texts), b) time (4 different time frames) and c) the third dimension of learner styles (Visual/Verbal learners or Dimension 3 as covariate). The main effects due to the text (F=1.709, p=0.187), the learner style Dimension 3 (F=1.441 p=0.228) and the interaction between time and text (F=0.994, p=0.373) were not statistically significant. Time was found to be a very significant variable (F=9.507, p=0.001), as for Dimension 1 and Dimension 2 above. Nevertheless, there is an important change of pattern: the *interaction* between the three variables text, time and Dimension 3 (F=2.944, p=0.012 < 0.05) seems to significantly affect publishability on average (Table 4.17).

Table 4.17. Vis/Vrb: Tests of inter-subject effects for the dependent variable *publishability*

Source	F	p
Visual/Verbal	1.441	0.228
Text	1.709	0.187
Time	11.133	**0.001**
Text * time	0.994	0.373
text * time * visvrb1	2.944	**0.012**

Finally, holistic marking was analyzed using a factorial analysis of variance with three factors: a) text (4 different texts), b) time (4 different time frames) and c) the fourth dimension of learner styles (Sequential/Global learners or Dimension 4 as covariate). The pattern pertinent to Dimension 1 and Dimension 2 is reflected here as well. The main effects due to the fourth learner style Dimension 4 (F=0.273 p=0.602) and the interaction between time and text (F=0.915, p=0.40) were not statistically significant. Time was again found to be a statistically significant variable (F=9.525, p=0.001), while the text becomes marginally significant (F=2.670, p=0.74; Table 4.18), again like in Dimension 1 and Dimension 2 above.

Table 4.18. Seq/Glo: Tests of inter-subject effects for the dependent variable *publishability*

Source	F	p
Sequential/Global	0.273	0.602
text	2.670	**0.074**
time	9.525	**0.001**
Text * time	0.915	0.404

4.10.3. Overview and discussion

Testing texts in relation to raw scores (numerical marking) seems to confirm that the texts selected for this research are indeed of equal weight and difficulty, since they were not found statistically significant despite the fact that they were used in reverse order by group B.

The initial hypothesis "change in task time does not correlate with translation quality" was clearly rejected. It becomes evident that differences in deadlines influence translation quality, at least as regards publishability, because time was found to be a statistically significant factor in relation to publishability (holistic marking reflecting the professional aspect of translation) for all four learning styles. Such results can be justified because publishability included the criterion of translation completion as per task guidelines but in a binary mode: if a translation was not complete, it would be assessed as UT automatically. On the other hand, (pedagogical) numerical marking allowed for assessment in a more relativist format. The factorial analysis, however, did not show any statistically meaningful effects of time in relation to this aspect of quality. This result might be attributed to the overall mark out of 10, which did not leave space for observations at a deeper level.

A contingency table was produced and a chi-square test of independence was performed in order to reveal any existing patterns concerning the statistically significant variable of time in relation to publishability (Table 4.19). The results show a clearly significant drop in holistic scores when time is reduced (x^2 =21.61, p=0.010<0.05). Many students were unable to finish their translations when they were allotted 20 and 10 minutes,

although it must be noted that, for several cases, UT included completed translations of overall very low quality. In those cases, translations would be accompanied by a low numerical score as well.

Table 4.19. Contingency table: time vs. publishability

		PT	PTI	UT	Total
Time	10	3	5	22	30
		10.0%	16.7%	**73.3%**	100.0%
	15	4	12	14	30
		13.3%	**40.0%**	**46.6%**	100.0%
	20	4	8	18	30
		13.3%	**26.7%**	**60.0%**	100.0%
	30	7	16	7	30
		23.3%	**53.3%**	23.3%	100.0%
	Total	18	41	61	120
		15.0%	34.2%	50.8%	100.0%

There seems to be a strong effect of time with respect to holistic marking (Table 4.20). This corroborates the result that change in task time clearly correlates at least with (holistic) translation quality, as explained above. There is also evidence of a marginally significant effect of text with respect to Dimension 1, Dimension 2, Dimension 4 and numerical marking but it is treated as non-significant because in this kind of analysis, text as a variable (four different texts) is not meaningful on its own, i.e. it is not *a* particular text causing an effect on numerical marking. Dimension 3, the visual/verbal learning style, was the only one found to interact in a statistically meaningful way with time and text when both aspects of marking were considered, with verbal participants showing a tendency to score higher than visual ones.

Table 4.20. Summary of findings related to learning styles

		QUALITY		
		Numerical (1-10)	Holistic (PT/PTI/UT)	
Dimension (Active/Reflective)	1	Non-significant	Strong effect of time, Marginal effect of text	Irrespective of position on LS scale, the less time available, the greater the tendency for participants to deliver UT translations
Dimension (Sensing/Intuitive)	2	Non-significant (marginally significant differentiation due to low quality performance by a single extremely Intuitive participant	Strong effect of time, Marginal effect of text	Irrespective of position on LS scale, the less time available, the greater the tendency for participants to deliver UT translations
Dimension (Visual/Verbal)	**3**	**There is a three-way significant interaction between text, time, Dimension 3 affecting numerical marking**	Strong effect of time	**The more visual participants are, the more they tend to deliver UT translations. Thus, verbal participants score significantly higher, resisting time constraints.**
Dimension (Sequential/Global)	4	Non-significant	Strong effect of time, Marginal effect of text	Irrespective of position on LS scale, the less time available, the greater the tendency for participants to deliver UT translations

4.11. Analysis of retrospective questionnaires

The participants were requested to answer a retrospective questionnaire (Appendix D.3) after they had translated texts 1 and 2. They were asked to fill in the same questionnaire a second time after they had translated texts 3 and 4. The questionnaire was intended to serve

as a secondary indicator of perceived time constraints, to provide information concerning participants' behavior in terms of management of online resources (as it constituted a significant part of the process), and to test working approaches worth dealing with for the purposes of this thesis. The results are presented below per question, not per time frame.

4.11.1. True/false items related to translating style

Three questionnaire items focused on the way C2008 participants approached the translation tasks:

1. I read the whole source text before I started translating it.
2. I had to change my usual translation method.
3. I could think clearly despite time constraints.

As far as item 1 is concerned, when students were asked whether they had read the whole text in advance, only 25% of them replied positively concerning the 30- and 20-minute tasks (Table 4.21). The percentage drops down to a very low 6.9% for the 15-minute and 10-minute time frames. These claims cannot be substantiated without process data. The replies do not necessarily imply that the participants would have read the whole text in advance if they had no (tight) fixed deadline. This result coincides with those of Schilperoord (1996) and Jensen (2001), namely that participants changed their translating style, probably making use of "ready-made cognitive stock-in-trade" (Schilperoord 1996: 293 cited in Jensen 2001: 178) in order to cope with time constraints.

Table 4.21. Reading the whole source text before translating

	"I read the whole source text before I started translating it."		
	YES %	NO %	Missing %
30/20 minutes	25	75	7.14
15/10 minutes	6.9	93.1	3.45

Regarding item 2, 62.07% of the participants claim they changed their translation method when they had 30 and 20 minutes for the translation task; several explicitly stated in the comments section of their retrospective questionnaire they had to do so in order to cope with time constraints (Table 4.22). The setup of the question, however, does not allow

me to examine whether they changed their method already from the first text or whether they only refer to a change from the first text to the second. The same is valid for the 15-minute and 10-minute time frames, where 80% of the participants state they changed their translation method.

Table 4.22. Changes in usual ttranslation method

	"I had to change my usual translation method."		
	YES %	NO %	Missing %
30/20 minutes	62.07	37.93	3.45
15/10 minutes	80	20	

The questionnaire does not allow us to see the nature of the change either, i.e. whether students kept changing methods, trying to adapt to the situation. This would be important, as such differences in translating style might reflect differences in learning styles. However, in order to define this relationship between time and method in more subtle terms, process data is needed.

An item that might provide evidence on translating style in relation to a possible effect of time constraints is the question "I could think clearly despite time constraints". The participants' answers (Table 4.23) show that roughly the same number of students gave the same reply irrespective of time frames, although it is not possible to know if there were differences between texts 1 and 2, or between 3 and 4. The negative replies are more numerous but not really dominant.

Table 4.23. Stated effect of time constraints on thinking processes

	"I could think clearly despite time constraints"	
	YES %	NO %
30/20 minutes	43.33	56.7
15/10 minutes	40	60

4.11.2. Items related to time availability

There were another five items to test C2008 participants' experience of time availability or lack thereof, acting as secondary indicators of experienced time pressure:

1. I had time to perform internet search(es).
2. I had time to choose among alternative solutions.
3. I had time to revise my translation.
4. I had enough time to finish the first translation.
5. I had enough time to finish the second translation.

Regarding the first item on the list, the participants had access to the internet and it seems they tried to make the most out of it. The responses indicate that 62.7% claim they had enough time to perform internet searches during the 30-/20-minute time frames. The increasing time pressure did not result in a corresponding decrease in the number of participants that report performing internet searches, since 56.67% claim they still did them (Table 4.24). It would be interesting to know if the access they had was sufficient for them and how much time they devote to such searches in relation to the task, as this might reflect differences in their style and also affect task completion. These relatively high percentages could imply that internet searching has become an integral part of the translation process for those participants and it occurred in such an automatized way that participants did not pinpoint it in the questionnaire.

Table 4.24. Reported availability of time for internet searches

	"I had time to perform internet search(es)"		
	YES %	NO %	Missing %
30/20 minutes	62.07	37.93	3.45
15/10 minutes	56.7	43.33	

Despite the fact that approximately half the participants claimed they had enough time to perform internet searches, the participants who stated they had time to choose among alternative solutions (item 2) are far fewer, 23.33% for 30/20 minute time frames (Table 4.25). It was expected that participants would have less time available to choose their optimal solution, but not at such a great extent as, for example, 90% for the 15-minute

and 10-minute time frames. A possible interpretation for participants who claimed they had no time to choose among alternative solutions but, apparently, had spent time on internet searches might be that these searches brought no satisfactory results.

Table 4.25. Reported availability of time for choosing alternative solutions

	"I had time to choose among alternative solutions"	
	YES %	NO %
30/20 minutes	23.33	76.67
15/10 minutes	10%	90%

As far as revision (item 3) is concerned, only 27.59% of the participants claim they had enough time to revise the translation for texts 1 and 2, even though 62.7% reported they had enough time to perform internet searches for the same texts (Table 4.26). On the other hand, these results are in harmony with the analogy observed in replies to item 2, time for alternative solutions. It is crucial to keep in mind that the time is halved for the third text (15 minutes) and it is further reduced to a third for the fourth text (10 minutes). This may be the reason why 93.33%, the overwhelming majority of the participants, did not have the time to revise (or even finish) their translations.

Table 4.26. Reported availability of time for revision

	"I had time to revise my translation"		
	YES %	NO %	Missing %
30/20 minutes	27.59	72.41	3.45
15/10 minutes	6.67	93.33	

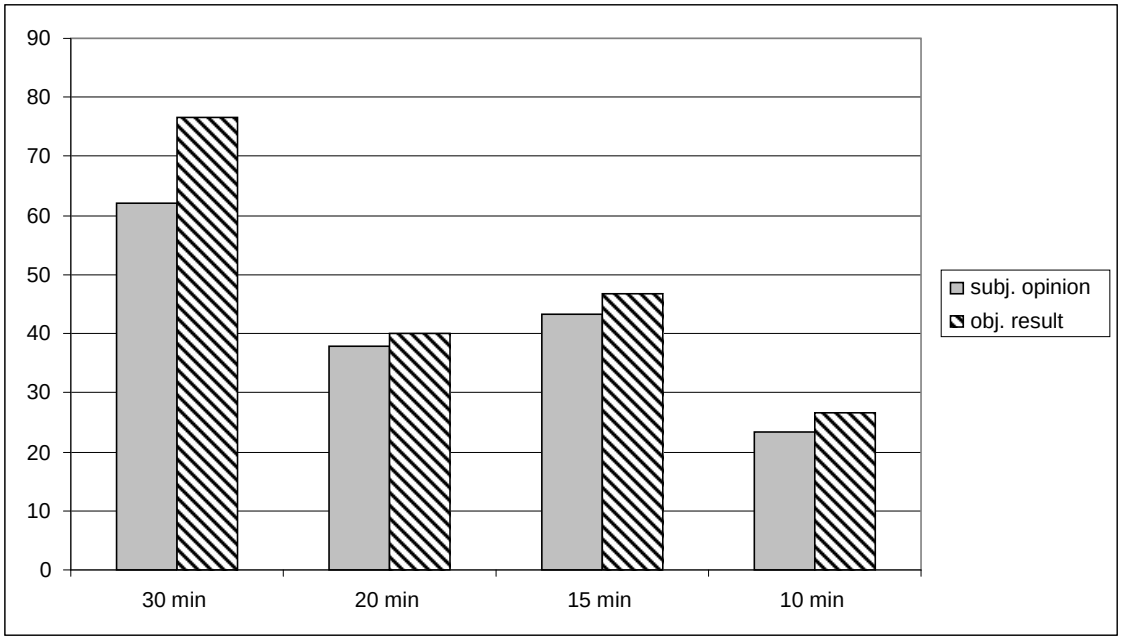
The last two items, 4 and 5, were actually the items to appear first on the questionnaire. It is clear that when participants had to translate a text in 30 minutes, more than half of them (62.07%) found the time sufficient to do so, but when the time frame is reduced to 20 minutes, the percentage immediately drops below 40%, a sign that lack of available time already significantly affects the sample as a total (Table 4.27).

Table 4.27. Reported availability of time for task completion

I had time to finish	the first translation			the second translation		
	YES %	NO %	Missing %	YES %	NO %	Missing %
30/20 minutes	62.07	37.93	3.45	37.93	62.07	3.45
15/10 minutes	43.33	56.67		23.33	76.67	

According to their replies, 76.67% of the students did not complete the translation of the last task, for which the available time was only 10 min. It is interesting that this claim is not fully supported by data from the actual translations: in Figure 4.2 below, students who finished the translation of text 1 and text 4 amount to 76.66% and 26.66% rather than what students claimed, 62.07% and 23.33%, respectively. This under-reporting implies that even students who had translated the whole text did not consider their output a *finished* product. It might be interpreted as a sign of developing professionalism: students are aware of their limits and the fact that they do not have the experience or skills to deal with this issue yet from their current, pedagogical point (González Davies 2011: personal communication).

Figure 4.2. Completion of translation task (C2008 student data vs. product data)



It was not considered necessary to check for correlations between sets of replies above and learning styles during that period because learning styles were included in the design last minute. Besides this, the C2008 study was exploratory. In the main experiments later on, the change in modality (participants typed their translations) described in detail in paragraphs below was assumed to have affected participants' behavior to the extent that such a posteriori correlations could not provide comparable results with data sets from C2009/C2010. Arising variables and corresponding sets of sub-hypotheses were thoroughly investigated, however, during the C2010 full-fledged study.

4.12. Summary of findings in relation to C2008 aims

The findings from the pilot study support the hypothesis that time correlates with translation quality in a pedagogical setting, contrary to some of Hansen's conclusions (2002). A factorial analysis of assessment, text, time and learner styles appears to confirm that students with a preference toward visual learning produce translations of a lower quality under increased time pressure.

A variety of instruments were tested (pre- and post-experiment questionnaires, the Index of Learning Styles) and areas in need of fine-tuning were revealed. Authentic texts ranked as being of medium translation difficulty by earlier groups of comparable students were also tested, and statistical analysis confirmed that they could be treated as interchangeable source texts. The actual realization of the experiment highlighted factors that required more careful management (for example, changing procedures in order to be granted permission to install software in the computer room, factoring in the typing speed variable). Within an exploratory framework related to learner style theory, the statistical analysis of assessment, text, time and learner styles also indicated interactions worth investigating on a larger scale. Moreover, the pilot was ecologically sound to a large extent since, with only minor modifications, it could be replicated in any classroom. Finally, the retrospective questionnaire pointed to features of online resource management that might prove pertinent for a larger study.

The lack of process research during C2008 experiments, dictated by practical limitations, had a major impact. The challenge to handle an end-product variable (quality), a process-oriented variable (time) and a personality variable (learner style), without recourse to triangulation or at least support from basic process research, implied that any findings should be regarded as highly tentative. On a positive note, the fact that there was no process research involved made me aware of certain limits, for example, it helped me locate the point beyond which one cannot infer strategies from text products. This helped fine-tune subsequent experiments from a methodological perspective and focus on elements worthy of examination. Moreover, this pilot study also highlighted the need for considering a more flexible definition of quality, one that would account for incomplete translations. In addition, the pilot indicated that an overall mark out of 10 was insufficient and underlined the need to adopt a statistically flexible numerical grading system with the potential to lead to strong correlations. Another methodological difficulty was that the identification of learning styles was based on self-reports. Clearly, a careful examination of the relationship between a person's identified learning style and actual performance should be made (Kratzig and Arbuthnott 2006: 32).

Findings from the C2008 pilot study were used to inform the methodologies as well as the instruments of the main experiments as will be seen in Chapter 5.

Chapter 5. Main experiments

This chapter presents how the main experiments of 2009 and 2010 were conducted, step-by-step. It has to be noted that after the C2008 pilot and before the C2009 experiment, i.e. during the Winter semester of 2009, there was an effort to improve the research design on the basis of the experience from the C2008 exploratory study (cf. Chapters 3, 4). Process-research instruments and methodologies were considered for the present study and piloted with comparable students. Certain participants' skills, namely language, computing and typing skills were also factored into the experiments, the assumption being that they might affect the degree of expertise and consequently, participant performance.

5.1. Experimental tasks with the class of Spring semester 2009 (C2009)

5.1.1. Aims

C2008 participants had hand-written their translations. C2009 participants had to type theirs. They would also have to deal with a non-invasive, yet still largely unknown keystroke logging and screen-recording software. This implied that the hidden variable of using computing technology[42] had to be controlled. Thus, the main aim of C2009 was to test modifications due to this shift in modality. In particular, the aims included testing

- all four time frames (30-20-15-10 minutes) anew;
- added measurement related to typing;
- selected keystroke logging/screen-recording software;

but also

- added instruments related to L1-L2 language skills;
- modified instruments: background and retrospective questionnaire;
- assessment grid.

[42] I would like to thank Séverine Davidson Hubscher for her comments at a later point (2010).

5.1.2. Participants

This group occurred naturally following standard registration procedures set by the School of English that is, it was "not created or modified in any way for the purposes of this study" (Scott-Tennent et al. 2001: 23). Once the registration period for the Spring semester of 2009 was over, though, students were checked against the criteria set in 3.2.1. concerning the participants' profile. A total of 25 out of 28 met these criteria. Two were excluded due to a great difference in age: most students were between 21 and 24 years old, whereas the ones excluded were approximately 10 to 15 years older. This difference might suggest difference in extramural knowledge and, possibly, expertise. A further student was excluded because her mother tongue was other than Greek. The C2009 participants had touch-typing freeware at their disposal for practice. They also received limited training under time constraints: a set of translation exercises testing students' "comfort zone", again based on Robinson (2003: 36). Two exercises with BBFlashback that is, the keystroke logging and screen-recording software to be used in the experimental tasks, also took place around the middle of the semester, for familiarization purposes.

5.1.3. Task setting

The four source texts used were the ones tested with the C2008 participants. They were considered to be of medium translation difficulty by two groups of comparable students. Statistical results from C2008 supported earlier student-based ranking in terms of experienced translation difficulty and, therefore, suggest that the texts are equally difficult and may be used in any order without distorting parameters of further analysis. The task guidelines also remained the same as in the C2008 pilot because the participants had found them to be clear and no misunderstandings had been reported.

The experiment was conducted in the same computer room of the Faculty of Philosophy (capacity: 20 computers) where the C2008 experiments had taken place. This time, there was a change both in terms of modality and of resources: participants were asked to type their translation and use exclusively online resources as aids. Before the start of the experiment, the participants took a brief typing speed test using the same freeware they had been given to practice with at the beginning of the semester. The test concerned

Greek because that was the language they would type their translation in. The corresponding scores in WPM were recorded.

Similar to the C2008 setting, there was no contact among participants during the experiment. The computer arrangement guaranteed that they were not able to look at each other's computer screens. Participants were advised not to distract or communicate with their fellow participants.

Following the individual differences paradigm, this time participants were divided randomly into two groups due to room capacity. The experiment was carried out on two consecutive mornings and the same procedure was followed for both groups. Participants were asked to fill in the modified background questionnaire (Appendix E.1). When everyone had finished, they were instructed to open the file containing the task guidelines, including the time frame. When it was confirmed that no clarifications were necessary, they were guided through the preparation of settings for BB Flashback screen-recording software, including activation of the keystroke logging function; they recorded a short video and they saved it on their desktop. The purpose behind this activity was to remind them how and where to save their files and under what uniform filename, in order to prevent confusion during data collection and analysis. They were advised to pay attention to the time indication on BB Flashback taskbar and they were instructed to find the first PDF file to be translated. When everyone was ready, they were asked to close all active windows apart from the one for BB Flashback because it seemed that many of them were already accessing translation-related websites. Afterwards, they were given a signal to activate recording and *then* open their files. This way, everyone would start at approximately the same time and the recordings would capture the process from the very beginning. Following completion of the first translation, each participant filled in the enriched retrospective questionnaire[43]. The same procedure was followed for the remaining three translation tasks. It should be noted that the participants took short breaks after the completion of each task, i.e. after filling in the retrospective questionnaire. During their

[43] cf. Appendix E.2. Only the final (C2010) instruments are included in Appendix E for reasons of convenience.

second break and also shortly after the end of the experiment, I collected the .doc and .fbr (BB Flashback) files saved on the desktop of each participant. The L2 language-skills test was administered after the translation tasks. It was assumed that the sample mainly consisted of higher-ability students as far as their level of English was concerned, so they were instructed to take the whole test. The L1 language skills test was left for the end of the session. Table 5.1. presents the flow of C2009 experiment.

Table 5.1. Experiment flow (C2009)*

	25 participants	
	Diagnostic sheets	
	(related t o computing skills-collected at beginning of semester)	
	ILS (collected at beginning of semester)	
	Typing speed test	
	Background questionnaire	
BBF	Text COR[44]	30’
	Retrospective questionnaire	
BBF	Text RETRO	20’
	Retrospective questionnaire	
BBF	Text PHOTO	15’
	Retrospective questionnaire	
BBF	Text WATER	10’
	Retrospective questionnaire	
	EN language test	
	EL language test	

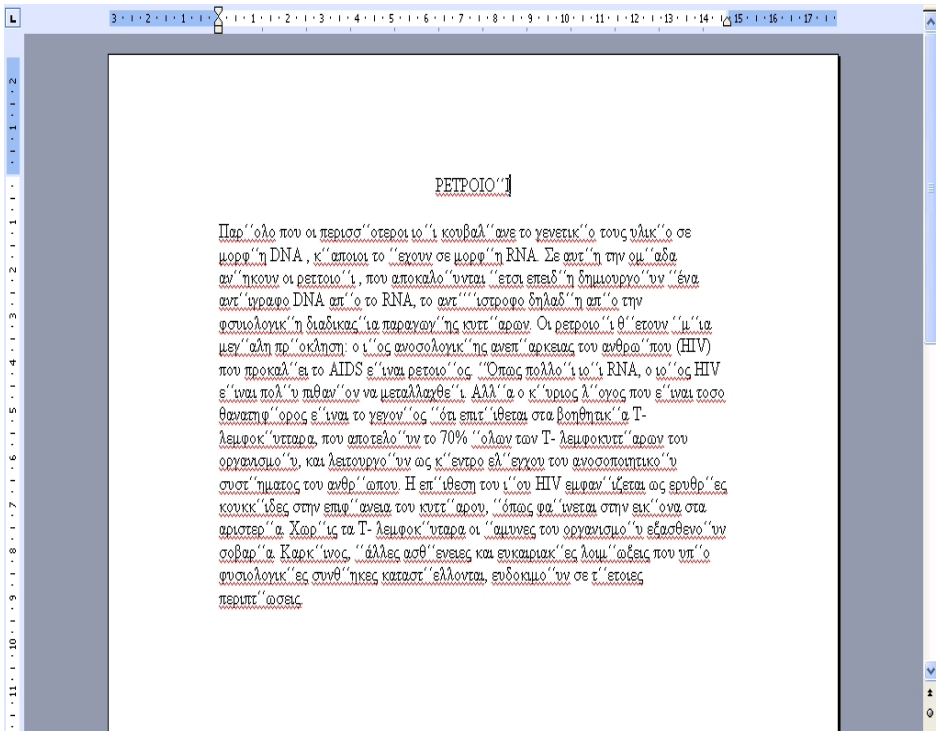
*Additions in bold. Modifications in italics.

[44] Code names of the texts used: “Effects of CORiolis”, “RETROviruses”, “PHOTOelectric effect”, “WATER not here”; BBF stands for “BBFlashback”, the screen recording and keystroke logging software used in the study.

5.1.4. Data organization and limitations

The C2009 recordings were made with the most recent freeware version of BBFlashback at that time; that version produced a systematic typing error misplacing Greek accent marks when the keystroke logging function was activated (Figure 5.1). This affected the time it took participants to translate and revise their products. Four participants, who had been practicing with the touch-typing freeware, commented in their retrospective questionnaires that had they not practiced with that freeware, they would have translated faster: touch-typing brought (desired) automatization and they would type faster, yet that also meant (accidentally) "automatically" inserting more misplaced accent marks that they would later have to spend time to delete. This software issue affected the whole experiment dynamics, for example, data related to duration of translation phases and stress experienced by participants, as some of them pointed out after the end of the experiments.

Figure 5.1. Translation sample showing BBFlashback glitch as regards Greek accents



Background questionnaires were collected. I confirmed that consent for the experiment had been given. All participants met the criteria set out in Chapter 3. Although

the corresponding items were still in the questionnaire for recording purposes, there was no need to check again whether students had worked as translators in the past or if there were significant differences regarding experience in general because that was already known before the experiment, without manipulating C2009.

A total of 25 learner-style questionnaires had already been collected at the beginning of the semester, as well as material related to participants' computing skills from their course diagnostic sheets. A total of 100 BB Flashback files (.fbr) were collected; a total of 100 translations (.doc files) were collected as well and anonymized, along with 100 corresponding retrospective questionnaires. While arranging retrospective questionnaires, it became obvious that a lot of participants had provided scant information concerning the WP/IPDR-type part, where they were asked to mention the most important problems they had faced and how they solved them. Although this is a likely drawback already mentioned by researchers (Hansen 2005; Pavlović 2007), it was unexpected because

- five comparable students in earlier pilot had provided a lot of information;
- the course syllabus itself had not been modified in terms of practice with WP/IPDR from one semester to another.

As a result, all 25 participants were called again for semi-structured interviews with BBF replay (an adaptation of Hansen's proposed approach; cf. Hansen 2006b) within 48 hours of the experiment. This was considered the most appropriate approach as it could be carried out almost immediately in order to minimize data loss as much as possible. Only 15 out of 25 participants showed up, however. The participants were asked the exact same questions they had not (fully) answered in their retrospective questionnaire. They had access to the texts and video recordings and made use of them at will, especially when they could not recall where their major difficulties were in each text.

5.1.5. Implications for C2010

On the one hand, C2009 aims were achieved: measuring typing speed by using the touch-typing freeware proved a rather easy task. Both L1 and L2 language skills instruments were also easy to administer, although the L1 instrument was not as detailed as I had expected (cf. Chapter 6). No problems were reported concerning the background questionnaire.

Participants commented positively on BB Flashback, even while acknowledging and complaining about the issue with the Greek accents. C2009 revealed the need for careful re-design of the retrospective questionnaire: the semi-structured interviews provided rich material. Nevertheless, it would be challenging from a practical viewpoint to arrange interviews with a whole other class for each text without risking loss of data due to memory constraints. One last important result was that the 10' time frame proved unrealistic with the shift in modality. Most participants had translated only a few lines; as a result, there was not much textual material for further analysis. The participants themselves confirmed that this was the case in their retrospective questionnaires. The problem with the software only made things worse by affecting text production negatively as well.

Although the C2009 aims were met, I was not able to move a step further and use a lot of C2009 data for comparisons with C2010 data. The high degree of data loss in combination with the BBFlashback glitch led me to reconsider my approach in view of the C2010 study. As O' Brien put it,

> [b]y highlighting challenges, one is inevitably exposing research design weaknesses. However, this should not be viewed negatively but should rather be seen as a means of improving the quality of combined research outputs with the aim of maturing the domain. (2009: 252)

There was no further data processing at that time.

5.2. Experiment with the class of Spring semester 2010 (C2010)

5.2.1. Aims

The principal aim of the C2010 set of experiments was to test the main hypothesis "learning styles correlate significantly with translation quality when the task takes place under time pressure" against a background of supporting sub-hypotheses examining effects on quality, effects of time and correlations with learning styles. A parallel aim, already mentioned in Chapter 1, was to strike a balance between the research aspect and the pedagogical aspect, while simulating a professional environment.

5.2.2. Similarities in relation to C2009

A total of 29 students attending the same course, "Scientific and Technical Translation Workshop", during spring semester 2010, met the requirements set in 3.2.1 and participated in the modified experiment. Their learning background as far as course syllabus and content are concerned was similar to the one shared by C2009 participants. The task guidelines remained the same as well. Regarding instruments, the learner style questionnaire by Felder and Soloman was administered during the semester and corresponding score sheets were collected. Moreover, the typing speed test and the background questionnaire[45] were kept as they were used with C2009. In addition, the physical setting where the experiment took place remained the same: the computer room of the Faculty of Philosophy.

5.2.3. Modifications in relation to C2009

After the experiment with C2009, I contacted BB Flashback and provided them with the necessary information regarding Greek stress marks. The updated version of the software, released a few months later, was the one used with C2010 participants and did not present that problem anymore.

The retrospective questionnaire was heavily re-designed. Items were re-grouped and re-arranged. Those items corresponding to IPDR/WP content were modified so that students would be explicitly required to focus on a few significant areas. This part was largely influenced by the retrospective questionnaire designed for the TransComp Longitudinal Study (Göpferich 2008: App. 256-263). The questionnaire was tested with five students who had participated in the C2009 set of experiments (and had already passed my course) because I wanted to make use of their experience with the C2009 retrospective questionnaire.

Three out of the four texts used in both C2008 and C2009 experiments were used with time frames set at 30-20-15 minutes, respectively. The 10' time frame was not

[45] There were some modifications but, since these consisted mainly of item rearrangement and modifications for aesthetic purposes, they are not discussed in the study.

included mainly because it was not realistic with the current sample. As stated above, many C2009 participants had translated a few lines only and this would not provide enough material for a realistic assessment of the translation product nor for analyses at a later stage.

5.2.4. Task setting

The environment was natural, much like the C2009 context as regards space and the selection of participants. The experiment was conducted in the computer room of the Faculty of Philosophy. Permission had been granted to install the freeware version of BB Flashback under System Administrator's rights and to save the necessary source text files likewise.[46] The experiment was carried out in one day. Participants could choose whether they wanted to come to the morning or to the afternoon session. For a few participants who were unable to come that day, the room was booked again two days later.

Both groups followed the same procedure. C2010 participants took the test assessing their typing speed in Greek and filled in the background questionnaire. They were then instructed to familiarize themselves with task guidelines and the time frame was announced. They prepared the settings for BB Flashback screen-recording software. They were shown how and where to save their files and under which uniform filename. They were reminded to close all active windows apart from the one for BB Flashback, so that they would all start from the same base. They were given a signal to activate recording and *then* open their files. When they finished each translation, they would fill in the corresponding retrospective questionnaire (Appendix E.2) and then they would take a short break. During their second break and also shortly after the end of the translation tasks, I collected the .doc and .fbr (BB Flashback) files saved on the desktop of each participant.

At the end, the participants were requested to fill in the multiple-choice Quick Placement Test described in Chapter 3. It was assumed that the sample mainly consisted of

[46] This meant that the software/files would not be automatically deleted after the computer was switched off, as had been the situation so far for the protection of the computers. This was and still is a safety policy at Aristotle University because more than a hundred students at Aristotle University attend courses in these computer rooms on a daily basis.

higher-ability students as far as their English language level was concerned and they were instructed to take the whole test. Participants were then asked to access the Hellenic American Union website, take the Greek Placement Test, and forward the corresponding score by e-mail to me. The flow of experiment with C2010 is shown in Table 5.2.

Table 5.2. Experiment flow (C2010)

	29 participants	
	Diagnostic sheets (collected during semester)	
	ILS (collected during semester)	
	Typing speed test (Greek) Background questionnaire	
BBF	Text COR Retrospective questionnaire	30’
BBF	Text RETRO Retrospective questionnaire	20’
BBF	Text PHOTO Retrospective questionnaire	15’
	EN language test EL language test	

5.2.5. Data organization

Participant-specific data were grouped together: a) 29 learner style questionnaires participants had filled in during the semester, and corresponding number of b) typing speed scores, c) English language test scores, d) Greek language test scores, e) background questionnaires. I checked the background questionnaires to confirm consent for the experiment. Task-specific data were also grouped together: a) a total of 82 translation files and b) the corresponding number of questionnaires. A total of 78 BB Flashback files were also collected (differences in file numbers are discussed in Chapter 6). The C2010 participants were assigned unique identification numbers 56-84 and the translation/retrospective questionnaires/BB Flashback files were coded respectively.

5.3. Final decisions

When the material was more thoroughly examined, it became evident that the amount of available and comparable data from experiments with C2009 and C2010 was too large to ignore (Table 5.3). It seemed that participant-related data from, essentially, two class units would be more representative and would possibly minimize variance in findings that could otherwise be attributed to differences in class dynamics. As a result, I decided to include parts of data from the experiment with C2009 in the analysis, adhering to certain methodological limitations, to be discussed in detail in chapter 6.

Table 5.3. Experiment flow: C2009-C2010*

C2009: 25 participants			C2010: 29 participants		
ILS (collected at beginning of semester) **Typing speed test (Greek)** **Background questionnaire**			ILS (collected during semester) Typing speed test (Greek) Background questionnaire		
BBF	*COR* Retrospective questionnaire	30’	BBF	COR Retrospective questionnaire	30’
BBF	*RETRO* Retrospective questionnaire	20’	BBF	RETRO Retrospective questionnaire	20’
BBF	*PHOTO* Retrospective questionnaire	15’	BBF	PHOTO Retrospective questionnaire	15’
BBF	WATER Retrospective questionnaire	10’			
	+ *Complementary Interview for all four texts*				
	EN language test **EL language test**			EN language test EL language test	

*In bold: C2009 data used in joint analysis with C2010 data; in italics: parts of C2009 data used in joint analysis with corresponding parts of C2010 data.

5.4. Chapter summary

A total of 84 students participated in experimental tasks for the present thesis, not counting another 25 students who volunteered for smalle-scale trials and pilots during variousstages of the project:

- - C2008 30 participants
- - C2009 25 participants
- - C2010 29 participants

The C2008 pilot study presented in Chapter 4 was exploratory in nature. It was mainly conducted in order to check whether and how such experimental tasks could be carried out in the given environment from a practical viewpoint and if it was worthwhile looking into learning styles. The ensuing data collection and analysis led to conclusions that paved the way for the C2009 study. The shift in modality i.e. the change from hand-written to computer-typed translations, led to a re-evaluation of experimental settings and design. Additional relevant literature was also made accessible and used for the modification of instruments. Thus, a second round of tests followed regarding choice of software to be used, typing speed, enrichment/standardization of tools, etc. The C2009 study, in turn, optimized preparation for the third and last study, C2010.

These two sets of experiments, following the initial exploratory study, with two corresponding class groups provided translation protocols at various stages. Data were elicited from qualitative assessment of the translation output, complemented by results from keystroke logging and screen-recording log files and pre/post-experiment questionnaires, including the Index of Learning Styles.

All source texts used were authentic and were judged to be of average translation difficulty according to comparable groups of students and as confirmed by further statistical analysis. Self-report questionnaires and tests were administered in order to identify learner styles and problematic areas as experienced by students but also to control pertinent factors

that might influence results, such as differences in age, expertise, typing speed in L1, linguistic competence in L1 and L2. Methodologically speaking, data from these questionnaires and tests were complemented by screen recordings in view of planned triangulation.

Chapter 6. Reports on Data Collection

This chapter is divided into three parts: product-related reports, process-related reports, and people-related reports. The first part, on product-related issues, focuses on the actual results from the qualitative assessment of students' translations, relevant student responses and certain final-ranking considerations. The second part deals with data from a process-oriented perspective: the time distribution across translation phases and other pertinent aspects, as well as reports concerning management of online resources. The third part focuses on the human aspect of the project, the participants themselves. It mainly includes profiling information, such as ranking in terms of language, typing and computing skills. It also includes the categorization of students according to their learning styles, ending with a selection of students' comments regarding their overall experience.

6.1. Product-related Data

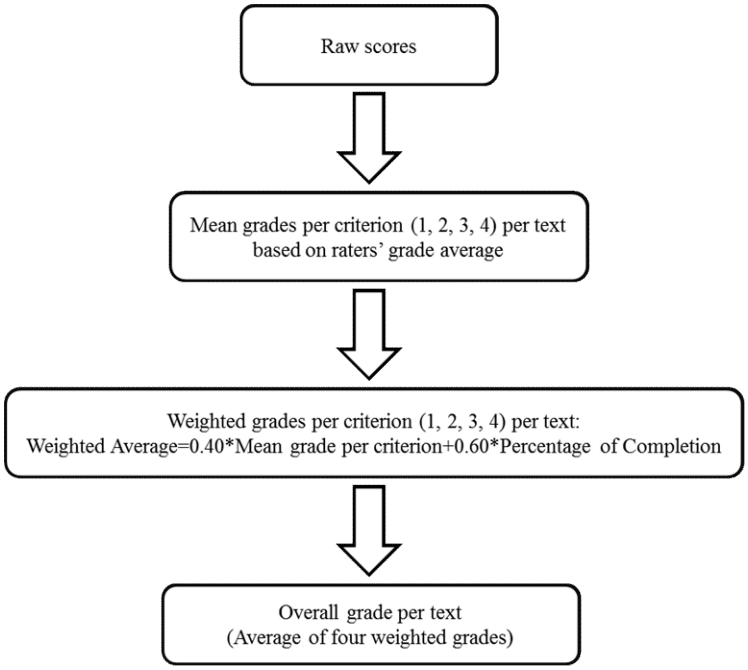
The C2010 grades from qualitative assessment of students' translations are presented in three forms:

a. The mean grades, that is, participants' calculated grade averages out of 10, are presented *per quality criterion*: Formal correctness, Terminology/Vocabulary, Accuracy/Message Transfer and Textual Flow;

b. The degree of Completion is calculated and "embedded" in each of the four criteria mentioned in (a) to create a set of four *weighted* grades (cf. Chapter 3);

c. Finally, the average of all five criteria is calculated to provide *a single overall grade per text* per participant, again on a scale out of 10.

Figure 6.1. Grading stages



6.1.1. Grade results

6.1.1.1. Formal Correctness

Formal Correctness includes factors such as grammar, punctuation, and most of the factors falling under the label "Mechanics" included in Mossop's revision criteria (2005). Table 6.1 shows that all participants received a passing grade (5/10 and above) in terms of the mean grades, i.e. the grade average produced by Rater 1 and myself. During the 30-minute time frame, the majority of participants (60%) seem to fall within the 7-7.5 bracket. When available time was reduced to 20 minutes, the grades spread, yet the majority (41.3%) still occupies the same middle bracket as before. The pattern evident for 20 minutes is roughly repeated in the results shown for 15 minutes.

Table 6.1. Frequency distribution of mean grades for Formal Correctness

Formal Correctness-Mean Grades								
(N=25) 30’			(N=29) 20’			(N=28) 15’		
	Freq	%		Freq	%		Freq	%
			5.0	2	6.9	5.0	1	3.6
5.5	2	8.0	5.5	3	10.3	5.5	2	7.1
6.5	5	20.0	6.0	2	6.9	6.0	1	3.6
7.0	7	28.0	6.5	7	24.1	6.5	8	28.6
7.5	8	32.0	7.0	5	17.2	7.0	7	25
8.0	2	8.0	7.5	7	24.1	7.5	5	17.9
8.5	1	4.0	8.0	2	6.9	8.0	2	7.1
Total	25	100.0	8.5	1	3.4	8.5	1	3.6
Missing	4		Total	29	100.0	9.0	1	3.6
Total	29					Total	28	100.0
						Missing	1	
						Total	29	

The scores seem to “unfold” when criterion 5, degree of Completion is embedded (Table 6.2). The weighted scores for the 30-minute time frame show that, had participants finished their text maintaining the same level of quality as regards criteria 1-4, most of them, actually 60%, would receive a grade between 8.6 and 9.0/10. Grades under 7.0 for both the 20-minute and the 15-minute time frame), however, seem to be on the increase, even if some participants still manage to receive grades around 9/10.

Table 6.2. Frequency distribution of weighted grades for Formal Correctness

Formal Correctness-Weighted Grades								
30’		Weighted	20’		Weighted	15’		Weighted
	Frequency	%		Frequency	%		Frequency	%
6.71	1	4.0	5.31	1	3.4	5.48	1	3.6
6.91	1	4.0	5.31	2	6.9	5.59	1	3.6
7.36	1	4.0	6.23	1	3.4	6.08	1	3.6
7.58	1	4.0	6.23	1	3.4	6.28	1	3.6
7.60	1	4.0	6.77	1	3.4	6.31	1	3.6
8.00	1	4.0	7.39	1	3.4	6.68	1	3.6
8.22	1	4.0	7.46	1	3.4	6.91	1	3.6
8.60	4	16.0	7.62	1	3.4	7.02	1	3.6
8.80	4	16.0	7.77	1	3.4	7.47	1	3.6
8.93	1	4.0	7.87	1	3.4	7.56	1	3.6
9.00	6	24.0	7.97	1	3.4	7.60	2	7.1
9.20	1	4.0	8.06	1	3.4	7.74	1	3.6
9.40	2	8.0	8.37	1	3.4	8.20	1	3.6
Total	25	100.0	8.42	1	3.4	8.45	1	3.6
Missing	4		8.46	1	3.4	8.60	3	10.7
Total	29		8.47	1	3.4	8.80	4	14.3
			8.60	3	10.3	8.88	1	3.6
			8.62	1	3.4	9.00	3	10.7
			8.71	1	3.4	9.20	1	3.6
			8.80	2	6.9	9.60	1	3.6
			9.00	3	10.3	Total	28	100.0
			9.20	1	3.4	Missing	1	
			9.40	1	3.4	Total	29	
			Total	29	100.0			

6.1.1.2. Terminology/Vocabulary

Participants had to look for appropriate vocabulary or render terminology in several cases. The pattern changes: the 30-minute time frame results seem more compact than the rest that is, most of them (72%) concentrating between 6.5-7.5/10 and not exceeding 8/10. The 20-minute and 15-minute time frame results, on the other hand, present greater variation: a few participants have received a failing grade (<5/10), while just two show results higher that the highest grade in the 30-minute time frame column. The majority of the sample in both

cases concentrates slightly below the mid-section for the 30-minute time frame, between 6 and 6.5/10 (Table 6.3).

Table 6.3. Frequency distribution of mean grades for Terminology/Vocabulary

Terminology/Vocabulary-mean grades								
(N=25) 30’			(N=29) 20’			(N=28) 15’		
	Freq	%		Freq	%		Freq	%
			3.5	3	10.3			
			4.5	1	3.4	4.5	1	3.6
5.0	1	4.0						
5.5	1	4.0	5.5	2	6.9	5.5	2	7.1
6.0	4	16.0	6.0	7	24.1	6.0	6	21.4
6.5	7	28.0	6.5	9	31.0	6.5	6	21.4
7.0	6	24.0	7.0	3	10.3	7.0	7	28.6
7.5	5	20.0	7.5	2	6.9	7.5	2	7.1
8.0	1	4.0	8.0	1	3.4	8.0	2	7.1
Total	25	100.0	8.5	1	3.4	9.0	1	3.6
Missing	4		Total	29	100.0	Total	28	100.0
Total	29					Missing	1	
						Total	29	

When weighted grades are taken into consideration, the 30-minute time frame results again start from a higher lever (6.51/10), whereas both the 20-minute and the 15-minute time frame results start from 4.31 and 5.19, respectively (Table 6.4). Seven participants in both of these two conditions received a grade lower than 7/10 in Terminology/Vocabulary and, as above, a couple of participants received grades exceeding the highest score for the 30-minute time frame.

Table 6.4. Frequency distribution of weighted grades for Terminology/Vocabulary

Terminology/Vocabulary-weighted grades								
30’		Weighted	20’		Weighted	15’		Weighted
	Frequency	%		Frequency	%		Frequency	%
6.51	1	4.0	4.31	1	3.4	5.19	1	3.6
6.91	1	4.0	5.11	1	3.4	5.51	1	3.6
7.36	1	4.0	5.43	1	3.4	6.08	1	3.6
7.40	1	4.0	5.43	1	3.4	6.28	2	7.1
7.58	1	4.0	5.71	1	3.4	6.68	1	3.6
7.80	1	4.0	6.97	1	3.4	6.91	1	3.6
8.00	1	4.0	6.99	1	3.4	7.02	1	3.6
8.22	1	4.0	7.27	1	3.4	7.14	1	3.6
8.40	3	12.0	7.37	1	3.4	7.20	2	7.1
8.60	5	20.0	7.82	1	3.4	7.27	1	3.6
8.73	1	4.0	7.86	1	3.4	7.56	1	3.6
8.80	5	20.0	7.97	1	3.4	8.05	1	3.6
9.00	3	12.0	8.02	1	3.4	8.40	3	10.7
Total	25	100.0	8.06	2	6.9	8.48	1	3.6
Missing	4		8.11	1	3.4	8.60	4	14.3
Total	29		8.37	1	3.4	8.80	4	14.3
			8.40	4	13.8	9.20	1	3.6
			8.42	1	3.4	9.60	1	3.6
			8.47	1	3.4	Total	28	100.0
			8.60	2	6.9	Missing	1	
			8.80	2	6.9	Total	29	
			9.00	1	3.4			
			9.40	1	3.4			
			Total	29	100.0			

6.1.1.3. Accuracy/Message Transfer

When it comes to Accuracy/Message Transfer, the picture is different: COR (30’) results still concentrate in the middle bracket between 7-7.5/10 (40%) but they are more evenly spread in both directions (Table 6.5). RETRO (20’) results mostly fall, slightly lower, between 6-6.5/10 (51.7%) and PHOTO (15’) results follow this downward trend: 50% of participants received a grade between 6-6.5%, as well.

Table 6.5. Frequency distribution of mean grades for Accuracy/Message Transfer

Accuracy/Message Transfer-mean grades								
(30')			(20')			(15')		
	Frequency	%		Frequency	%		Frequency	%
			4.5	2	6.9			
5.0	1	4.0	5.5	2	6.9	5.0	1	3.6
5.5	4	16.0	6.0	6	20.7	5.5	1	3.6
6.0	4	16.0	6.5	9	31.0	6.0	7	28.6
6.5	3	12.0	7.0	5	17.2	6.5	6	21.4
7.0	5	20.0	7.5	2	6.9	7.0	5	17.9
7.5	5	20.0	8.0	2	6.9	7.5	2	7.1
8.0	3	12.0	8.5	1	3.4	8.0	4	14.3
Total	25	100.0	Total	29	100.0	9.0	1	3.6
Missing	4					Total	28	100.0
Total	29					Missing	1	
						Total	29	

Some 84% of the participants scored high in terms of Accuracy/Message Transfer (>8/10) when they had 30 minutes at their disposal, rather higher than in the other criteria seen so far. As available time decreased, however, many participants received grades lower than 8/10: 40.9% and 46.7% for the 20-minute and the 15-minute time frames, respectively (Table 6.6).

Table 6.6. Frequency distribution of weighted grades for Accuracy/Message Transfer

Accuracy/Message Transfer-weighted grades								
30’	Acc/MT Frequency	Weighted %	20’	Acc/MT Frequency	Weighted %	15’	Acc/MT Frequency	Weighted %
6.31	1	4.0	4.91	1	3.4	5.39	1	3.6
6.91	1	4.0	5.11	1	3.4	5.51	1	3.6
7.36	1	4.0	5.31	1	3.4	5.68	1	3.6
7.58	1	4.0	5.83	1	3.4	6.28	2	7.1
8.00	3	12.0	6.03	1	3.4	6.68	1	3.6
8.20	3	12.0	7.17	1	3.4	6.71	1	3.6
8.22	1	4.0	7.37	1	3.4	7.14	1	3.6
8.40	3	12.0	7.39	1	3.4	7.22	1	3.6
8.53	1	4.0	7.67	1	3.4	7.36	1	3.6
8.60	1	4.0	7.86	1	3.4	7.40	1	3.6
8.80	4	16.0	7.97	2	6.9	7.47	1	3.6
9.00	4	16.0	8.02	2	6.9	7.80	1	3.6
9.20	1	4.0	8.06	2	6.9	8.40	4	14.3
Total	25	100.0	8.20	1	3.4	8.45	1	3.6
Missing	4		8.40	2	6.9	8.60	5	17.9
Total	29		8.42	1	3.4	8.68	1	3.6
			8.51	1	3.4	9.00	1	3.6
			8.67	1	3.4	9.20	2	7.1
			8.80	3	10.3	9.60	1	3.6
			9.00	1	3.4	Total	28	100.0
			9.20	2	6.9	Missing	1	3.4
			9.40	1	3.4	Total	29	100.0
			Total	29	100.0			

6.1.1.4. Textual Flow

Textual Flow includes factors such as fluency, cohesion and coherence. Around half of the participants (52%) received a grade between 7-7.5/10 for the 30-minute time frame. A slight downward shift can be observed for the 20-minute time frame: almost the same percentage of participants (51.7%) scored between 6.5 and 7/10. Results for the 15-minute time frame are more evenly spread between 6-8/10 (Table 6.7).

Table 6.7. Frequency distribution of mean grades for Textual Flow

Textual Flow-mean grades								
(30')			(20')			(15')		
	Frequency	%		Frequency	%		Frequency	%
			4.0	1	3.4			
			4.5	1	3.4			
5.5	1	4.0	5.5	1	3.4	5.5	2	7.1
6.0	4	16.0	6.0	2	6.9	6.0	4	14.3
6.5	4	16.0	6.5	10	34.5	6.5	5	17.9
7.0	8	32.0	7.0	5	17.2	7.0	8	28.6
7.5	5	20.0	7.5	6	20.7	7.5	3	10.7
8.0	3	12.0	8.0	2	6.9	8.0	5	17.9
Total	25	100.0	8.5	1	3.4	9.0	1	3.6
Missing	4		Total	29	100.0	Total	28	100.0
Total	29					Missing	1	
						Total	29	

A more detailed, yet similar, pattern emerges when the criterion of Completion is taken into account (Table 6.8). Results for Textual Flow are more dispersed when available time decreases (20-minute and 15-minute time frames). In fact, dispersion is directed toward lower grades: some 17% of the participants scored lower than 7/10 when they translated text RETRO within 20 minutes. This percentage increases to 28.8% in the case of text PHOTO, translated within 15 minutes.

Table 6.8. Frequency distribution of weighted grades for Textual Flow

Textual Flow-weighted grades								
30’	Frequency	Weighted %	20’	Frequency	Weighted %	15’	Frequency	Weighted %
6.51	1	4.0	5.11	1	3.4	5.59	1	3.6
6.71	1	4.0	5.31	1	3.4	5.68	1	3.6
7.56	1	4.0	5.51	1	3.4	5.71	1	3.6
7.60	1	4.0	5.63	1	3.4	5.88	1	3.6
7.78	1	4.0	6.03	1	3.4	6.48	1	3.6
7.80	1	4.0	7.17	1	3.4	6.68	1	3.6
8.20	1	4.0	7.19	1	3.4	6.71	1	3.6
8.22	1	4.0	7.37	1	3.4	6.82	1	3.6
8.40	3	12.0	7.67	1	3.4	7.40	1	3.6
8.60	3	12.0	7.97	1	3.4	7.47	1	3.6
8.73	1	4.0	8.02	2	6.9	7.54	1	3.6
8.80	3	12.0	8.06	2	6.9	7.76	1	3.6
9.00	3	12.0	8.17	1	3.4	7.80	1	3.6
9.20	3	12.0	8.26	1	3.4	8.25	1	3.6
9.40	1	4.0	8.51	1	3.4	8.40	1	3.6
Total	25	100.0	8.60	3	10.3	8.60	2	7.1
Missing	4		8.80	1	3.4	8.68	1	3.6
Total	29		8.82	1	3.4	8.80	4	14.3
			8.87	1	3.4	9.00	2	7.1
			9.00	3	10.3	9.20	3	10.7
			9.20	2	6.9	9.60	1	3.6
			9.40	1	3.4	Total	28	100.0
			Total	29	100.0	Missing	1	
						Total	29	

6.1.1.5. Comments on weighted grades

The results for the 20-minute and 15-minute time frames are quite similar. It looks as if the breaking point for most participants is under one of those time frames. This “stumbling block” supports the decision taken as a result of C2009 experiments, namely to exclude the 10 minute time frame from the C2010 experiments, as it would not contribute empirically.

From a statistical viewpoint, the weighted grades were analyzed per criterion to detect possible systematic differences between the three texts. The participants’ product-based performance is significantly higher as regards the 30-minute time frame in terms of

Formal Correctness and Terminology/Vocabulary (p=0.026 and p=0.048, respectively). It remains relatively unaffected when criteria 3 and 4 that is, Accuracy/Message Transfer and Textual Flow are taken into analysis (Table 6.9). Apparently, participants made more spelling mistakes and grammatical errors in their effort to finish on time. At the same time, some of them were probably not able to locate and use appropriate terminology.

Table 6.9. C2010 overview per criterion (weighted grades)

Criterion		30’	20’	15’	
Formal Correctness	Mean	8.5164	7.9083	7.8801	**p=0.026**
	Std. Deviation	0.74199	1.20344	1.18130	
Terminology – Vocabulary	Mean	8.3084	7.6738	7.7301	**p=0.048**
	Std. Deviation	0.67961	1.29001	1.17083	
Accuracy – Message Transfer	Mean	8.3084	7.8117	7.7730	p=0.568
	Std. Deviation	0.69363	1.24401	1.19044	
Textual Flow	Mean	8.4204	7.9014	7.8730	p=0.623
	Std. Deviation	0.74422	1.25701	1.23808	

6.1.1.6. Results-Overall grades

The final grades are again shown on a single table below, with grades around the central 7/10 zone strategically highlighted. The differences observed per criterion now fade away: Table 6.10 only reveals a slight difference in terms of grade variation between text COR (30’) and the other two texts. Again, it seems that certain participants were able to score high in all three texts, despite tight deadlines. At the same time, although the lowest results for the 30-minute time frame start at 6.66, the results for the 20-minute and the 15-minute time frame start at 4.96 and 5.44 respectively. This is already an indication that time affects overall translation quality on average, at least regarding increase in grades at the low end of the scale.

Table 6.10. C2010: Final grades per text

30’			20’			15’		
	Frequency	%		Frequency	%		Frequency	%
6.66	1	4.0	4.96	1	3.4	5.44	1	3.6
6.71	1	4.0	5.26	1	3.4	5.76	1	3.6
7.41	1	4.0	5.36	1	3.4	5.93	1	3.6
7.63	1	4.0	5.78	1	3.4	5.98	1	3.6
7.65	1	4.0	5.93	1	3.4	6.28	1	3.6
7.90	1	4.0	7.17	1	3.4	6.68	1	3.6
8.22	1	4.0	7.24	1	3.4	6.81	1	3.6
8.25	1	4.0	7.32	1	3.4	7.02	1	3.6
8.45	2	8.0	7.62	1	3.4	7.39	1	3.6
8.50	1	4.0	7.86	1	3.4	7.40	1	3.6
8.60	1	4.0	7.87	1	3.4	7.42	1	3.6
8.65	1	4.0	8.02	1	3.4	7.56	1	3.6
8.70	1	4.0	8.06	1	3.4	7.60	1	3.6
8.73	1	4.0	8.12	1	3.4	8.30	1	3.6
8.75	3	12.0	8.16	1	3.4	8.55	2	7.1
8.85	1	4.0	8.17	1	3.4	8.60	1	3.6
8.90	1	4.0	8.46	1	3.4	8.60	2	7.1
8.95	1	4.0	8.50	2	6.9	8.65	1	3.6
9.00	2	8.0	8.57	1	3.4	8.68	1	3.6
9.10	1	4.0	8.62	1	3.4	8.70	1	3.6
9.15	1	4.0	8.65	2	6.9	8.75	2	7.1
Total	25	100.0	8.80	1	3.4	8.95	1	3.6
Missing	4		8.85	1	3.4	9.10	1	3.6
Total	29		8.90	1	3.4	9.15	1	3.6
			9.10	1	3.4	9.60	1	3.6
			9.20	2	6.9	Total	28	100.0
			Total	29	100.0	Missing	1	
						Total	29	

6.1.2. Retrospective questionnaire (part II-product-related questions)

The C2010 participants filled in a retrospective questionnaire after each translation task, including product-related items. Although this part of the questionnaire was designed for research purposes, it might also serve in actual training and form the basis of a discussion

with students in an authentic classroom, following completion of a given translation task. The results for all three variables are presented per text, even though the variables are not strictly related in order to provide a clear (over)view of students' subjective perceptions.

The C2010 participants were asked to rate their satisfaction after they had delivered their product. They were also asked to rate how they experienced tasks in terms of difficulty and interest. Five-point Likert scales were used in all cases. As far as the 30-minute time frame is concerned, 52% of participants claimed they were neither satisfied nor dissatisfied with their products, and 68% rated text the 30 minute text as a text of medium difficulty, similar to the C2008 participants and earlier groups of students who were used for text selection (Table 6.11). As far as interest in the text is concerned, replies are spread along the available range: 24% found it to be very interesting, 20% gave the completely opposite reply, while 28% did not consider the text to be either of the two.

Table 6.11. 30-minute time frame: Product-oriented comments

Final_product_satisfaction			Easy_difficult_text			Interesting_or_not_text		
	Frequency	%		Frequency	%		Frequency	%
Very dissatisfied			Very easy			Very interesting		
1	3	12.0	1			1	6	24.0
2	6	24.0	2	2	8.0	2	5	20.0
3	13	52.0	3	17	68.0	3	7	28.0
4	3	12.0	4	5	20.0	4	2	8.0
			5	1	4.0	5	5	20.0
Very satisfied			Very difficult			Not interesting at all		
Total	25	100.0	Total	25	100.0	Total	25	100.0
Missing	4		Missing	4		Missing	4	
Total	29		Total	29		Total	29	

The participants' replies changed when they answered the same questions for the 20-minute time frame (Table 6.12). Some 34% claimed they were rather satisfied with their translation of text RETRO, many of them commenting that they were very proud they could do as much within the given time frame of 20 minutes. Answers related to the degree

of difficulty were divided between values 2 and 3 (medium difficulty), although seven participants mentioned in their comments that the text was trickier than they had thought, with a few very difficult parts. Contrary to text COR, the participants who found text RETRO not interesting at all are considerably fewer and the percentages steadily increase toward "very interesting" (31%). A possible interpretation could be what one participant noted: "It talked about AIDS, about things I didn't know that may affect all of us," this is, text RETRO felt closer to their own everyday life and experiences.

Table 6.12. 20-minute time frame: Product-oriented comments

Final_product_satisfaction			Easy_difficult_text			Interesting_or_not_text		
	Frequency	%		Frequency	%		Frequency	%
Very dissatisfied			Very easy			Very interesting		
1	1	3.4	1	2	6.9	1	9	31.0
2	8	27.6	2	14	48.3	2	7	24.1
3	9	31.0	3	8	27.6	3	7	24.1
4	10	34.5	4	5	17.2	4	4	13.8
5	1	3.4				5	2	6.9
Very satisfied			Very difficult			Not interesting at all		
Total	29	100.0	Total	29	100.0	Total	29	100.0

Less than half the participants (42.9%) were neither satisfied nor dissatisfied with their translation of text PHOTO within 15 minutes; 35.7% found the text of medium difficulty and another 35.7% found it to be on the easy side, at least the part they had translated (Table 6.13). It is interesting that participants who had finished the translation commented that the second paragraph was "definitely more difficult" than the first because it was a lot more "scientific". The participants did not seem to be as interested in text PHOTO as much as they were in text RETRO. Still, those who found text PHOTO to be interesting are slightly more numerous than those who did not find it of interest (42.9% vs. 35.7%).

Table 6.13. 15-minute time frame: Product-oriented comments

Final_product_satisfaction			Easy_difficult_text			Interesting_or_not_text		
	Frequency	%		Frequency	%		Frequency	%
Very dissatisfied			Very easy			Very interesting		
1	2	7.1	1	2	7.1	1	7	25.0
2	9	32.1	2	10	35.7	2	5	17.9
3	12	42.9	3	10	35.7	3	6	21.4
4	4	14.3	4	6	21.4	4	8	28.6
5	1	3.6			100.0	5	2	7.1
Very satisfied			Very difficult			Not interesting at all		
Total	28	100.0	Total	28		Total	28	100.0
Missing	1		Missing	1		Missing	1	
Total	29		Total	29		Total	29	

6.1.3. Participant-driven and problem-specific data collection

As explained in Chapter 3, C2009 and C2010 participants mentioned a maximum of five problematic areas in their retrospective questionnaires and/or semi-structured interviews. Two lists (one for C2009 and another for C2010) were drawn per text, including all problems mentioned by students.

Table 6.14. Number of problems mentioned by participants per text

	30’	20’	15’
C2009 (RQ*+interview)	9	11	11
Participants	15	15	15
C2010 (RQ)	13	15	15
Participants	25	29	28

*Retrospective questionnaire

C2010 participants mention approximately the same number of problems faced per text. These numbers seem to be consistently higher that those concerning C2009 (Table 6.14). This could be attributed to the lower number of respondents from C2009. This might also explain the fluctuating numbers concerning problems stated by C2009.

Problems mentioned by C2009 and C2010 largely overlap for all three texts. The most frequently mentioned problems are the same for both classes and they were the ones chosen for further analysis (Table 6.15). This adds to the (internal) validity of problem selection. Not all participants mentioned five problems. Fewer participants seem to report problems as time constraints increase. One reason might be that the participants did not translate the whole text; another could be that they grew tired toward the end of the experimental tasks.

Table 6.15. List of key problems selected [47]

		Problem (in order of appearance in the text)	Participants	
			C2009	C2010
30’	1	The effects of Coriolis (title)	6/15	16/25
	2	low pressure pocket	8/15	14/25
	3	its momentum drives it east of due north	11/15	11/25
	4	lag westward to its faster-moving destination	11/15	13/25
20’	5	Retroviruses (title)	7/15	14/29
	6	T-cells	6/15	13/29
15’	7	threshold frequency	9/15	17/28
	8	measurable current	8/15	10/28

These participant-based items were also treated as translation units for analysis in both this Chapter and Chapter 7. I agree with Jensen when she claims that “the unit could vary in size from a single word to a full sentence” (“depending on the text and the translator”) (2001: 97).

[47] Other problems are not shown because they were reported by less than 4/15 C2009 participants and less than 7/29 C2010 participants.

6.1.4. Summary

Assessment of 157 translations showed that, as time decreases, the number of lower-scoring participants increases. Aspects such as Formal Correctness, Terminology/Vocabulary, and Textual Flow seem to be compromised, whereas Accuracy/Message Transfer stands as more robust, relatively unaffected. Most participants found the texts to be of medium difficulty, yet in their evaluations they were reluctant regarding final product satisfaction. Their opinions on whether they found texts to be interesting vary greatly, although it seems that the text translated within 20 minutes, a text dealing with health issues, received the most positive replies.

6.2. Process-related Data

Retrospective questionnaires from C2009 and C2010, along with screen recordings from C2010, were the main sources of process-related data for this part of the study. Each participant filled in one retrospective questionnaire per text. As shown in Table 6.16, data were collected from a total of 157 questionnaires. Certain questionnaires are missing from the 2010 group because, as mentioned above, some participants faced attendance or technical issues and did not provide a translation to be commented on. The reason for using questionnaire data from both classes is explained in detail below.

Table 6.16. Number of retrospective questionnaires per text

	30’	20’	15’	Total Number of Questionnaires
2009 (N=25)	25	25	25	75
2010 (N=29)	25	29	28	82
				157

Each participant also produced one screen recording per text, i.e. a total of three recordings per person. Given that the time frames per translation task were 30, 20, and 15 minutes respectively, the result was a maximum of 65 minutes of screen recording per

participant who had delivered the whole set. Data collection, however, was based on screen recordings from C2010. As mentioned in Chapter 3, the C2009 recordings were used to test participants' reaction to the new modality (from pen-and-paper to typing/computing), in preparation for the C2010 experiment. Any post-experiment thoughts to include screen-recording data from C2009 in the analysis were abandoned because, as explained in Chapter 3, the video recordings from C2009 were not directly comparable with those from C2010 due to the screen-recording software glitch. Another reason was that the number of C2009 participants (29) is considered high vis-à-vis most process-oriented empirical studies in translation (cf. Chapter 2). On the other hand, the approximately equal academic ability of C2009 and C2010, as regards grade average and skills, meant that results from C2010 analysis might be extrapolated to a certain extent to C2009, thereby enhancing the validity of the present study.

Certain technical issues further reduced the number of screen recordings. Regarding text COR, apart from the four missing protocols already mentioned, the video file provided by participant #62 was corrupted. Participant #79 accidentally saved video files for texts RETRO and PHOTO in a wrong format, while participant #72 forgot to save the video file after the task. In the end, a total of approximately 28 hours of recordings was collected for processing (Table 6.17).

Table 6.17. Number and duration of C2010 screen-recording files per text

	30'	20'	15'	Total nr. of SR files
	30'	20'	15'	
Files C2010 (N=29)	24	28	26	78 files
Duration	720'	560'	390'	1670 minutes (28 hours approx.)

In order to proceed in a fast yet practical and efficient manner, the next step in the data collection procedure had to be carefully designed. Two recordings from C2009 were chosen as pilots. While watching the first recording, I proceeded in a linear way, i.e. I was

collecting pertinent data as they came up on screen. This increased the frequency of stopping and going back in the file. This first procedure included mixing horizontal (e.g. looking for time stamps pertinent to translation phases) and vertical tasks (e.g. I had to log the content per internet look-up). Apart from the long duration, an added disadvantage was that, after data collection, the impression regarding student's performance as a whole was too fragmentary to produce any coherent comments. While watching the second recording, however, I opted for a three-stage collection procedure, which proved to be more appropriate in relation to the purposes of this study. The aim was now to collect: 1) data related to task time distribution, 2) textual item-specific data, 3) data related to management of online resources. This second procedure was also time-consuming because each recording had to be processed at least three times, but it was chosen because it provided a comprehensive view of the process, also in terms of omissions and degree of linearity, which are other aspects pertinent to this study.

6.2.1. Production flow and time management

6.2.1.1. 30-minute time frame

According to the screen recordings, 17 of the 24 C2010 participants prepared their workbench in various ways. The time spent in this first phase ranges from 3 seconds to 155 seconds (2.58 minutes). All participants planned their translation, spending between 24 and 361 seconds (Table 6.18). They spent between 792 and 1745 seconds typing their translation. For those participants who chose to revise and had the time to do so (14/24), this last phase of revision lasted between 35 and 577 seconds.

Table 6.18. Production flow for 30 minutes (in seconds)

(SR) N=24 30 minutes	N	Mean	Std. Deviation	Min.	Max.
Preparation	17	73.24	42.426	3	155
Planning	24	153.00	84.361	24	361
Translation	24	1408.92	237.682	792	1745
Revision	14	242.29	181.894	35	577

6.2.1.2. 20-minute time frame

Slightly fewer C2010 participants (18/28) spent time preparing their workbench when available time was reduced to 20 minutes. The time spent in this first phase ranges from 6 seconds to 120 seconds (2 minutes). All of them planned their translation, spending between 33 and 330 seconds. The participants spent less time than before translating, between 870 and 1167 seconds (Table 6.19). For those few participants who chose to revise and had the time to do so (6/28), revision lasted significantly less than before, between 9 and 174 seconds.

Table 6.19. Production flow for 20' (in seconds)

(SR) N=28 20 minutes	N	Mean	Std. Deviation	Min.	Max.
Preparation	18	51.72	36.599	6	120
Planning	28	97.14	70.413	33	330
Translation	28	1057.71	83.587	870	1167
Revision	6	91.50	60.883	9	174

6.2.1.3. 15-minute time frame

In the 15-minute time frame, most C2010 participants (19/26) did not prepare their workbench at all. Those who did only spent between 6 and 59 seconds. They hurried into the second phase of planning, spending less time there as well, between 8 and 86 seconds. Translating took them even less time than before, between 590 and 892 seconds. Much like during the 20-minute time frame, a few participants did revise their texts (8/26). This time, however, those who revised spent more time than during the 20-minute time frame, between 27 and 243 seconds (Table 6.20).

Table 6.20. Production flow for 15' (in seconds)

(SR) N=26 15 minutes	N	Mean	Std. Deviation	Min.	Max.
Preparation	7	32.43	19.865	6	59
Planning	26	36.69	22.409	8	86
Translation	26	816.88	72.833	590	892
Revision	8	118.38	65.566	27	243

6.2.1.4. Overall production flow and time management

As available time decreases, the C2010 participants tend to drop any time-consuming preparing moves (Table 6.21a) to focus directly on planning and translating. Many of them even reduced the time spent on planning their translation under the third time frame of 15 minutes (Table 6.21b). They "trim" revision in a similar way: the corresponding percentage starts from almost 60% under the 30-minute time frame. When the available time is halved, so is the percentage for revision, approximately 30% (Table 6.21a). On the other hand, participants resist reducing translation time. This result echoes Jensen's conclusions (2001). Table 6.21b shows that the minimum percentage for the translation phase slightly increases as time decreases, while there are cases where participants devoted almost all of their time into translation. This behaviour may imply a blurring of phases, which Pym refers to as "blending" (2010).

Table 6.21a. C2010 management of translation phases in relation to time frames

	N=24		RETRO N=28		PHOTO N=26	
	30 min	%	20 min	%	15 min	%
Preparation	17	70.8	18	64.2	7	26.9
Planning	24	100	28	100	26	100
Translation	24	100	28	100	26	100
Revision	14	58.3	6	21.4	8	30.7

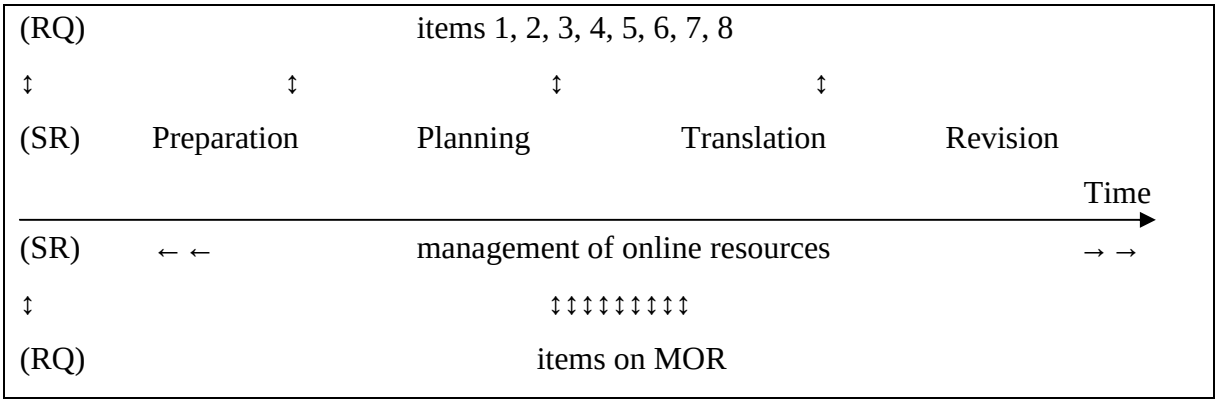
Table 6.21b. Range of time spent per translation phase in relation to time frames

	30 min	20 min	15 min
Preparation	0.3-3.7%	0.5-4.6%	0.7-6.6%
Planning	1.6-20.1%	2.8-27.5%	0.9-9.6%
Translation	63.6-96.9%	72.5-97.3%	68.1-99.1%
Revision	2.3-37.1%	0.9-15.3%	3-28%

6.2.2. Other aspects of the translation process

In the following paragraphs, data from retrospective questionnaires (RQ) are presented complemented by the observational data from screen recordings (SR). The results from both sources are juxtaposed with the following aims in mind: a) to facilitate comparisons, and b) to provide a basis for triangulation (Figure 6.2).

Figure 6.2. Data collection flow: Capturing process-based performance*



*RQ: retrospective questionnaires, SR: screen recordings, MOR: management of online resources

6.2.2.1. Reading source text before translating

The participants were asked whether they had read the whole text before translating it. When reporting on their 30-minute translations, only 8 of 25 (32%) claimedo have read the whole source text before they started translating. The numbers change dramatically when the participants were given 20 minutes: only 2/25 claimedo have read the text. The third text came with a time frame of 15 minutes and 3 of 28 stated they had read the source text before they started translating.

The screen recordings show a different picture. For example, the majority of C2010 participants (79.2%) seem to have read text COR (30') before the start of the translation phase, at least to the degree that such a conclusion may be reached from screen recordings only. This conclusion is supported by phase-time distribution data. As seen above, the preparation and planning phases are reduced in proportion to the total time allowed. Nevertheless, it is evident that even participants who claim not to have read the source text before translating did not start translating right away. The recordings show that, in many cases, participants spent up to 2.5 minutes a) (re-) arranging ST and TT windows on their computer desktop, or b) opening multiple windows in order to access basic translation-related sites. They personalized their work space in a preparatory fashion reminiscent of hard-copy dictionary stacking on final exam days in the recent past. In these time intervals it is probably true that participants also spent some time looking at the source text without acknowledging it. Taking into consideration the limitations of screen recording in relation to eye-tracking, BBFlashback time stamps were used as a rough basis for evaluation when the source text remained in full vision on screen for a long time. Table 6.22 demonstrates consistent under-reporting for all time frames concerned, although, admittedly, even the screen recordings confirm a decrease in prior source-text reading corresponding to decrease in time.

Table 6.22. Did you read the whole source text before translating it?

	30'		20'		15'	
	RQ	SR	RQ	SR	RQ	SR
YES	8 (32%)	19 (79.2%)	2 (6.9%)	20 (71.4%)	3 (10.7%)	10 (38.5%)
NO	17 (68%)	5 (20.8%)	27 (93.1%)	8 (28.6%)	25 (89.3%)	16 (61.5%)
	N=25	N=24	N=29	N=28	N=28	N=26

6.2.2.2. Change of usual translation method

The participants were asked whether they had changed their usual translation method that is, the steps they had followed to translate texts COR, RETRO and PHOTO. They were expected to know what "method" meant because we had used the term in this sense throughout the course. Those who answered positively then had to briefly describe what

their usual method was to ensure that only *conscious* changes were included. Methodologically speaking, participant-driven descriptions would minimize the need for looking into each recording for traces of such changes. Some 44% stated they had changed their usual translation method during the 30-minute time frame. This percentage decreases as regards the 20-minute time frame, only to increase again in the 15-minute time frame, where participants who did change their usual translation and those who did not actually settle into two equal-size groups (Table 6.23): It is possible that those who had changed their method in the first text realized this change was not to their benefit and switched back to their usual method, or vice versa.

Table 6.23. Did you have to change your usual translation method?

RQ	30’	20’	15’
	2010	2010	2010
YES	11 (44%)	10 (34.5%)	14 (50%)
NO	14 (56%)	19 (65.5%)	14 (50%)
	N=25	N=29	N=28

Most participants replied that their usual translation method was to read the whole text before translating. A Mann-Whitney test was used to check the relation of their statements, i.e. whether those who claimed they had changed their usual translation method had also moved on without reading the source text in advance (Table 6.24). As far as the 30-minute time frame is concerned, ten out of 16 participants (43.5%) who did not read the source text in advance did change their usual translation method, while the remaining six did not. At the same time, six out of seven participants who did read the source in advance did not switch method. This agreement or coincidence in the two variables is statistically significant ($x2(1)=4.537$, $p=0.033$) and it may also imply flexibility and adaptability on the part of the participants vis-à-vis the circumstances of the experiment. On the other hand, two thirds of the participants who did not read text RETRO (20-minute time frame) in advance did not change their usual translation method either. Half of those who did not read text PHOTO (15-minute time frame) in advance similarly did not change their usual

translation method. These results were not significant in either case: x2(1)=1.131, p=0.288 for the 20-minute time frame, x2(1)=0.373, p=541 for the 15-minute time frame.

Table 6.24. Relating prior ST reading with change of usual translation method (RQ)

		Change_method_CORIOLIS		
30 minutes		No	Yes	Total
Reading_before_CORIOLIS	No	6	10	16
		26.1%	43.5%	69.6%
	Yes	6	1	7
		26.1%	4.3%	30.4%
	Total	12	11	23
		52.2%	47.8%	100.0%
20 minutes		Change_method_RETRO		
		No	Yes	Total
Reading_before_RETRO	No	17	10	27
		58.6%	34.5%	93.1%
	Yes	2	0	2
		6.9%	.0%	6.9%
	Total	19	10	29
		65.5%	34.5%	100.0%
15 minutes		Change_method_PHOTO		
		No	Yes	Total
Reading_before_PHOTO	No	12	13	25
		42.9%	46.4%	89.3%
	Yes	2	1	3
		7.1%	3.6%	10.7%
	Total	14	14	28
		50.0%	50.0%	100.0%

6.2.2.3. Revision

The C2010 participants were asked whether they had had enough time to revise their translations. Self-report data from retrospective questionnaires show that an increasing number of participants claimed they ran out of time before they could revise their texts; percentages start from 48% for the 30-minute time frame then jump to 69% for the 20-minute time frame to reach 71% for the 15-minute time frame. Data from screen recordings, collected on the basis of the definition of the revision phase, seem to agree with those from

retrospective questionnaires in general, indirectly indicating that my criterion of what revision is and that of the participants' coincide. Table 6.25 shows low percentages of participants who stated they had time to revise up to a point. Apparently, the second biggest group is the one consisting of participants who stated that they had enough time to revise. It ranges from 44% for the 30 minute time frame down to 14.3% (exactly one third) when the available time is also reduced to one third of the original time frame.

Table 6.25. Revision

	Revision and Time for revision					
	No revision?	No revision	Partly?	Yes?	Light R	Heavy R
30' (RQ N=25) (SR N=24)	12/25 (48%)	10/24 (41.7%)	2/25 (8%)	11/25 (44%)	6/24 (25%)	8/24 (33.3%)
20' (RQ N=29) (SR N=28)	20/29 (69%)	23/28 (82.1%)	1/29 (3.4%)	8/29 (27.6%)	1/28 (3.6%)	4/28 (14.3%)
15' (RQ N=28) (SR N=26)	20/28 (71%)	18/26 (69.2%)	4/28 (14.3%)	4/28 (14.3%)	1/26 (3.8%)	7/26 (26.9%)
	RQ	SR	RQ	RQ	SR	SR

Data from screen-recording files were also used to portray the nature of revision. Revision was split into two categories:

- light revision, including simple re-reading of text, modifications such as correction of typos, punctuation and spelling mistakes;
- heavy revision, including more substantial modifications, such as term insertion following internet search, and sentence restructuring.

A pattern emerges for all three texts, with participants opting for the extreme: either they did not revise at all, or they revised substantially. Only a few participants opted for light revision, and they become even less numerous as time decreases.

It seems that many participants were revising during the translation phase. It becomes difficult, therefore, to talk about a separate revision phase in many cases and to calculate the time spent. The participants seem to recognize the above definition, placing

revision as a semi-autonomous process toward the end of the entire translation task, and responded accordingly. Yet this intertwining of the two phases (translation-revision) appears to correspond to texts reported as "partially revised" and echoes the concept of "reflection-in-action": a situation in which "our thinking serves to reshape what we are doing while we are doing it" (Shön 1987: 26). This underlines the need to take into account another feature of the translation process, namely the various degrees of linearity.

6.2.2.4. Linearity and Revision

For the purposes of the present study, and on the basis of screen recordings, translation work methods are divided into three categories:

1. Linear, whereby participants start translating from the title and proceed in a linear fashion until the end of the translation phase;
2. Inline, including cases where participants turn back to modify their translation but horizontally, i.e. at line level. The physical line of the text on screen was set rather arbitrarily as a limit on the assumption that participants would stick to modifications on or close to the same translation unit, as they perceived it. Since participants were not good typists it was assumed they would use the keyboard "arrows" for inline revisions and the mouse for revisions falling in category (3), even if that meant a sentence spreading over two lines, thereby wasting time. The line level was also seen as a convenient compromise between (1) and (3);
3. Multidirectional or non-linear, for example where participants leave the title for the end, translate a few lines and then start again from the beginning, or jump to a second paragraph. etc. Multidirectional work methods only include modifications beyond line level.

The table on revision is repeated to delineate the relationship between revision as a separate translation phase and linearity (Table 6.26). Almost half the C2010 participants started off with an in-line approach (41%), with the rest of them evenly split into non-linear and linear. As time decreased, during the 20-minute time frame, the percentage of in-line modifications remains relatively stable, yet there is a definite increase in non-linear approaches. A similar picture is valid for the 15-minute time frame. This shift in degree of

linearity could be interpreted as a secondary indicator of time pressure: participants were in a hurry to finish their tasks, leaving items for further processing at a later stage.

Revision does not constitute a separate phase for many participants. It seems to integrate with translation as available time decreases (cf. Pym 2009), often manifested by varying degrees of linearity (and lack thereof).

Table 6.26. Linearity and Revision

	Revision						Linearity		
	No?	No	Partly?	Yes?	Light R	Heavy R	Multi (non-linear)	In-line	Linear
30’	12/25 (48%)	10/24 (41.7%)	2/25 (8%)	11/25 (44%)	6/24 (25%)	8/24 (33.3%)	7 29.1%	10 41.6%	7 29.1%
20’	20/29 (69%)	23/28 (82.1%)	1/29 (3.4%)	8/29 (27.6%)	1/28 (3.6%)	4/28 (14.3%)	12 42.8%	12 42.8%	4 14.3%
15’	20/28 (71%)	18/26 (69.2%)	4/28 (14.3%)	4/28 (14.3%)	1/26 (3.8%)	7/26 (26.9%)	11 42.3%	10 38.5%	5 19.2%
source of data	RQ	SR	RQ	RQ	SR	SR	SR	SR	SR

6.2.2.5. Omissions

The majority of participants insisted on translating everything at all costs. Some 28% of them claimed they had omitted text on purpose when given 30 minutes, only 13.8% when given 20 minutes, and a much higher 35.7% when given 15 minutes. Even those who stated that they consciously decided to omit content, however, admit in the accompanying comments that they did so due to lack of time. What is more, the video recordings confirm that most participants regard as omissions the last lines or sentences they had no time to translate anyway. As these omissions are not really the result of conscious decision-making, we cannot really refer to them as “strategic omissions” (Krings 2001) and they are of little value for the purposes of this study, as they would not render meaningful data, reflecting

differences in learning styles. The number of people who appear to have actually decided to omit text is almost half, especially for the time frame of 15 minutes (Table 6.27). However, even those participants either repeated their main problems with the text or neglected to specify the reason behind the omissions. Due to such scant and fragmentary information, comments on omissions were only used as secondary indicators of problem-spotting (discussed in 4.2.3.7.), always bearing in mind that "linguistic omissions and additions are often required to ensure accuracy" (Hale 1997: 211).

Table 6.27. C2010: Conscious omissions

	Omissions (RQ: Decision not to translate)		
	30'	20'	15'
YES	7 (28%)	4 (13.8%)	10 (35.7%)
NO	18 (72%)	25 (86.2%)	18 (64.3%)
	N=25	N=29	N=28

6.2.2.6. Task completion

Task completion was seen from two aspects. First, the participants were asked if they had enough time to finish their translation. Second, their subjective statements were complemented by screen-recording analysis, where the criterion for completion was whether the participant had typed the last punctuation mark of the translation before delivering the product, irrespective of any quality-related considerations.

When the available time was set at 30 minutes, 40% of the participants stated it was enough for them to finish their translation. This percentage is reduced as time decreases for the 20-minute time frame (24.1%) and it returns almost as high as the first one in the 15-minute time frame (35.7%). The recordings show, however, that some participants who gave a negative answer to the question "Did you have enough time to finish your translation?" in their retrospective questionnaire did in fact finish their translation on time. The corresponding percentage for the 30-minute time frame is quite high, 66.7%, while percentages for the 20' and the 15-minute time frames are quite similar, 35.7% and 38.5% respectively (Table 6.28). The similarity in percentages recalls parallel results concerning other variables, further supporting the view that participants had reached a "stumbling

block" and empirically justifying the decision not to include a 10-minute time frame. A possible interpretation of the tendency toward under reporting task completion could be that participants did finish the translation of the text but not in the way *they* wanted it and they reflected this attitude in the answers they gave. Depending on their translating style, they might have needed more time for revision or multi-directional or in-line modifications during the translation phase.

Table 6.28. Task completion (RQ-SR)

	30'				20'				15'			
	RQ N=25		SR N=24		RQ N=29		SR N=28		RQ N=28		SR N=26	
YES	10	40%	16	66.7%	7	24.1%	10	35.7%	10	35.7%	10	38.5%
NO	15	60%	8	33.3%	22	75.9%	18	64.3%	18	64.3%	16	61.5%
Early delivery			8	33.3%			2	7.1%			1	3.8%

Another relevant point, this time in terms of time constraints, is the number of participants who managed to deliver their products *before* the deadline: approximately one third of participants managed to deliver text COR before the deadline of 30 minutes; only two participants did the same for text RETRO (20'), and just one for PHOTO (15').

This combination of data was further analyzed with a Mann-Whitney test (Table 6.29). As regards the 30-minute time frame, all eight participants who had not finished their translation on the basis of screen recordings admitted in their questionnaires that there was not enough time. The same is valid for all 18 participants when variables for the 20-minute time frame are analyzed. As far as the corresponding text is concerned (RETRO), 16 participants had not finished their translation on the basis of screen recordings and 16 of them admitted in their questionnaires that there was not enough time for them. The coincidence between the participants' perception of task completion and more subjective observational data is clearly validated, since all relevant p values are <0.05: $p=0.001$ for the 30-minute time frame, $p=0.001$ for the 20' time frame, $p=0.009$ for the 15-minute time frame. This conclusion is of critical importance because it brings up the complementary relationship between the pedagogical and the professional, since it is important for students to learn to know when their product is ready for delivery to the client (Kiraly 2000: 192).

Table 6.29. Task completion: coincidence between self-report and observational data

		Enough_time_COR		
30 minutes		No	Yes	Total
SR_Finish_Tcor	No	8	0	8
		33.3%	0%	33.3%
	Yes	2	14	16
		8.3%	58.3%	66.7%
	Total	10	14	24
		41.7%	58.3%	100.0%
		Enough_time_RETRO		
20 minutes		No	Yes	Total
SR_Finish_Tretro	No	18	0	18
		64.3%	0%	64.3%
	Yes	3	7	10
		10.7%	25.0%	35.7%
	Total	21	7	28
		75.0%	25.0%	100.0%
		Enough_time_PHOTO		
15 minutes		No	Yes	Total
SR_Finish_Tphoto	No	13	3	16
		50.0%	11.5%	61.5%
	Yes	3	7	10
		11.5%	26.9%	38.5%
	Total	16	10	26
		61.5%	38.5%	100.0%

6.2.2.7. Procedures

Procedure is considered to be a simple, neutral word from everyday life labeling a set of steps (modified from Scott-Tennent et al. 2001: 23) leading to a specific result for the purpose of specific problem-solving. As already discussed in Chapter 3, four procedures were chosen as the most pertinent for the present study:

1. Omission, including all types thereof, such as instances of strategic omission or avoidance, accidental omissions.
2. Literalism, synonymous with word-for-word or segment-for-segment translation.

3. Specification, meaning a restatement, rephrasing, rewording.
4. Generalization: a roundabout way of expressing something; circumlocution. It feels vaguer.

Table 6.30. Procedures*

	30' N=24								20' N=28				15' N=26			
	P1	%	P2	%	P3		P4		P5		P6		P7		P8	
Omission			1	4.5	6	27.3	4	20.0	1	3.6			7	26.9	2	8.3
Literalism	11	**45.8**	4	18.2	6	27.3	6	30.0	23	**82.1**	11	**45.8**	3	11.5	18	**75.0**
Specification	9	37.5	4	18.2	7	**31.8**	3	15.0	4	14.3	9	37.5	6	23.0	1	4.2
Generalization	4	16.7	13	**59.1**	3	13.6	7	**35.0**			4	16.7	10	**38.5**	3	12.5
	24	100.0	22	100.0	22	100.0	20	100.0	28	100.0	24	100.0	26	100.0	24	100.0

*Based on screen-recording data. Numbers of participants differ because some of them did not reach certain items while translating.

The C2010 participants seem to avoid omissions when it comes to terms and this is supported by their replies in the retrospective questionnaires (4.3.2.5.). Omissions seem to increase, however, when long and complex phrases (P3, P4) are to be translated and during the last time frame of 15 minutes (Table 6.30). As far as the rest of the procedures are concerned, there is a marked tendency toward literalism, reaching extremely high percentages during the 20- and 30-minute time frame: 82.1% for P5 and 75% for P8, respectively. The participants' second most preferred procedure is generalization. In fact, it could be argued that generalization is participants' last resort before omission: generalization is employed by 35% as a solution to P4, while the corresponding percentage for omission is 20%. Generalization is employed by 38.5% as a solution to P7 as well, and again the corresponding percentage for omission, 26.9%, is relatively high. Comments from participants' retrospective questionnaires indicate that omission is seen as a weakness. They seem to agree with Leppihalme's interviewees, who felt that omission was permissible only when everything else fails (1997: 88).

6.2.3. Management of online resources

Management of online resources (MOR) is seen as yet another performance variable that might reflect differences in learning styles, as it is inextricably intertwined with text production. The following paragraphs report how C2010 participants handled online resources, given the relative lack of available time. A second set of questions aims at illustrating the nature and quality of this management, i.e. how participants ended up with their results by focusing on specific-item analysis (the problems analyzed are those described in 4.1.6.) and screen recordings. From a methodological viewpoint, it is important to note that the participants had no access to hard-copy dictionaries or other related material. They were thus forced to resort to the internet for their documentation needs, so that their (recorded) moves on screen would represent the totality of their visible research efforts.

6.2.3.1. Perceived availability of time for internet searches

Despite the fact that many C2010 participants did not have enough time to finish their translation tasks, more than half (60%) stated they had enough time to perform the internet searches they wished to make. The number of participants who found no time to search on the internet increases as time decreases, from 0% to 3% and to 6% for the last text. Nevertheless, the percentage of participants who stated they had enough time to perform the internet searches they wanted remains high, at 75.8% as regards the 20-minute time frame and 60.7% as regards the 15-minute time frame, respectively (Table 6.31). This result poses questions as to the quality of searches and participants' prioritizing skills between time for searches and time for overall task completion.

Table 6.31. Perceived availability of time for internet searches

	Did you have time to perform internet searches?		
	30'	20'	15'
	N=25	N=29	N=28
YES	15 (60%)	22 (75.8%)	17 (60.7%)
UP TO A POINT	10 (40%)	4 (13.8%)	5 (17.9%)
NO	0	3 (10.3%)	6 (21.4%)

6.2.3.2. Perceived availability of time for alternative solutions

Some 64% of participants stated that they had time to choose between alternative solutions when they had 30 minutes at their disposal. This percentage drops by two thirds when available time is reduced and remains at this low level under the last time frame of 15 minutes (Table 6.32). In essence, there are no differences between the 20-minute and the 15-minute time frames because, in all cases, the difference in percentage arises from a single missing participant; therefore, percentages are treated as equal.

Table 6.32. Perceived availability of time for alternative solutions

	Did you have time to choose among alternative solutions?		
	30’	20’	15’
	COR	RETRO	PHOTO
	N=25	N=29	N=28
YES	16 (64%)	7 (24.1%)	7 (25%)
UP TO A POINT	1 (4%)	2 (6.9 %)	2 (7.1%)
NO	8 (32%)	20 (67.9%)	19 (67.9%)

6.2.3.3. Type of unit searched

Screen-recording data allow for a more in-depth look into how participants handled online resources. The analysis becomes item-specific, focusing on the participant-driven list of eight problems selected in previous paragraphs. The first question to be asked is *what* participants looked at in their effort to solve their problems. “What” does not refer to actual search content, since that would certainly differ but it would not reflect different learning styles. It refers to the type of translation units participants chose to search for online. For the purposes of this analysis, the translation units I examined correspond to the eight selected problems most frequently faced by C2010 (and C2009) participants. It should be noted that although participants may have reported a specific item as a problem, this report does not necessarily guarantee that they searched online for a solution nor vice versa, hence differences between tables on problematic areas and below may occur.

Table 6.33. Types of units searched online

	30' (N=24)				**20' (N=28)**		**15' (N=26)**	
	P1*	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
Whole Unit	..	4 (19%)	..	..	16 (76.2%)	13 (100%)	1 (5.3%)	1 (14.3%)
Part of Unit	15 (78.9%)	12 (57.1%)	20 (100%)	19 (100%)	2 (9.5%)	..	11 (57.9%)	6 (85.7%)
Combination	4 (21.1%)	5 (23.8%)	..	..	3 (14.3%)	..	7 (36.8%)	..
Actual Search	19	21	20	19	21	13	19	7

*P=problem faced by the majority of participants

A tendency toward segmentation of units is evident in Table 6.33, especially in those cases where the translation unit was a compound term: P1-Coriolis effect, P2-low pressure pocket, P7-threshold frequency or an adjectival phrase: P8-measurable current. P3 and P4 are rather long phrases, therefore, looking for isolated words from those phrases would be taken for granted. It is interesting that, regarding P1, only one participant searched for "effect" on its own. The rest focused on "Coriolis", often neglecting the fact that "effect" in such contexts may be a false friend of the Greek word "phenomenon", as shown in classroom examples.

The tendency toward segmentation, although appropriate at times, signals that participants still perceive a "term" to be a single word. This is a characteristic of beginning students of translation who "tend to approach a translation task as a sequence of words and sentences whose meaning is to be established and then translated into the target language" (Tirkkonen-Condit 1989: 252). Even though they stated that they had faced problems with (the whole) *term* X, in practice their search is largely limited to word level, or even lower. Five participants broke P5-retroviruses into its constituent parts and searched for "retro".

6.2.3.4.Types of resources and frequency

C2010 participants visited a variety of websites and portals to solve the eight selected problems, according to screen recordings. Sites included in.gr-foreignword.com-

pathfinder.gr [48] , IATE, translatum.gr, physics4u.gr, med.auth.gr, Google, Wikipedia, mymemory.net, Google translate, Babelfish, Systran. From a pedagogical viewpoint, a greater variety of websites was expected, when considering the number of sites shown and used in class. It seems that participants followed relatively tried and true paths they felt safe with. On the other hand, it would not be reasonable to require them to try new types of websites or even use sites they did not feel comfortable with for whatever reason, especially under time constraints. Moreover, a few participants even visited sites presented in class as examples to avoid because they were of low reliability for translation purposes.

A closer look at those websites revealed the four broad categories in Table 6.34:

- Encyclopedias
- General bilingual online dictionaries
- Specialized bilingual dictionaries
- Portals offering free machine translation services.

Table 6.34 clearly demonstrates a preference for general bilingual online dictionaries for all selected problems. Encyclopedias may be the starting point for certain participants, since they seem to be visited more often for the first problem per text but less for those following: once the participant gets familiar with the topic, sites of an encyclopedic nature may not be needed any more. Resorting to encyclopedias is also reduced in proportion to reduced time. There is a relatively limited use of specialized bilingual dictionaries, although the texts were rather specialized. Comments in the retrospective questionnaires did not help to attribute this behavior to reluctance on behalf of participants or to lack of time. On the other hand, it is evident that participants often consulted free machine-translation sites. This could be interpreted as an intelligent approach with the purpose of saving time, under demanding time constraints. There were cases where participants visited certain machine-translation sites of questionable quality, since site visitors-users are allowed to modify online translations at will. There were other cases where participants used such sites in their search for a term, for example, the term “retrovirus” (P5) further below.

[48] These three websites offer a general English<>Greek online dictionary. They are treated as one because they share the same lexicographical database of in.gr.

Table 6.34. Types of resources used

	(30')				(20')		(15')	
	P1	P2	P3	P4	P5	P6	P7	P8
Encyclopedias	7	4	2	3	6	3	..	..
Gen. Bilingual	12	16	17	13	13	3	14	5
Sp. Bilingual	8	6	2	1	7	5	3	1
MT sites	5	3	3	5	7	3	6	1

Websites were analyzed again to check how participants were using them (Table 6.35). For example, nine participants used site(s) from a single category: encyclopedias or general bilingual dictionaries or specialized bilingual dictionaries or machine translation sites. There is a clear descending order that, at 15 minutes, might be interpreted as a secondary indication of time constraints. This tendency may also be interpreted as a sign of economy: participants perhaps economized on their search moves so as to focus on other, more pressing matters.

Table 6.35. Frequency of sites used (categories)

	30'				20'		15'	
	P1	P2	P3	P4	P5	P6	P7	P8
0	6	3	4	6	6	15	7	19
1	9	15	16	15	13	12	15	7
2	5	4	4	2	7	1	4	
3	3	2		1	2			
4	1							

6.2.3.5. Occurrence of searches

The participants' management of online resources was seen in relation to the translation phases defined in 4.2.1 for the eight selected problems. The preparation phase was excluded because it does not involve documentation searches.

According to Table 6.36, 13 of 19 and 14 of 21 participants accessed websites during the planning phase, before translating, for problems P1 and P5. This increased percentage may be attributed to the fact that these problems were located in the titles of texts COR and

RETRO. As a result, they posed an extra challenge due to lack of immediate context. For the rest of the problems, most participants looked terms or phrases up as soon as they appeared in the text during the translation phase. Pauses indicated by corresponding time stamps in the screen recordings (keystroke logging function) hint that participants "saw" most of the problems quite earlier than that (cf. Muñoz 2009a). However, eye-tracking technology would be the appropriate methodology to provide evidence for such an eventuality. Searches during the revision phase are scarce. This might be attributed to time constraints rather than conscious decision-making, as previously mentioned comments from retrospective questionnaires suggest.

Table 6.36. Occurrence of online searches (translation phases)

	(30')				(20')		(15')	
	P1	P2	P3	P4	P5	P6	P7	P8
Planning	13 (68.4%)				14	2 (15.4%)		
Translation (show-up)		19	19	19	3	8 (61.5%)	17 (89.5%)	4 (57.1%)
Translation (during unit processing)		2				3 (23.1%)		1 (14.3%)
Revision					1		1 (5.3%)	2 (28.6%)
Combination	6 (1.6%)		1		3		1 (5.3%)	
Total	19	21	20	19	21	13	19	7

6.2.4. Summary

A four-phase translation model was used to analyze the multi-faceted translation process. The data show that participants heavily reduce the preparation and planning phases but resist shortening translation time as time decreases. Fewer participants revise when deadlines become tighter but, at the same time, those who do opt to revise, revise substantially. The quality of the translation phase is altered as well: more participants blend translation and revision, and this attitude seems to throw them off linear ways of translating. Participants usually consult online resources the moment they reach the (problematic) item for translation. Most of them search for terms at word level, although they do consult a

variety of sources, especially during the 30-minute time frame. Although many of them do not seem to finish their translations, they claim they had enough time for internet searches.

6.3. Participant-related data

There was a conscious effort to control participant-specific variables in a way that would allow correlations with learning styles to emerge. The following paragraphs present another set of variables, including level of L1/L2, level of typing and computing skills, that needed to be controlled due to their potential effect on task time. Attention is then paid to learning styles themselves. Participant profiling is complemented by the presentation of additional information and a selection of students' comments regarding overall task experience.

6.3.1. Skills

6.3.1.1. Language skills (L1-L2) 09-10

The test for assessing Greek language skills was the free online version of the "Greek Placement Test" offered to non-native speakers of Greek by a private institution in Greece, the Hellenic American Union. Even though analysis was based on C2010 results, in this chapter results from both C2009 and C2010 are presented in Table 6.37, merely to further consolidate the fact that these two classes had equal dynamics on the whole.

Table 6.37. Level of L1 (Greek). C2009 and C2010

			EL_Level			
Grade (%)	C2009	%	C2010		C2009 and C2010	%
93	0	0%	2	6.9%	2	3.7%
95	0	0%	1	3.4%	1	1.9%
97	10	40%	8	27.6%	18	**33.3%**
98	5	20%	7	24.1%	12	**22.2%**
100	10	40%	11	37.9%	21	**38.9%**
Total	25	100%	29	100%	54	100%

It is clear that C2009 and C2010 participants scored high in this test. The uniformity of grade distribution is alarming: the results should be interpreted with caution because this test was originally intended for *non-native* speakers of Greek. In addition, differences in percentages reflect differences in one or two replies. From another perspective, this picture does not reflect the impression construed on the basis of participants' translations into Greek throughout their semester. What can be concluded is that both C2009's and C2010's level of Greek appears similar, i.e. without any significant differences ($\chi^2(4)=3.325$ and $p=0.505$). This rather crude picture attests to the need for a valid, easy to use, yet fine-grained tool to measure L1 language skills of native speakers of Greek.[49]

Moving to participants' L2, English, the test administered was the Quick Placement Test (QPT) by Oxford University Press. This test comes with a Chart of Equivalent Levels (CEL) helping users translate results meaningfully into several ranking schemes regarding language proficiency, among them the Common Reference Language Levels (A1-A2-B1-B2-C1-C2) developed by the Council of Europe (2009). A further, practical, reason was

[49] The State Language Certificate Exam for Greek, level D, developed under Common European Framework guidelines and also addressed to non-native speakers of Greek, would have been the preferred candidate. However, it has four papers and the whole exam takes 4-5 hours and corresponding time to grade it. Thus, it was considered to be excessive in relation to this study.

that the Quick Placement Test can be marked very quickly using the offered overlays. Participants were instructed to take the whole test.

Table 6.38. Level of L2 (English) for C2009 and C2010

		C2009		C2010		C2009 and C2010	
	B2	0	0%	4	13.8%	4	7.4%
EN_Level	C1	14	56%	17	58.6%	31	**57.4%**
	C2	11	44%	8	27.6%	19	**35.2%**
		25	100%	29	100%	54	100%

The vast majority of participants from both C2009 and C2010 are considered to be proficient users of English because their scores fall within C1 and C2 level (Table 6.38). Classes seem to differ slightly in their C2 band scores but this difference is not significant ($\chi^2(2)=4.49$ and $p=0.106$).

6.3.1.2. Typing skills

As mentioned in Chapter 3, controlling the variable of translating speed would constitute a challenge because the process of translating is not a homogeneous, linear act. From a practical viewpoint, the following fact had to be taken into consideration: the keystroke logging software used, BBFlashBack, did not have a function indicative of translation production, unlike Translog, which presents a distinction between (overall number of) keystrokes as an indicator of average typing speed and text production keystrokes as a rough measure of text production efficiency (Jakobsen 2010: personal communication). Therefore, I decided to limit analysis to typing speed, which could be effectively measured.

In their diagnostic sheets for the course, C2009 and C2010 participants were asked whether they touch-typed. There were very few positive answers, less than 15% (Table 6.39), although many of the participants commented that they were fast two-finger typists.

Table 6.39a. Touch-typists in C2009 and C2010

Touch-typists?	C2009	C2010	Frequency	%
Yes	2	4	8	14.8
No	23	25	46	**85.2**
Total	25	29	54	100.0

WPM was kept as a measuring unit throughout the semester and in this study because that was the measuring unit of the freeware used for all typing exercises and final typing speed test. The results from the final typing speed test (Appendix E.5) are greatly dispersed. This was unexpected because the freeware was installed in the School of English Computing Lab and it was available for download on the course's website in BlackBoard for C2009 and C2010 participants to practice with. C2009 and C2010 participants were also tested in class three times during the semester in order to gauge, and improve, their typing speed progress themselves.

The wide range of participants' typing speed, from 17 to 43 WPM (Appendix E.5), called for more flexible data management, collapsing results. Band scales were used in order to have a clear view of the material and to process corresponding data statistically at a later point (Table 6.39c).

I decided to classify C2009 and C2010 participants into three groups: slow, average and fast typists, after taking as a guide the figures mentioned in typing literature (cf. Chapter 3) and the lack of touch-typists in the groups (Table 6.39a). Most participants had claimed to be an average PC user. This, along the previous comment that the rate may drop down to 19 WPM when text is composed by an average PC user on the spot (3.2.2.3), led me assume that 20 WPM would be a suitable border between slow and average typists. On the other hand, participants did not really meet professional rate of 50 WPM. Taking into account that the transcription rate of average PC users is set at 33 WPM (Linguanaut 2011), this number was rounded off to 30 WPM to distinguish average typists from fast ones.

Table 6.39b. Typing speed results for C2009 and C2010 (band scores)

Participants' Typing Speed						
	C2009	%	C2010	%	C2009 and C2010	%
Slow (<20WPM)	13	52.0%	10	34.5%	23	42.6%
Moderate (21-29 WPM)	9	36%	14	48.3%	23	42.6%
Fast (>30 WPM)	3	12%	5	17.2%	8	14.8%
Total	25	100%	29	100%	54	100%

According to Table 6.39b, when C2009 and C2010 are seen as a whole, two equally large groups occur: slow and moderate typists, each group corresponding to 42.6% of the total percentage. It seems that C2010 has approximately the same number of slow and fast typists in relation to C2010, but C2010 appears to have a higher number of moderate typists. This increase may be the result of additional typing practice by participants, although there is not enough evidence to support this. Statistically speaking, the differences in these band scores are not significant: the Pearson test used to measure correlation between C2009 and C2010 scores was x^2 =1.691 and p=0.429. The results were used in this study, while bearing in mind that they constitute participants' *potentially maximum* typing speed while translating.

6.3.1.3. Computing skills 09-10

A result of the change in modality was that the level of general computing skills for C2009 and C2010 participants had to be established. Both groups had successfully attended the first-year compulsory module "Computer Literacy". Self-report data came from answering the question: "Do you consider yourself a 1) beginner, 2) false beginner, 3) average, 4) advanced PC user?" found in their diagnostic course sheets. Participants' listing of known software programs on the same sheet was a further piece of evidence: "Please name

software programs you know and feel confident about using". The answers to this question were only consulted in two cases where the selection of level by the students was not clear.

Table 6.40. Level of Computing Skills for C2009 and C2010

	Participants' Computing Skills					
	C2009		C2010		C2009 and C2010	
Beginner	2	8%	1	3.4%	3	5.6%
False beginner	1	4%	5	17.2%	6	11.1%
Average PC user	18	72%	20	69%	38	70.4%
Advanced PC user	4	16%	3	10.3%	7	13%
Total	25	100%	29	100%	54	100%

The overwhelming majority of participants from both C2009 and C2010 claim to be average computer users (Table 6.40), meaning that they are able to use programs such as Microsoft Word, Excel, PowerPoint and feel confident handling their e-mail accounts and surfing on the internet. Classes seem to differ slightly in their band scores but this difference is not significant ($\chi^2(3)=5.55$ and $p=0.135$). In essence, it seems three groups occur: below average users, average users, advanced users. Evidence from class experience until the time of the experiment provides further support of these results.

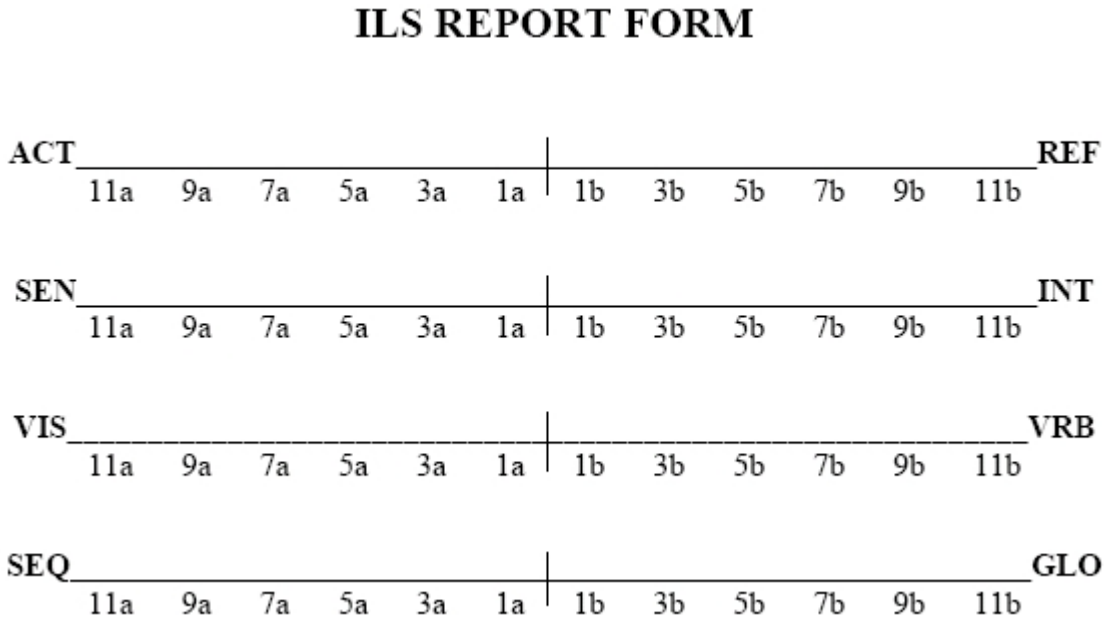
6.3.2. Learning styles

6.3.2.1. Identification and treatment of learning styles

The pencil-and-paper version of the Index of Learning Styles (ILS), "an instrument designed to assess preferences on the four dimensions of the Felder-Silverman learning style model" (Felder and Spurlin 2005: 103), was used as a step toward identifying the learning styles of the C2009 and C2010 participants. Participants had to answer a 40-item questionnaire by choosing between answer A and answer B in each case. Then they filled in the answer sheet provided.

The participants themselves calculated their scores by subtracting "b" responses from "a" responses and then transferred their score from their answer sheet to the ILS report form (Figure 6.3), like the C2008 participants before them. This procedure gave them the opportunity to have a clear view of their profile at a glance and proved useful in sparking discussion in the classroom after both experiments. For statistical purposes, however, I followed Felder and Spurlin's advice and re-calculated the C2009 and C2010 scores, this time counting "a" responses exclusively, so that scores on each of the four dimensions would be integers ranging from 0 to 11 (2005: 104).

Figure 6.3. ILS report form



This meant that 0 or 1 "a"[50] responses for any of the four dimensions would represent a strong preference for learning styles on the *right*-hand side of the form (referential/intuitive/verbal/global), whereas 10 or 11 "a" answers would represent a strong

[50] As mentioned by Felder (2005)

preference for learning styles on the *left*-hand side of the form (active/sensing/visual/sequential) (Table 6.41).

Table 6.41. ILS scoring format counting “a” responses

ACT						Dimension 1							REF
SEN						Dimension 2							INT
	11	10	9	8	7	6	5	4	3	2	1	0	
	strong preference		moderate preference		mild preference		Mild preference		moderate preference		strong preference		
VIS						Dimension 3							VRB
SEQ						Dimension 4							GLO

6.3.2.2. Classification of C2009 and C2010 participants

The distribution of C2009 and 2010 participants as one group for each of the four learning style dimensions, following re-calculation of scores according to Felder and Spurlin (2005: 104), is presented in Table 6.42. We find that 72.3% of the participants seem to be rather well balanced concerning Dimension 1, Active/Reflective, that is, they occupy central positions 4 to 7 on the 11-integer scale, those with a slant toward active learning being more numerous (44.5%) than those with a tendency toward reflective learning (27.8%). Two out of three participants are “sensing” learners, i.e. they “often like solving problems by well-established methods and dislike complications and surprises” (Felder and Soloman 1993: 8). In fact, there is a variety of sensing learners, from rather balanced ones to those with a very strong preference for sensing learning, almost evenly spread along their half of the scale. A similar tendency, albeit stronger, can be seen in Dimension 3: approximately 30% of participants are verbal learners, whereas the remaining 70% have a visual approach to learning and problem solving, either mild or strong. This distribution frequently occurs in university classes (ibid.: 9). As far as the fourth dimension is concerned, the proportion is approximately 40/60 in favor of global learners. Nevertheless, this dimension seems to be

more compact, i.e. there are few participants at the extremes and more around the center of the scale.

Table 6.42. Re-calculation of ILS scores for statistical purposes (C2009 and C2010)

Participants' ILS Scores (C2009-C2010)

Dim1: ACT ↑↑↑↑↑↑↑↑↑↑↑ >REF	LS Dimension 1: Active-Reflective			Dim2: SEN ↑↑↑↑↑↑↑↑↑↑↑ >INT	LS Dimension 2: Sensing-Intuitive			Dim3: VIS ↑↑↑↑↑↑↑↑↑↑↑ >VRB	LS Dimension 3: Visual-Verbal			Dim4: SEQ ↑↑↑↑↑↑↑↑↑↑↑ >GLO	LS Dimension 4: Sequential-Global		
	'a'	Participants	%		'a'	Participants	%		'a'	Participants	%		'a'	Participants	%
	1	2	3.7		1	1	1.9		1				1		
	2	1	1.9		2	2	3.7		2	1	1.9		2	3	5.6
	3	3	5.6		3	3	5.6		3	1	1.9		3	6	11.1
	4	7	13.0		4	7	13.0		4	8	14.8		4	6	11.1
	5	8	14.8		5	5	9.3		5	6	11.1		5	7	13.0
	6	11	20.4		6	7	13.0		6	3	5.6		6	11	20.4
	7	13	24.1		7	6	11.1		7	9	16.7		7	14	25.9
	8	5	9.3		8	8	14.8		8	8	14.8		8	5	9.3
	9	2	3.7		9	8	14.8		9	8	14.8		9	1	1.9
	10	1	1.9		10	6	11.1		10	6	11.1		10		
	11	1	1.9		11	1	1.9		11	4	7.4		11	1	1.9

C2009 and C2010 N= 54 participants 100%

Table 6.43a. ILS scores per class unit (C2009-C2010)

Participants' ILS Scores per Class Unit (C2009, C2010)

	LS Dimension 1: Active-Reflective					**LS Dimension 2: Sensing-Intuitive**					**LS Dimension 3: Visual-Verbal**					**LS Dimension 4: Sequential-Global**				
	'a'		2009		2010	'a'		2009		2010	'a'		2009		2010	'a'		2009		2010
Dim1: ACT → REF	1	2	8.0%			1			1	3.4%	1					1				
	2	1	4.0%			2	2	8.0%			2	1	4.0%			2	2	8.0%	1	3.4%
	3	2	8.0%	1	3.4%	3			3	10.3%	3			1	3.4%	3	5	20.0%	1	3.4%
	4			7	24.1%	4	1	4.0%	6	20.7%	4	3	12.0%	5	17.2%	4	3	12.0%	3	10.3%
	5	2	8.0%	6	20.7%	5	2	8.0%	3	10.3%	5	2	8.0%	4	13.8%	5	2	8.0%	5	17.2%
	6	5	20.0%	6	20.7%	6	3	12.0%	4	13.8%	6	3	12.0%			6	3	12.0%	8	27.6%
	7	8	32.0%	5	17.2%	7	5	20.0%	1	3.4%	7	4	16.0%	5	17.2%	7	8	32.0%	6	20.7%
	8	3	12.0%	2	6.9%	8	5	20.0%	3	10.3%	8	2	8.0%	6	20.7%	8	2	8.0%	3	10.3%
	9	1	4.0%	1	3.4%	9	3	12.0%	5	17.2%	9	3	12.0%	5	17.2%	9			1	3.4%
	10	1	4.0%			10	3	12.0%	3	10.3%	10	5	20.0%	1	3.4%	10				
	11			1	3.4%	11	1	4.0%			11	2	8.0%	2	6.9%	11			1	3.4%

Dim2: SEN → INT | **Dim3: VIS → VRB** | **Dim4: SEQ → GLO**

C2009 (N=25) and C2010 (N= 29) participants

Table 6.43b. C2009 and C2010 χ^2 test for independence

	Value	Df	p
Pearson Chi-Square	15.103[a]	10	0.128
Pearson Chi-Square	14.363[a]	10	0.157
Pearson Chi-Square	11.210[a]	9	0.262
Pearson Chi-Square	8.796[a]	8	0.360

The frequency distribution is slightly modified when the two groups are analyzed separately (Table 6.43a). It seems that C2009 participants are more evenly distributed on the sensing side of Dimension 2, while the same group seems to have more extreme visual learners than C2010. However, none of these observations are significant (Table 6.43b). The patterns on the average remain statistically stable for all of the four dimensions concerned, as Table 6.43b indicates, irrespective of whether participants' learning styles are analyzed per year or as a single group.

6.3.3. Participant-related comments

In their retrospective questionnaires, the C2010 participants were asked to express how they felt during each translation task. This part of the retrospective questionnaire was translated and modified from TransComp material (Göpferich, 2008: 257) and it was only distributed to C2010 participants. The purpose behind this particular set of questions was:

- to provide secondary indications of time pressure or other subjective-emotional factors that might have contributed to participants' performance (micro-level);
- to complement the picture of C2010 as a group by placing emphasis on the human factor (macro-level); and
- to combine the empirical with the pedagogical (cross-section); as with other parts of the same retrospective questionnaire, this set of questions could easily form the basis of a lively discussion in an authentic classroom setting.

Table 6.44. C2010 reactions and perceptions

	N=25 30’			N=29 20’			N=28 15’		
Focused?		Freq.	%		Freq.	%		Freq.	%
Not at all	1	2	8				1	2	7.1
Up to a certain degree	2	11	44	2	14	48.3	2	14	50.0
Very much so	3	12	48	3	15	51.7	3	12	42.9
	Total	25	100.0	Total	29	100.0	Total	28	100.0
Time?		Freq.	%		Freq.	%		Freq.	%
Not at all	1	1	4				1	2	7.1
Up to a certain degree	2	10	40	2	8	27.6	2	6	21.4
Very much so	3	14	56	3	**21**	**72.4**	3	**20**	**71.4**
	Total	25	100.0	Total	29	100.0	Total	28	100.0
Upset?		Freq.	%		Freq.	%		Frequency	%
Not at all	1	**7**	28	1	4	13.8	1	4	14.3
Up to a certain degree	2	11	44	2	18	62.1	2	12	**42.9**
Very much so	3	**7**	28	3	7	24.1	3	12	**42.9**
	Total	25	100.0	Total	29	100.0	Total	28	100.0
Relaxed?		Freq.	%		Freq.	%		Frequency	%
Not at all	1	20	80	1	20	69.0	1	22	78.6
Up to a certain degree	2	5	20	2	7	24.1	2	5	17.9
Very much so				3	2	6.9	3	1	3.6
	Total	25	100.0	Total	29	100.0	Total	28	100.0
Tired?		Freq.	%		Freq.	%		Frequency	%
Not at all	1	14	56	1	16	55.2	1	10	37.0
Up to a certain degree	2	9	36	2	10	34.5	2	11	40.7
Very much so	3	2	8	3	3	10.3	3	6	22.2
	Total	25	100.0	Total	29	100.0	Total	27	100.0

When the participants were asked whether they felt focused and concentrated while translating, no more than 8% claimed they were not focused at all, for one or all texts (Table 6.44). Slight fluctuations withstanding, the group was split roughly in half, one part claiming they were focused up to a certain degree and the other part claiming they were very absorbed in their task.

The participants were also asked directly whether they had experienced any time pressure during their tasks. More than half (56%) stated they felt a lot of time pressure even from the first time frame of 30 minutes. This perception dramatically increases for the other two time frames, but the percentages are very similar: 72.4% and 71.4%, respectively. This similarity is yet another indication of the "stumbling block" phenomenon observed both in product-based data and in process-based data reports in previous sections. Once again, the percentages of participants who felt no time pressure were very low: a maximum of two people (7.1%) in the 15-minute time frame might be attributed to a multitude of factors, such as appropriate management of online resources or interest in the text.

Another question was whether participants felt restless or upset during the tasks. C2010 starts with two almost equal groups of participants (28% each) answering "not at all" and "very much so". When time is reduced to 2/3, there is a shift from "not at all" to "up to a certain degree". Participants split into two equal groups when available time is halved: 42.9% feel restless/upset "up to a certain degree" and another 42.9% feel very restless/upset. Participants commented orally after the experimental tasks that they felt "angry" at themselves because they knew they could do better, they "were better than that" or because they "did not want to give up".

This feeling of general unease is further supported by participants' replies in relation to how relaxed they felt during their translation tasks. They vast majority did not feel relaxed at all (80% as regards the 30-minute time frame and 78.6% the 15-minute time frame). The percentage is lower for the 20-minute time frame (69%) but it could be argued again for this case that participants felt relatively more relaxed because a) they had become familiar with the task type or b) they had not realized that text RETRO was "trickier" that the other texts and, therefore, may have underestimated the challenge.

Around half the C2010 participants did not feel tired or disinterested as time was passing by. or so they reported. The percentages do not really differ between the 30- and the 20-minute time frames. When it comes to the 15-minute time frame, however, there is an obvious increase in participants who either started feeling tired or shifted from "up to a certain degree" in favor of "very much so". Three participants made a point of stating that they would not have felt tired if they had had the time to have their morning coffee before

the experiment. Another two, from the afternoon session, commented that they do not perform at the best of their abilities during early afternoon.

6.3.4. Summary

The C2009 and C2010 classes seem to share a lot of features. They both consist of participants whose mother tongue is Greek and whose level of English is at C1 or C2 level. Most C2009 and C2010 participants are average computer users, slow to medium-speed typists, who had no prior translation-related work experience at the time of the experiments. Their learning styles were identified in view of further statistical analyses. Most C2010 participants claimed they felt time pressure during the experiment; some of them even during the first task. Although many of them grew increasingly tired, especially during the last task, half of them managed to maintain their focus.

6.4. Chapter summary

The above synthetic view of participants and participant performance prepares the ground for subsequent statistical processing. Reports from products and processes alike indicate a high level of coincidence behind management of translation tasks which took place under a 20-minute and a 15-minute frame and a tendency of participants to remain attached to the word level vis-à-vis online search techniques and problem-solving procedures. Similarities in participant profiling between C2009 and C2010 support the assumption that these groups have equal dynamics in many respects, therefore facilitating extrapolation of results from C2010, the main unit of analysis, onto C2009. Behind a large number of tables and numbers, this chapter has combined the experimental with the pedagogical by making use of tools and processes that can be easily adjusted for application in further experiments or in authentic classrooms with active student involvement.

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Chapter 7. Data Analysis

7.1. Rationale for Analysis

The aim of the present study is to test whether learning styles correlate significantly with translation quality when the task is carried out under time constraints. The testing of this main hypothesis is preceded by three clusters of relevant sub-hypotheses. This inductive approach was chosen to reduce the inherent complexity of the main predicted variables and to provide a clear view of the multifaceted nature of the specific classroom environment. The three clusters concern the effects of the three main variables, namely the dependent variables of quality, time and learning styles: a) effects *on* quality, b) effects of time, and c) correlations involving learning styles. The structure of this chapter is similar to that of chapter 6: from products, to process, to people. Analysis is limited to C2010 data in relation to products and processes. As regards people, however, data from both C2009 and C2010 participants were used in order to reduce probability errors due to variance in class dynamics; in other words, to demonstrate that C2010 was not an "exceptional" group in any respect. Further evidence of the similarities between the two class units is provided in view of increased internal validity and extrapolation of results. The findings from each hypothesis testing are discussed.

7.2. Effects on quality

In the present setting, the dependent variable of quality may constitute a result of participants' varying degrees of skills, of various aspects linked to the translation process itself or even a result of how participants themselves felt during the translation tasks.

7.2.1. Effects of skills on quality

7.2.1.1. Effects of language proficiency

Proficiency in Greek (L1) and English (L2) is tested against each quality criterion, i.e. grades for Formal Correctness, Terminology/Vocabulary, Accuracy/Message Transfer,

Textual Flow, as well as overall grades per text to help demonstrate systematic differences at both the micro- and the macro-level. Two hypotheses were formulated and tested:

L1 hypothesis: C2010 participants with higher L1 scores will deliver products of higher quality.

The slight differences among participants' L1 test scores failed to reach statistical significance in the analysis. This is to be interpreted with caution: given the shortcomings of the instrument used (cf. Chapter 3), the only available instrument at the time of the experiments, there must remain considerable doubts as to the possible validation of the hypothesis.

L2 hypothesis: C2010 participants with higher L2 scores will deliver products of higher quality.

An ANOVA test indicates that L2 proficiency does not significantly affect overall product quality (p=0.767 for the 30-minute task, p=0.547 for the 20-minute task, p=0.509 for the 15-minute task; see Table 7.1).

Table 7.1. L2 effects on overall product quality

C2010	L2 Level	N	Mean	Std. Dev.	Minimum	Maximum	p
30'	B2	4	8.6250	0.32275	8.25	9.00	0.767
Weighted grade	C1	15	8.3311	0.68233	6.71	9.15	
	C2	6	8.3741	0.94163	6.66	9.10	
	Total	25	8.3884	0.69337	6.66	9.15	
20'	B2	4	8.4670	0.42433	7.87	8.85	0.547
Weighted grade	C1	17	7.7079	1.12794	5.36	9.10	
	C2	8	7.7485	1.67984	4.96	9.20	
	Total	29	7.8238	1.23313	4.96	9.20	
15	B2	3	7.0529	1.62964	5.44	8.70	0.509
Weighted grade	C1	17	7.9318	1.13761	5.76	9.10	
	C2	8	7.8492	1.17971	6.28	9.60	
	Total	28	7.8141	1.18233	5.44	9.60	

A closer look at quality per criterion, excluding the statistical weight for degree of Completion (mean grades), confirms the above result but only for the first two tasks. Within a 15-minute deadline, it seems that those participants with higher L2 (EN) scores

produced, on the average, translations of a higher quality in terms of Formal Correctness, Accuracy and Textual Flow. To be more precise, it seems that participants with the highest L2 scores, i.e. those at C2 level, surpass their fellow C1- and B2-level participants by around 1 whole mark (Table 7.2). The category of Terminology/Vocabulary remains statistically unaffected - an interpretation might be that many participants needed additional skills and/or were affected by additional parameters beyond their language skills in order to locate and choose appropriate terminology/vocabulary on time, for example time for internet search.

Table 7.2. L2 effects on product quality per criterion (mean scores)

C2010		L2 Level	N	Mean	Std. Dev.	Min	Max	ANOVA (p)
COR_FormalCorr_mean	30	B2	4	7.25	0.65	6.5	8.0	0.786
	min	C1	15	7.00	0.68	5.5	8.5	
		C2	6	7.17	0.88	5.5	8.0	
		Total	25	7.08	0.70	5.5	8.5	
COR_Terminology_		B2	4	6.25	1.04	5.0	7.5	0.269
Vocabulary_mean		C1	15	6.70	0.56	5.5	7.5	
		C2	6	7.00	0.77	6.0	8.0	
		Total	25	6.70	0.71	5.0	8.0	
COR_Accuracy_mean		B2	4	6.13	1.11	5.0	7.5	0.080
		C1	15	6.57	0.86	5.5	8.0	
		C2	6	7.33	0.52	6.5	8.0	
		Total	25	6.68	0.90	5.0	8.0	
COR_TextualFlow_mean		B2	4	6.63	0.95	6.0	8.0	0.346
		C1	15	6.87	0.69	5.5	8.0	
		C2	6	7.25	0.42	6.5	7.5	
		Total	25	6.92	0.69	5.5	8.0	
RETRO_FormalCorr_mean	20	B2	4	6.63	0.85	5.5	7.5	0.551
	min	C1	17	6.65	0.95	5.0	8.0	
		C2	8	7.06	0.86	6.0	8.5	
		Total	29	6.76	0.90	5.0	8.5	
RETRO_Terminology_		B2	4	6.13	0.25	6.0	6.5	0.933
Vocabulary_mean		C1	17	6.12	1.23	3.5	8.0	
		C2	8	6.31	1.51	3.5	8.5	
		Total	29	6.17	1.20	3.5	8.5	
RETRO_Accuracy_mean		B2	4	6.50	0.71	6.0	7.5	0.562
		C1	17	6.38	0.93	4.5	8.0	
		C2	8	6.81	1.00	5.5	8.5	
		Total	29	6.52	0.91	4.5	8.5	
RETRO_TextualFlow_mean		B2	4	6.88	0.48	6.5	7.5	0.911
		C1	17	6.68	1.07	4.0	8.0	
		C2	8	6.81	0.96	5.5	8.5	
		Total	29	6.74	0.96	4.0	8.5	
PHOTO_FormalCorr_mean	15	B2	4	6.25	0.65	5.5	7.0	**0.042**
	min	C1	16	6.81	0.75	5.0	8.0	
		C2	8	7.50	0.96	6.5	9.0	
		Total	28	6.93	0.88	5.0	9.0	
PHOTO_Terminology_		B2	4	6.25	1.19	4.5	7.0	0.191

Vocabulary_mean	C1	16	6.53	0.53	5.5	7.5	
	C2	8	7.13	1.22	5.5	9.0	
	Total	28	6.66	0.89	4.5	9.0	
PHOTO_Accuracy_mean	B2	4	6.50	1.08	5.0	7.5	**0.038**
	C1	16	6.50	0.66	5.5	8.0	
	C2	8	7.44	0.98	6.0	9.0	
	Total	28	6.77	0.90	5.0	9.0	
PHOTO_TextualFlow_mean	B2	4	6.38	0.85	5.5	7.5	**0.017**
	C1	16	6.78	0.71	5.5	8.0	
	C2	8	7.63	0.79	6.5	9.0	
	Total	28	6.96	0.85	5.5	9.0	

7.2.1.2. Effects of typing skills/speed on quality

Typing speed, estimated in words per minute (WPM), was tested against overall quality, as was the fifth quality criterion, degree of Completion.

Typing speed hypothesis 1: Faster typists will deliver products of higher quality.

Typing speed does not seem to correlate with overall product quality when participants are given 30 or 20 minutes to translate a text (p=0.338 and 0.110, respectively). When the available time is halved down to 15 minutes, though, there is a statistically significant difference between fast typists and slow typists (p=0.021): the former seem to consistently produce translations of much higher overall quality than the latter (see Table 7.3). These results are to be interpreted with caution because, in essence, typing speed differs qualitatively from actual translating speed: typing speed alone does not include the moments of reflection or pauses a participant may have had during the translation process, especially during the first two, relatively more relaxed, time frames.

Table 7.3. Effects of typing speed on overall product quality

C2010		N	Mean	Std. Dev.	Min	Max	p
30 min Weighted grade	Slow	8	8.37	0.81	6.66	9.00	0.338
	Moderate	13	8.26	0.69	6.71	9.15	
	Fast	4	8.85	0.22	8.60	9.10	
	Total	25	8.39	0.69	6.66	9.15	
20 min Weighted grade	Slow	10	7.21	1.57	4.96	8.85	0.110
	Moderate	14	8.02	0.95	5.36	9.10	
	Fast	5	8.51	0.71	7.62	9.20	
	Total	29	7.82	1.23	4.96	9.20	
15 min Weighted grade	Slow	10	7.18	1.10	5.76	9.10	**0.021**
	Moderate	13	7.88	1.15	5.44	8.95	
	Fast	5	8.91	0.45	8.55	9.60	
	Total	28	7.81	1.18	5.44	9.60	

The results emphasize empirically the need for advanced typing skills as an aid to the translation workflow in situations when time is of importance, as expected. This need is further supported by results from Table 7.4, where typing speed is analyzed in relation to the fifth quality criterion, namely, degree of Completion.

Typing speed hypothesis 2: Faster typists will deliver products of higher degree of completion.

Again, it it significantly clear that an increased typing speed positively affects completion of translations as regards the third time frame of 15 minutes ($p=0.021$, <0.05).

Table 7.4. Effects of typing speed on degree of completion

C2010		N	Mean	Std. Deviation	P
30 min Cor_completion	Slow	8	0.94	0.13	0.465
	Moderate	13	0.92	0.11	
	Fast	4	1.00	0.00	
	Total	25	0.94	0.11	
20 min retro_completion	Slow	10	0.79	0.22	0.128
	Moderate	14	0.89	0.16	
	Fast	5	0.97	0.05	
	Total	29	0.87	0.18	
15 min photo_completion	Slow	10	0.75	0.16	**0.021**
	Moderate	13	0.87	0.17	
	Fast	5	1.00	0.00	
	Total	28	0.85	0.17	

7.2.1.3. Effects of computing skills on quality

C2010 participants belong to a generation largely exposed to computing and it was expected that the majority would state that they were average computer users. Actually, two thirds (20/29) of participants did so in their diagnostic sheets (cf. Chapter 6).

Computing skills hypothesis: the more advanced the computing skills will deliver products of higher quality.

While taking into consideration that participants' statements from their diagnostic sheets may be sensitive to self-report bias, the results reveal strong statistically significant correlations: participants with weak computing skills have produced products of a lower overall quality on average, as soon as available time decreases (p=0.001 for the 20-minute task, p=0.007 for the 15-minute task; see Table 7.5). One interpretation might be that weaker participants lost time while dealing with issues of a technical nature, even though the screen recordings only revealed a couple of such cases. Another plausible interpretation, although the current setting does not provide relevant evidence, might be that those who stated that they are average or advanced PC users were able to fall back on their computing skills, especially under tight deadlines.

Table 7.5. Effects of (stated) computing skills on overall product quality

C2010	Level	N	Mean	Std. Dev.	Min	Max	p
30 min	False beginners	4	8.22	1.04	6.66	8.75	0.804
Weighted grade	Average	18	8.45	0.65	6.71	9.15	
	Advanced	3	8.27	0.66	7.63	8.95	
	Total	25	8.39	0.69	6.66	9.15	
20 min	False beginners	6	**6.34**	1.46	4.96	8.85	**0.001**
Weighted grade	Average	20	8.27	0.87	5.36	9.20	
	Advanced	3	7.83	0.45	7.32	8.16	
	Total	29	7.82	1.23	4.96	9.20	
15 min	False beginners	6	**6.54**	0.68	5.76	7.56	**0.007**
Weighted grade	Average	19	8.16	1.11	5.44	9.60	
	Advanced	3	8.17	0.66	7.40	8.55	
	Total	28	7.81	1.18	5.44	9.60	

7.2.2. Effects of process on quality

7.2.2.1. Effects of production flow

Changes in production flow reflect changes in general time management, as evidenced by the four phases of the translation process described in detail in Chapter 6. Changes in production flow are now tested against overall quality. The purpose of this analysis is to check for systematic time management-related effects that may explain participants' product-related performance. Our hypothesis is that:

Change in production flow (duration of translation phases) correlates with overall quality.

A Spearman's rho test does not confirm statistical significance when the first task, with a relatively relaxed time frame of 30 minutes, is taken into analysis. According to Table 7.6, p=0.966 for the Preparation phase, p=0.0.336 for the Planning phase, p=0.113 for the Translation phase and p=0.496 for the Revision phase.

Table 7.6. Effects of production flow on quality (30-minute task)

30’		Weighted grade
SR_Prepcor_time	Correlation Coefficient	-0.011
	Sig. (2-tailed)	0.966
	N	17
SR_InitialPlancor_time	Correlation Coefficient	-0.205
	Sig. (2-tailed)	0.336
	N	24
SR_Translationcor_time	Correlation Coefficient	-0.332
	Sig. (2-tailed)	0.113
	N	24
SR_SepRev_Durcor_time	Correlation Coefficient	-0.198
	Sig. (2-tailed)	0.496
	N	14

On the other hand, when the time is reduced by a third for the second task, to 20 minutes, the significance of revision is statistically highlighted: apparently, the more time participants dedicated to revision, the higher their overall grade (p=0.020; see Table 7.7).

Table 7.7. Effects of production flow on quality (20-minute task)

20’		Weighted grade
SR_Prepretro_time	Correlation Coefficient	-0.187
	Sig. (2-tailed)	0.458
	N	18
SR_InitialPlanretro_time	Correlation Coefficient	-0.277
359	Sig. (2-tailed)	0.153
	N	28
SR_Translationretro_time	Correlation Coefficient	-0.089
	Sig. (2-tailed)	0.651
	N	28
SR_SepRev_Durretro_time	Correlation Coefficient	+ 0.883
	Sig. (2-tailed)	**0.020**
	N	6

When the time is halved to 15 minutes for the third task, revision is no longer of statistical significance, probably because many participants did not reach that phase. The

focus is now shifted to the main translation phase instead, since the results show that translation time is significant. Analysis confirms that the more time participants dedicated to the translation phase, the lower their overall grade (p=0.022; see Table 7.8). One might argue that if participants translate more, they revise less because they incorporate revision acts in their translation. This assumption, however, could be misleading if it focuses on considerations of quantity, whereas the issue here is one of the *quality* of translation[51]. The present result probably indicates that participants were confused and they were typing away blindly in a hurry without paying attention to the actual content of what they were writing. It might also imply that blending translation and revision caused or increased their dispersion. Although this result sounds paradoxical at first, it is actually supported by the fact that both Formal Correctness and Terminology/Vocabulary were significantly affected by time reduction (7.3.1.1.).

Table 7.8. Effects of production flow on quality (15 minute task).

15'		Weighted grade
SR_Prepphoto_time	Correlation Coefficient	-0.357
	Sig. (2-tailed)	0.432
	N	7
SR_InitialPlanphoto_time	Correlation Coefficient	0.057
	Sig. (2-tailed)	0.783
	N	26
SR_Translationphoto_time	Correlation Coefficient	- 0.446*
	Sig. (2-tailed)	**0.022**
	N	26
SR_SepRev_Durphoto_time	Correlation Coefficient	-.252
	Sig. (2-tailed)	.548
	N	8

7.2.2.2. Effects of reading source text before translating

A series of t-tests were carried out to test the hypothesis:

Reading the source text in advance will result in products of higher quality.

[51] The translation phase might also be termed as "drafting" here.

Differences in decision-making as stated by participants did not reach statistical significance as regards overall translation quality (Table 7.9). It seems that those participants who consciously did not read their source text before translating compensated by other means, perhaps by focusing on the source text more as they went along.

Table 7.9. Effects of prior ST reading on quality

	Reading_before_ CORIOLIS	N	Mean	Std. Deviation	p
30 min Weighted grade	Yes	17	8.4029	0.68723	0.883
	No	8	8.3576	0.75314	
	Reading_before_ RETRO	N	Mean	Std. Deviation	
20 min Weighted grade	Yes	27	7.7452	1.23970	0.213
	No	2	8.8854	0.44484	
	Reading_before_ PHOTO	N	Mean	Std. Deviation	
15 min Weighted grade	Yes	25	7.7082	1.16260	0.176
	No	3	8.6964	1.15938	

7.2.2.3. Effects of stated change of usual translation method

Similarly, another series of t-tests were carried out to test the hypothesis:

Changing one's usual translation method will result in products of higher quality.

This hypothesis is validated neither for the 30- nor for the 20-minute task (p=0.145, p=0.777, respectively; see Table 7.10). However, it seems that when participants were only allowed 15 minutes, those who stated that they had changed their method received higher grades (p=0.04). This might indicate the need for flexibility under time constraints. It might also imply that, from a management point of view, it is worth taking calculated risks, when even approved practices do not seem to work under specific circumstances. On the other hand, these results should be treated with caution because they are based on self-report data: the possibility that certain participants reported things they suspected I might want to hear cannnot be excluded altogether.

Table 7.10. Effects of stated change of usual translation method on overall product quality

	Change_method _CORIOLIS	N	Mean	Std. Deviation	p
30 min	Yes	14	8.5801	0.62600	0.145
Weighted grade	No	11	8.1379	0.77232	
	Change_method _RETRO	N	Mean	Std. Deviation	
20 min	Yes	19	7.7755	1.34106	0.177
Weighted grade	No	10	7.9157	1.05812	
	Change_method _PHOTO	N	Mean	Std. Deviation	
15 min	Yes	14	7.3602	1.34755	**0.04**
Weighted grade	No	14	8.2679	0.80243	

7.2.2.4. Effects of revision

Quality might also depend on the nature of modifications taking place during the Revision phase itself. In Chapter 6, the nature of revision was described in three categories, a) no revision, b) light revision, including small-scale modifications such as typos, and c) heavy revision, including large-scale modifications such as sentence restructuring and term insertions following internet search. Hence, the following hypothesis was formulated and data from screen recordings were used in ANOVA tests or t-tests, depending on the number of values involved:

Nature of revision affects overall product quality.

An ANOVA test showed that revision significantly affected overall product quality as regards the 30-minute time frame (p=0.04; see Table 7.11). Irrespective of conscious decision-making or time constraints, participants who did not revise at all received significantly lower overall grades than those who did revise, even if the latter only corrected typos.

Table 7.11. Effects of revision on overall product quality (30-minute task)

Nature of revision	30 minutes	Mean	Std. Deviation	Minimum	Maximum
No revision	10	7.8511	0.79783	6.66	8.85
Light	6	8.6917	0.18280	8.45	9.00
Heavy	8	8.7688	0.33481	8.25	9.15
Total	24	8.3671	0.69986	6.66	9.15

A similar statistical significance appears as regards the 20-minute task (p=0.045; see Table 7.12). When there was no revision, the products were of significantly lower overall quality. Although one participant performed modifications of a light nature, her data were excluded altogether from the analysis for statistical purposes (the sample did not suffice for a valid analysis) and a t-test was used in this case instead of an ANOVA.

Table 7.12. Effects of revision on overall product quality (20-minute task)

T- test	SR_SepRevisionretro	N	Mean	Std. Dev.
20' Weighted grade	No revision	23	7.7078	1.16417
	Heavy	4	8.9625	0.28100

The participants' behavior in relation to the 15-minute task was similar to that in relation to their behavior during the 20-minute task (see Table 7.13): either they did not revise at all or they revised heavily. Although there was one participant performing modifications of a light nature, this piece of data was excluded altogether from the analysis and a t-test was used in this case as well for the same statistical purposes as above. It is statistically clear that the nature of revision affects overall product quality. In fact, the more heavy the revision, the higher the quality (t(23)=-3.481 p=0.002).

Table 7.13. Effects of revision on overall product quality (15-minute task)

	SR_SepRevision photo	N	Mean	Std. Dev.
15' Weighted grade	No revision	18	7.3896	1.12694
	Heavy	7	8.9214	.37733

The hypothesis "nature of revision affects overall product quality" is clearly validated when screen-recording data on the nature of revision is taken into account. In fact, the more heavily the participants revised, the higher their overall score. The effects of revision were also tested against mean grades, i.e. raters' averages before embedding the criterion of Completion. No significant effects were found (cf. Appendix F.1), as expected, mainly due to the grading scheme: both raters had graded taking into account the piece they had in front of them, irrespective of text completion. As a result, even two very well translated sentences would receive a high score.

A second set of analyses was carried out to further delineate the relationship between revision and overall quality, this time on the basis of retrospective data. The shift toward self-report data will also show how realistic participants were on average in their evaluations. The hypothesis formulated on the basis of the retrospective questionnaire is:

Perceived availability of time for revision correlates positively with overall product quality.

There seems to be a statistically significant differentiation between those who felt they had no time for revision and those who felt they had time to revise up to a point ($p=0.013$) during the 30-minute task. The former had significantly lower grades than the latter. This result is to be interpreted with caution because the second category includes data from only two participants who, nevertheless, received very high grades (>9/10). Data from the 20-minute task show a similar picture; here, statistical significance depends on a single person (Table 7.14). This sample is too small to allow for any kind of extrapolation or generalization. Thus, this single participant was excluded from statistical analysis. A t-test with the remaining data revealed that $p=0.151$ and the result is thus treated as insignificant. As regards the 15-minute task, the evidence again points to the same pattern: there is a statistically significant differentiation between those who felt they had no time for revision and those who felt they had time to revise up to a point ($p=0.019$), with the first receiving significantly lower grades. The same pattern seems to appear in all three cases but it largely depends on one or two participants. A larger sample for analysis for this type of research might have provided more solid results. On the other hand, the consistency of the pattern at hand leads to believe that participants are realistically aware of their needs with respect to revision.

Table 7.14. Stated time availability for revision in relation to overall product quality

	30’	Mean	Std. Dev.	Min	Max	p
No time for revision	12	7.9968	0.80215	6.66	9.00	0.013
Partly	2	9.0500	0.07071	9.00	9.10	
Yes	11	8.6955	0.26500	8.25	9.15	
Total	25	8.3884	0.69337	6.66	9.15	
	20’	Mean	Std. Dev.	Min	Max	p
No time for revision	20	7.5623	1.25641	4.96	9.10	
Partly	1	9.2000	.	9.20	9.20	0.021*
Yes	8	8.3056	1.03273	5.93	9.20	
Total	29	7.8238	1.23313	4.96	9.20	
	15’	Mean	Std. Dev.	Min	Max	p
No time for revision	20	7.4343	1.15139	5.44	8.95	0.019
Partly	4	8.9250	.23274	8.70	9.15	
Yes	4	8.6016	.83493	7.56	9.60	
Total	28	7.8141	1.18233	5.44	9.60	

*T-test result for remaining two categories: p=0.151

Both the hard- and soft-data analyses above, mirroring the actual process as well as the personal experience of participants themselves, validate their corresponding hypotheses. In the first case, the nature of revision significantly affects overall product quality, irrespective of task deadline. Unrevised products were of significantly lower quality, and this is true of both light and heavy revision. Analysis of the sample also indicates that the heavier the nature of revision, the higher the overall product quality. In the second case, the perceived availability of time for revision correlates significantly with overall product quality. Participants who felt they had no time for revision received significantly lower grades than those who felt they had time to revise up to a point. This picture appears across all time frames, despite irregularities due to sample limitations.

It is evident that revision improved most participants’ products. Evidence from screen recordings shows that those who opted for a heavy revision pattern scored higher than those who did not revise at all. At the same time, however, we might even argue that the principle of “golden medium” turned out to be the most beneficial, since evidence from retrospective questionnaires shows that the very few participants who claimed they had

revised up to a point (irrespective of how substantially) scored rather higher on the average than those who claimed they had no or, even, enough time for revision (Table 7.14). These results might imply that certain participants revised in a focused, selective way and others may have simply "corrected" already appropriate material, introducing mistakes and compromising overall quality. These same results leading to considerations of revision quality might also provide an interpretation of what Lorenzo found that is, the more time her students had spent on revision, the worse the final product (2002). From a training viewpoint, the fact that participants acknowledge the need to revise their products constitutes another indication of their progress toward translation competence.

7.2.2.5. Effects of linearity

The possible effects of linearity were checked against overall product quality. As already mentioned in Chapter 6, the participants were divided into three categories depending on whether a) they had proceed in a linear fashion while translating, b) they were working "inline" that is, they were turning back to modify their translation within the same line level or c) they were working in a multidirectional way, jumping from a sentence in the middle of the text to a sentence in the beginning, etc. It was assumed that a linear approach would lead to translations with fewer accidental omissions and syntactic disagreements, hence to higher quality products. The hypothesis is that:

The more linear the work process, the higher the overall product quality.

A series of ANOVA tests did not confirm a systematic relationship of statistical significance between linearity and overall product quality for any of three texts ($p=0.517$ for the 30-minute task, $p=0.097$ for the 20-minute task and $p=0.188$ for the 15-minute task). Nevertheless, it is noted that participants who were working "in-line" consistently had a smaller grade span than the other two groups; their minimum grades are always higher than the minimum grades of the other groups by half a mark at least. Although overall product quality is not affected (Table 7.15), this might imply that applying modifications on the spot, that is, the moment they are fresh in mind and while one is still working on the same line, might work as an effective secondary approach. This could probably benefit weaker students in particular, who would be expected to face other problems concurrently.

Table 7.15. Effects of linearity on overall product quality

	30’	Mean	Std. Dev.	Min	Max	p
No Linearity	7	8.1706	0.80288	6.71	9.00	0.517
In Line	10	8.5600	0.44089	7.63	9.15	
Linearity	7	8.2881	0.90944	6.66	9.10	
Total	24	8.3671	0.69986	6.66	9.15	
	20’	Mean	Std. Dev.	Min	Max	
No Linearity	12	7.7703	1.33932	5.36	9.20	0.097
In Line	12	8.3675	0.56326	7.17	9.20	
Linearity	4	6.9940	1.46627	4.96	8.46	
Total	28	7.9154	1.15104	4.96	9.20	
	15’	Mean	Std. Dev.	Min	Max	
No Linearity	11	7.4312	1.50774	5.44	9.60	0.188
In Line	10	8.3752	0.72221	7.02	9.15	
Linearity	5	7.7435	0.85639	6.68	8.65	
Total	26	7.8543	1.18498	5.44	9.60	

7.2.2.6. Effects of stated omissions

Participants’ decisions not to translate parts of the text, as reported in their retrospective questionnaires, is another aspect tested in relation to overall quality. The question was “Did you decide at any point not to translate part of the original text?” and the following hypothesis was formulated:

Deciding to translate everything correlates significantly with higher quality.

A series of t-tests did not reveal any significant relation between participants’ decisions and overall quality (p=0.930 for the 30-minute task, p=0.147 for the 20-minute task, p=0.323 for the 15-minute task; see Table 7.16). It is to be noted, though, that this type of self-report data only refers to conscious decisions up to the point they had translated, not to actual, and probably unwanted or accidental, omissions that may have hampered their translation and might give a different picture.

Table 7.16. Stated decisions to omit text in relation to overall product quality

Decision not to translate	30 min	N	Mean	Std. Dev.	p
Weighted grade	No	18	8.3963	0.75469	0.930
	Yes	7	8.3683	0.55554	
	20 min	N	Mean	Std. Dev.	
Weighted grade	No	25	7.9576	1.13783	0.147
	Yes	4	6.9875	1.65936	
	15 min	N	Mean	Std. Dev.	
Weighted grade	No	18	7.9816	1.21692	0.323
	Yes	10	7.5124	1.11319	

7.2.2.7. Effects of task completion

It was expected that:

Completed translations are of higher quality.

The fact that the degree of completion was included as a criterion of quality automatically implies that complete translations receive higher grades than incomplete ones. However, our hypothesis here refers to analysis based on screen recordings, where task completion was measured by whether participants had typed the final full stop of the target text, irrespective of any subsequent efforts to revise. It is assumed that participants would share a similar view because their (subjective) opinions were proven to be in agreement to a great extent with data from screen-recording software (cf. Chapter 6).

A series of t-tests clearly confirms that those who finished writing their translations scored higher in terms of overall quality than those who did not ($p \leq 0.002$; table 7.17).

Table 7.17. Effects of task completion on overall translation quality.

	SR_Finish_Tcor	N	Mean	Std. Dev.	p
30 min	No	8	7.6139	0.70435	**0.002**
Weighted grade	Yes	16	8.7438	0.25617	
	SR_Finish_Tretro	N	Mean	Std. Dev.	
20 min	No	18	7.4044	1.13709	**0.001**
Weighted grade	Yes	10	8.8350	0.26568	
	SR_Finish_Tphoto	N	Mean	Std. Dev.	
15 min	No	16	7.2196	1.07536	**0.001**
Weighted grade	Yes	10	8.8700	0.33267	

7.2.2.8. Effects of perceived availability of time for internet searches

The effect of the perceived availability of time for internet searches, as reported by participants after completing the translation, on quality was checked. Participants were asked "Did you have time to perform internet search(es)?". Although the actual time spent on internet searches was not calculated objectively, it was assumed that time availability or lack thereof was experienced as a fact by participants and might dictate subsequent behavior. The hypothesis is that:

The more time the participant perceives as having been available for internet searches, the higher the overall product quality.

A series of ANOVA tests did not validate this hypothesis (p=0.301 for the 30-minute task, p=0.211 for the 20-minute task, p=0.220 for the 15-minute task; cf. Appendix F.2). This result is interpreted as another indication of the multifactorial nature of translation and as another reason to look into more "personal" procedures of participants, such as applications of learning styles, later on.

7.2.2.9. Effects of perceived availability of time for choosing between alternatives

The same rationale was followed in the case of perceived availability of time for choosing between alternatives. The question this time was "Did you have time to choose among alternative solutions?" and the following hypothesis was formulated:

The more time the participant perceives as having been available for choosing between alternatives, the higher the overall product quality.

Statistical analysis revealed no significant relationship between the two variables: p=0.313 for the 30-minute task, p=0.096 for the 20-minute task, p=0.191 for the 15-minute task (cf. Appendix F.3).

7.2.3. Effects of participants' feelings

The feelings of C2010 participants, as depicted in their retrospective questionnaires, were tested against overall grades per text. This analysis was prompted by the participants' own comments: some of them had explicitly stated that they were feeling very tired and stressed because of the tight time frames, or even upset at not being able to perform the way they would have liked to. Oneway ANOVA tests were run for the following pertinent variables:

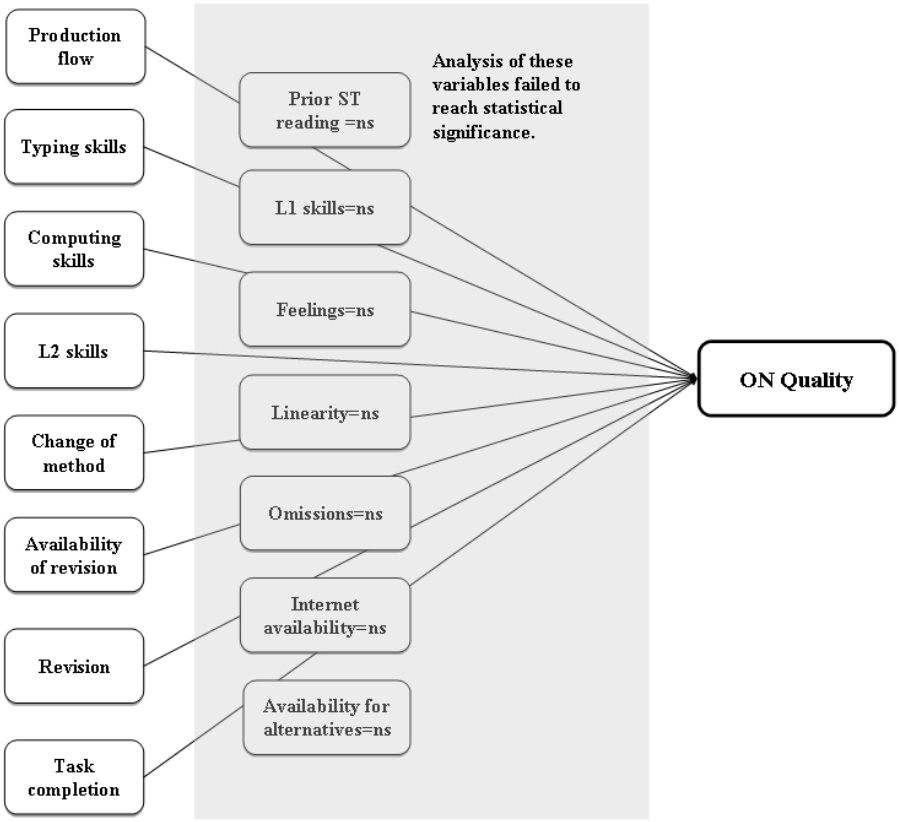
- feeling focused/concentrated
- feeling time pressure
- feeling upset/restless
- feeling relaxed
- feeling tired and disinterested.

However, no statistical significance emerged as far as overall grades on average are concerned vis-à-vis any of the five variables, irrespective of time frame (cf. Appendix F.4).

7.2.4. Summary of effects on quality

In sum, quality seems to be significantly affected by the level of skills such as L2, typing and computing skills but not by participants' feelings toward the tasks, at least in the manner these were expressed in the retrospective questionnaires. Aspects of the translation process that also affect quality include parts of the production flow, stated change of method when under tight deadlines, and task completion in general. Lack of revision seems to negatively affect translation quality and participants acknowledge this in their statements (Figure 7.1.).

Figure 7.1 Summary of possible variables affecting translation quality



7.3. Effects of time

The hypothesized effects of time on both product and process were tested, while a distinction was made between objectively measured time, on the basis of time stamps from screen recordings, and the subjective perception of time availability as experienced by participants and expressed in their retrospective questionnaires.

7.3.1. Effects of time related to the product

7.3.1.1. Change in time frame and quality

Friedman's test can be applied to related samples when there are time-dependent measurements of a given variable. It is a non-parametric test and it was used here to check how quality, overall and per criterion, evolved during the three different time frames of 30,

20 and 15 minutes. Two sets of hypotheses were thus formulated. The results are presented in the tables below. The first hypothesis concerns overall product quality:

Change in time frame correlates with a change in overall translation quality.

Although the overall grade for the 30-minute task is quite higher than those for the 20-minute or the 15-minute task, 8.38 vs. 7.9 and 7.8, respectively, and overall grades for the 30-minute task start from a higher level (6.66) than those for the 20-minute or the 15-minute task (4.96 and 5.44), these differences failed to reached statistical significance in the Friedman non-parametric test (Table 7.18, p=0.263).

Table 7.18. Effects of time on overall product quality

	N	Mean	Std. Dev.	Min	Max	p
30' Weighted grade	24	8.3838	0.70788	6.66	9.15	0.263
20' Weighted grade	24	7.9515	1.12742	4.96	9.20	Chi-square
15' Weighted grade	24	7.8561	1.16254	5.44	9.15	2.674

Consequently, the null hypothesis is supported i.e., change in time frame does not correlate with change in *overall* translation quality.

Our second hypothesis is that:

Change in time frame affects translation quality (weighted scores) per criterion.

Breaking quality down into its constituent criteria shows that the rather discreet differences vaguely indicated in overall quality tests acquire statistical clarity. It seems that, as far as Formal Correctness is concerned, more time led to higher scores on average (Table 7.19). Quality scores for the first task (30') are systematically higher than either those for the 20-minute or the 15-minute task (p=0.026). This effect may have been the result of a lack of revision and/or a possible increase in typographical and spelling errors. The same is valid for Terminology/Vocabulary, albeit much weaker than in the previous case (p=0.048), and it might be due to relative lack of time for focused internet searches (Table 7.20).

Table 7.19. Effects of time on Formal Correctness per time frame

	N	Mean	Std. Dev.	Min	Max	p
30’	24	8.4963	0.75093	6.71	9.40	0.026
20’	24	8.0432	1.07407	5.31	9.20	χ2
15’	24	7.9373	1.14881	5.48	9.20	7.326

Table 7.20. Effects of time on Terminology/Vocabulary

	N	Mean	Std. Dev.	Min	Max	p
30’	24	8.3046	.69395	6.51	9.00	0.048
20’	24	7.8098	1.19132	4.31	9.40	χ2
15’	24	7.7540	1.15528	5.19	9.20	6.088

On the other hand, both Accuracy/Message transfer and Textual Flow seem to be more robust and remain statistically unaffected by changes in time frame (p=0.590 and p=0.180, Tables 7.21 and 7.22). This result is aligned with many participants’ stated reluctance to omit source-text segments from their renditions and it finds indirect support in the high L1 scores of the participants.

Table 7.21. Effects of time on Accuracy/Message Transfer

	N	Mean	Std. Dev.	Min	Max	p
30’	24	8.3130	0.70817	6.31	9.20	0.590
20’	24	7.9265	1.16288	4.91	9.40	χ2
15’	24	7.8207	1.16730	5.39	9.20	1.054

Table 7.22. Effects of time on Textual Flow

	N	Mean	Std. Dev.	Min	Max	p
30’	24	8.4213	0.76022	6.51	9.40	0.180
20’	24	8.0265	1.14904	5.11	9.20	χ2
15’	24	7.9123	1.23469	5.59	9.20	3.432

7.3.2. Effects of time related to the process

The effects of changes in time frame were also tested against a variety of process-related variables by means of a pair-wise statistical test for proportions. In other words, variables were tested per pairs of time frames to detect variable development in the course of time. Procedures and aspects related to management of online resources, both described in Chapter 6, were excluded from the analysis because the data collected was problem-specific: problems in all three texts called for a different combination each time, thus any results might be incoherent from an isolated, time-based perspective.

7.3.2.1. Production flow

As seen in Chapter 6, C2010 participants tend to drop any time-consuming preparatory moves and instead, as available time decreases, focus more directly on planning and translation. They compromise on revision in a similar way: the corresponding percentage of those who revised starts from almost 60% in the 30-minute time frame; when the available time is halved, so is the percentage of participants who revised, approximately 30% (Table 7.23). The variables were tested in an effort to detect significant effects of time. The formulated hypothesis is that:

Change in time frame affects production flow.

Planning and translation are not affected by change in time frame, since all participants went through these two phases, irrespective of time frame. As far as the phases of preparation and revision are concerned, the situation is different. Table 7.23 shows how many participants prepared their translations; the pair-wise test for proportions reveals that the decrease in preparation between the 30-minute time frame and the 20-minute time frame was not significant ($p=0.613$). This significance becomes very clear when the 15-minute time frame is compared to either the 30- or the 20-minute time frame ($p=0.013$ and $p=0.022$, respectively). During the 30-minute time frame, approximately one out of two participants revised. There is a very significant decrease when the available time is 20 minutes ($p=0.016$) and a marginally significant decrease when the 30- and the 15-minute time frames are compared ($p=0.071$). The impression we get from the same Table 7.23,

concerning the relationship between the 20-minute and the 15-minute time frames is that there is no significant change (p=0.250).

Table 7.23. Effects of time on management of translation phases

	30 min	%	20 min	%	15 min	%
	N=24		N=28		N=26	
Preparation	17	70.8	18	64.2	7	26.9
Planning	24	100	28	100	26	100
Translation	24	100	28	100	26	100
Revision	14	58.3	6	21.4	8	30.7

7.3.2.2. Reading the source text before translating

The majority of the C2010 participants (79.2%) seem to have read parts of the text intended for the 30-minute task before the start of the translation phase, at least to the degree that such a conclusion may be reached from screen recordings only. Table 7.24 confirms the decrease in prior source text reading corresponding to a decrease in available time.

Table 7.24. Effects of time on reading source text before translating

	30 minutes SR	20 minutes SR	15's SR
YES	19 (79.2%)	20 (71.4%)	10 (38.5%)
NO	5 (20.8%)	8 (28.6%)	16 (61.5%)
	N=24	N=28	N=26

The effect of time is hypothecized as follows:

Change in time frame affects reading the source text before translating.

The pair-wise test for proportions was used for the analysis of the positive answers to the question "Did you read the whole text before translating it?". There was no significant difference between the number of participants who read their source text in the 30- and 20-minute time frames (p=0.374). When reading in the 15-minute time frame is compared to reading under either of the other two times, however, the effect of time is either clearly significant (p=0.032 in relation to 30 minutes) or marginally significant (p=0.052 in relation to 20 minutes).

7.3.2.3. Stated change of usual translation method

Participants were asked whether they felt they had to change their usual translation method to translate the texts. The question "Did you have to change your usual translation method?" led to the following hypothesis:

Change in time frame correlates positively with a change in participants' stated usual translation method.

Table 7.25 shows that almost half of the participants stated they had changed their usual translation method during the 30-minute task. This percentage decreases during the 20-minute task, only to increase again in the last, 15-minute task, where participants actually settle into two equal-size groups. Although Table 7.25, including self-report data, shows differences in percentages per time frame, these differences failed to reach statistical significance when the test for proportions was carried out, when comparing the 30- and the 20-minute tasks (p=0.712) as well as when comparing the 15-minute task to either the 30 or the 20-minute task (p=0.375 and 0.183, respectively).

Table 7.25. Effects of time on change of usual translation method

	30'	20'	15'
YES	11 (44%)	10 (34.5%)	14 (50%)
NO	14 (56%)	19 (65.5%)	14 (50%)
	N=25	N=29	N=28

7.3.2.4. Revision

An increasing number of participants ran out of time before they could revise their texts, according to screen recordings. Table 7.26 shows very low percentages of participants who revised up to a point. A pattern emerges, for all three texts, with participants opting for extremes: either they did not revise at all or they revised substantially; only few participants opted for light revision and they become even less as time decreases.

Table 7.26. Effects of time on revision

Revision			
	None	Light	Heavy
30' (SR N=24)	10/24 (41.7%)	6/24 (25%)	8/24 (33.3%)
20' (SR N=28)	23/28 (82.1%)	1/28 (3.6%)	4/28 (14.3%)
15' (SR N=26)	18/26 (69.2%)	1/26 (3.8%)	7/26 (26.9%)

This issue was described in detail in 7.2.2.3 above. What is now examined is whether the available descriptive statistical data provide enough support for inferences as regards the hypothesized effect of time. Our hypothesis is that:

Change in time frame affects the nature of revision.

The pair-wise test[52] was carried out per category: no revision, light revision, heavy revision.

Time seems to significantly affect the nature of revision when revising under 20 or 15 minutes is compared to the 30-minute time frame: p=0.034 and p=0.087, respectively, when comparing groups who did not revise. This last figure is considered marginal in terms of practical rather than statistical significance (margin of ±10%). The statistical significance of proportions is clear and strong when comparing those who revised their translations lightly during the 30-minute task and those who did the same during the 20-minute task (p=0.018). The hypothesis is also clearly validated when comparing light revision for the 30-minute task and light revision for the 15-minute task (p=0.023). Paradoxically, the effect of time seems to fade away, as far as heavy revision is concerned. There is a marginally significant effect of time only when comparing the 20-minute time frame with the 30-minute time frame (p=0.077) and no effect whatsoever for the 30 vs. 15 time frame comparison, despite differences in percentages (p=0.339).

[52]Single participants in a given category, whose data might be excluded in other types of tests for reasons of statistical consistency, are included in pair-wise tests for proportions since focus is shifted from the data of said individual per se to the emerging proportions.

Finally, there are no significant effects of time when comparing the 20-minute and the 15-minute tasks, irrespective of category (p=0.293, p=0.521 and p=0.152 for "no revision", "light revision" and "heavy revision", respectively).

7.3.2.5. Linearity

Almost half the C2010 participants started off with an in-line approach (41%), turning back to modify text within the same line, with the rest of them evenly split into non-linear and linear (Table 7.27). As time decreased by one third, the percentage for in-line modifications remains relatively stable, yet there is a definite increase in non-linear approaches. A similar picture is valid for the last task that too place within 15 minutes.

Table 7.27. Linearity

Linearity			
	Non-linear	In-line	Linear
30' (SR N=24)	7/24(29.1%)	10/24 (41.6%)	7/24 (29.1%)
20' (SR N=28)	12/28(42.8%)	12/28 (42.8%)	4/28(14.3%)
15' (SR N=26)	11/26 (42.3%)	10/26 (38.5%)	5/26(19.2%)

Hypothesized effect of time:

Change in time frame affects linearity.

No significant effect of time came up as a result of the test for proportions, despite the fact that the percentage for linear participants is consistently lower than the percentage for the other two categories (Table 7.28).

Table 7.28. Effects of time on linearity (p-values)

Linearity		
Non-linear	In-line	Linear
30'~20' p=0.208	30'~20' p=0.474	30'~20' p=0.122
30'~15' p=0.219	30'~15' p=0.571	30'~15' p=0.237
20'~15' p=0.512	20'~15' p=0.400	20'~15' p=0.672

7.3.2.6. Omissions

Participants were asked "Did you decide at any point not to translate part of the original text?". The hypothesized effect of time, based on self-report data on this type of conscious omissions was formulated as follows:

Change in time frame affects decisions not to translate part of the text.

The majority of participants expressed their reluctance to leave parts of the source text untranslated. Some 28% of participants claimed they had omitted text on purpose when given 30 minutes, only 13.8% when given 20 minutes, and a much higher 35.7% when given 15 minutes (Table 7.29). The pair-wise test for proportions showed that those who had admitted they had decided not to translate certain parts/phrases during the 30-minute time frame were not significantly more or less than those who had answered likewise referring to the 20-minute time frame (p=0.124). The same is valid when comparing the 30-minute time frame with the 15-minute time frame (p=0.310). When the proportions of positive answers for the 20- and the 15-minute time frame were analyzed, however, a rather weak statistical significance emerged (p=0.0475).

Table 7.29. Reported decisions to omit text

	Omissions (Decision not to translate)		
	30'	20'	15'
YES	7 (28%)	4 (13.8%)	10 (35.7%)
NO	18 (72%)	25 (86.2%)	18 (64.3%)
	N=25	N=29	N=28

7.3.2.7. Task completion

Task completion was only tested on the basis of screen recordings rather than retrospective questionnaires. As already mentioned in 7.2.2.7, task completion was measured by whether participants had typed the final full stop of the target text, irrespective of any subsequent efforts to revise. Approximately one third of the participants managed to deliver their translations before the 30-minute deadline; only two participants did the same for the 20-minute task, and just one for last task (Table 7.30). More than half of the participants did not manage to complete their tasks when the constraints became tighter.

Table 7.30. Task completion

	30’		20’		15’	
	SR N=24		SR N=28			SR N=26
YES	16	66.7%	10	35.7%	10	38.5%
NO	8	33.3%	18	64.3%	16	61.5%
Early delivery	8	33.3%	2	7.1%	1	3.8%

The effect of time was hypothesized as follows:

Change in time frame affects task completion.

When the 20- and 15-minute task percentages were compared to the completion percentage of the task with the most relaxed time frame of 30 minutes, marginal (practical) significances arise: p=0.058 for the pair 30’-20’, while p=0.084 for the pair 30’-15’. The pair-wise test for proportions reveals no differences when comparing the percentage of those who completed the 20-minute task within the deadline with the percentage of those who completed the 15-minute task within the deadline (p=0.566). On the other hand, it becomes statistically clear that the relatively relaxed time frame of 30 minutes helped more participants deliver their translations before the deadline than either of the other two time frames: p=0.016 when comparing the 30-minute time frame with the 20-minute time frame, while p=0.007 when comparing the 30-minute time frame with the 15-minute time frame (Table 7.31). These results provide yet another indication of the fact that, when time is reduced by one third or more, participants tend to experience a “block” leading to behavioral changes.

Table 7.31. Effects of time on task completion (p-values)

Yes	Early delivery
30’~20’ p=**0.058**	30’~20’ p=**0.016**
30’~15’ p=**0.084**	30’~15’ p=**0.007**
20’~15’ p=0.56	20’~15’ p=0.514

7.3.2.8. Perceived availability of time for internet searches

The number of participants who claimed they found no time to search on the internet increases as time decreases, from 0% to 3% and to 6% for the last text. Nevertheless, the

percentage of participants who stated they had enough time to perform the internet searches they wanted or needed remains high, at 75.8% for the 20-minute task and 60.7% for the 15-minute task, respectively (Table 7.32).

Table 7.32. Perception of time availability for internet searches

	Time for internet searches		
	30’	20’	15’
	N=25	N=29	N=28
YES	15 (60%)	22 (75.8%)	17 (60.7%)
UP TO A POINT	10 (40%)	4 (13.8%)	5 (17.9%)
NO	0	3 (10.3%)	6 (21.4%)

The hypothesis we formulated was that:

Change in time frame affects perception of time availability for internet searches.

The results from the pair-wise test for proportions indicate no significant effects when comparing positive answers across all time frames (Table 7.33). Once again, and according to Table 7.33, there are no significant effects when comparing the 20-minute time frame with the 15-minute time frame, irrespective of answer. When comparing data for each of the other two categories (“up to a point”, “no”), the emerging pattern bears a strong resemblance to that described in 7.3.2.7 above: the 30-minute frame significantly “stands out” when compared with either the 20- or the 15-minute time frame.

Table 7.33. Effects of time on perceived availability of time for internet searches (p-values)

“Did you have time to perform internet search(es)?”		
Yes	Up to a point	No
30’~20’ p=0.759	30’~20’ p=**0.030**	30’~20’ p=**0.054**
30’~15’ p=0.487	30’~15’ p=**0.065**	30’~15’ p=**0.010**
20’~15’ p=0.755	20’~15’ p=0.350	20’~15’ p=0.146

7.3.2.9. Perceived availability of time for choosing alternatives

Some 64% of the participants stated that they had time to choose among alternative solutions when they had 30 minutes at their disposal (Table 7.34). This percentage drops by two thirds when the available time is reduced and remains at this low level under the last

time frame of 15 minutes. In essence, there are no differences between the 20- and 15-minute time frames because in all cases, the difference in percentage arises from a single missing participant; therefore, the percentages are treated as equal.

Table 7.34. Perception of time availability for alternative solutions

	Time to choose among alternative solutions		
	COR	RETRO	PHOTO
	N=25	N=29	N=28
YES	16 (64%)	7 (24.1%)	7 (25%)
UP TO A POINT	1 (4%)	2 (6.9 %)	2 (7.1%)
NO	8 (32%)	20 (67.9%)	19 (67.9%)

Based on these reports, we hypothesized that:

Change in time frame affects perception of time availability for choosing between alternatives.

The pair-wise test for proportions confirms the descriptive comments and hypothesis. The pattern observed in 7.3.2.8 is also partially repeated. For example, there were no significant effects when comparing the 20- and the 15' time frames for any of the three categories ($p=0.526$ for "yes", $p=0.980$ for "up to a point" and $p=0.480$ for "no" answers). When positive answers were compared, strong effects became evident. The comparison between the 30-minute time frame and the 20-minute time frame produced a p-value equal to 0.012, while the comparison between the 30- and the 15-minute time frame produced a value of 0.019. When the rest of the answers in the middle category where compared, no statistically significant results arose ($p=0.674$ when comparing the 30- with respect to the 20-minute task, while $p=0.684$ when comparing the 30-minute with respect to the 15-minute task). Comparison of negative answers showed clearly significant results when both remaining pairs were compared: $p=0.030$ as regards the 30- and the 20-minute task comparison and, similarly, $p=0.034$ as regards the 30- and the 15-minute task comparison (Table 7.35). Results such as these seem to suggest once again that the pivotal time frame where participants "stumble" and tend to behave as if outside of their comfort zone was the 20-minute one.

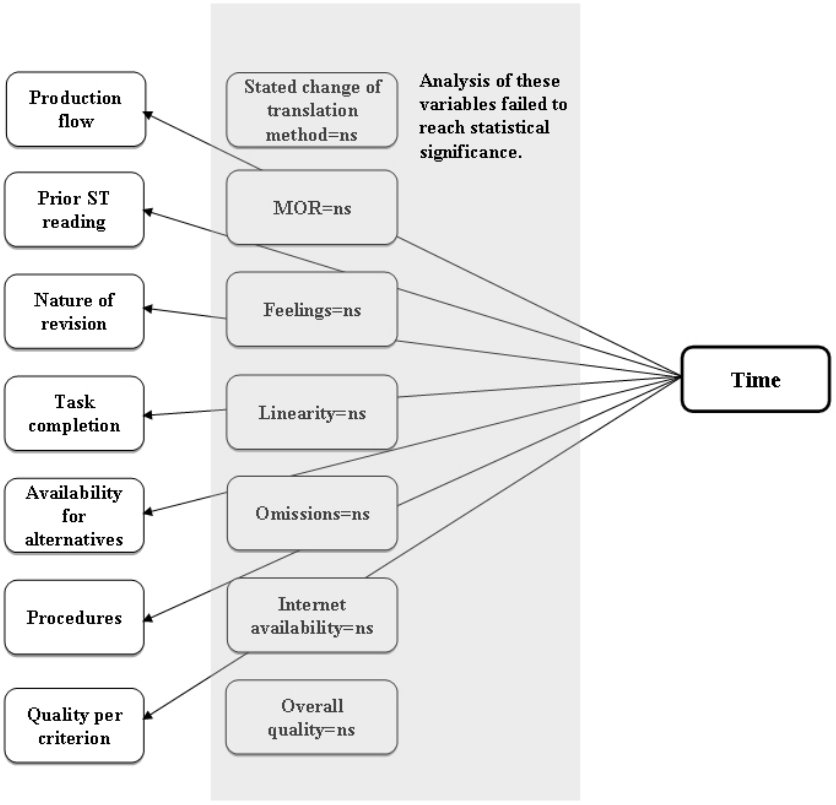
Table 7.35. Effects of time on perceived availability of time for internet searches (p-values)

"Did you have time to choose among alternative solutions?"		
Yes	Up to a point	No
30'~20' p=0.012	30'~20' p=0.674	30'~20' p=0.030
30'~15' p=0.019	30'~15' p=0.684	30'~15' p=0.034
20'~15' p=0.526	20'~15' p=0.980	20'~15' p=0.480

7.3.3. Summary

Change in time frame seems to significantly affect certain aspects of translation quality but not overall quality per se. Differences in percentages are illusory in many respects: change in time frame does not have a significant effect on stated change of translation method, patterns of linearity, conscious omissions, perception of availability for internet searches. Decrease in available time, though, clearly affects production flow, as regards preparation and revision. It also affects the decision to read the source text in advance, the nature of revision itself, task completion, subjective perception of time availability to choose alternative solutions. (Figure 7.2).

Figure 7.2. Summary of time effects



7.4. Correlations with learning styles

Learning styles were defined in Chapter 3 as "patterns of thinking, perceiving, problem-solving and remembering when approaching a learning task" (modified from Cassidy 2004: 48). Any ensuing correlations, therefore, may extend to a great number of translation-related and project-specific variables. Results from corresponding analyses of hypothesized correlations of learning styles are presented here in a different order: from people-based variables, to process-based variables, to product-based variables, unlike other parts of this study. The purpose behind this approach is to provide a complete picture of the dynamics of learning styles in terms of overall participant performance and prepare the ground before testing the main hypothesis, *learning styles significantly correlate with translation quality when the translation task is taking place under time constraints*.

7.4.1. Relating learning styles to participants' reported feelings of the overall experience

It was expected that participants' feelings as they were experiencing the tasks would reflect differences in their learning styles, even though feelings as a variable did not seem to correlate with overall translation quality. Our hypothesis is thus that:

Learning style dimensions correlate significantly with participants'expressed feeling per translation task.

The participants had answered the question "How did you feel during the activity?" for each of the following conditions:

- feeling focused/concentrated
- feeling time pressure
- feeling upset/restless
- feeling relaxed
- feeling tired and disinterested.

For each item they were instructed to select one out of three possible answers: "not at all" or "up to a certain degree" or "very much so" (questions adapted from Göpferich 2008).

However, ANOVA tests as well as t-tests, depending on the number of variables involved, did not validate this hypothesis (Appendix F.5) for any of the above feelings, contrary to expectations.

7.4.2. Relating learning styles to the process

Much like in previous sections, data from both self-report and screen-recording data led to the formulation of several hypotheses, this time in relation to learning styles. The hypothesis concerning the overall production flow is presented first. Then we review sets of hypotheses, related to each aspect of the process factored in so far, such as revision, linearity, and management of online resources.

7.4.2.1. Production flow

The hypothesized correlation of learning styles is that:

Learning styles correlate significantly with time distribution per process phase.

A Spearman's rho analysis was carried out, taking into account the duration of the four translation phases (preparation, planning, translation, revision) and the four dimensions of learning styles (Active/Reflective, Sensing/Intuitive, Visual/Verbal, Sequential/Global). It was expected that differences in group behavior, such as significant "trimming" of the preparation and revision phases, easily discernible in the data set as presented in Chapter 6, would also be statistically reflected and mapped onto learning styles. Analysis, however, revealed no correlation between duration of process phases, as confirmed by screen-recording data and learning styles ($p>0.05$ for all combinations; Appendix F.6). This finding was rather surprising given the extent of change in performance as depicted by descriptive statistics. On the other hand, the results might be attributed to the fact that the nature of the task called for behaviors reflecting more than one learning-style dimension, but none more dominant than the others.

Another series of analyses, focused on specific aspects of the translation process, followed.

7.4.2.2. Reading source text before translating

The initial intention was to test correlations between learning styles and data from both the participants' retrospective questionnaires as well as from data arising from screen recordings. That plan was abandoned and only the more robust data set from screen recordings was kept for analysis because the learning-style data also came from self-reporting questionnaires. Preference was then given to data from screen recordings in order to underpin test validity and reliability.

The hypothesized correlation of learning styles is that:

Learning styles correlate significantly with participants' source-text reading before the translation phase.

The analysis rendered results that were less significant than expected. As far as the time frame of 30 minutes is concerned, the fourth dimension (Sequential/Global) correlates with prior source text reading, but only marginally so ($p=0.053$). Those five participants who did not read the source text of the 30-minute task before translating tended to be moderate sequential learners (mean 8, std ±2.12), while those who did read it tend to be balanced learners (mean 5.89, std. ±1.37). During the 20-minute time frame, the third

dimension (Visual/Verbal) comes into play, although only marginally as well (p=0.055): those who did not read the source text have a tendency toward verbal learning (mean 5.75, std ± 1.67); those who read the source text have a clear preference for visual learning (mean 7.4, std ±2.35), as would be expected intuitively. When the available time was set at 15 minutes, the second dimension (Sensing-Intuitive) correlates with prior source text reading (p=0.053). The 16 sensing learners did not read the last text (15 minutes; mean 7.06, std ±2.29), whereas the remaining ten participants tend to be intuitive learners (mean 5.30, std ±2.11).

This shift from one dimension to another, although marginally significant, is striking. Methodologically speaking, it could be interpreted as an indication of the need for a larger sample. This result might also imply that there is a need for a finer-grained instrument in terms of learning styles. Then again, the variety of learning styles and the marginal significance of the results might be attributed to increased task blending, as highlighted in Chapter 6 and previous paragraphs; multiple tasks taking place concurrently might require activation of various cognitive elements and application of traits from all learning styles mentioned above.

7.4.2.3. Stated change of usual translation method

It was hypothesized that:

Learning styles correlate with stated change of participants'usual translation method.

This hypothesis was not validated (Appendix F.7), even though many participants had mentioned that their change included not reading the source text in advance (cf. Chapter 6) and this was statistically confirmed as regards the first text (ibid.).

7.4.2.4. Revision

For reasons of consistency, data from screen recordings were used in order to test the hypothesis:

Learning styles correlate significantly with the nature of revision.

An ANOVA test did not reveal any significant results in relation to texts used in either the 30-minute or the 15-minute task (Table 7.36, Appendix F.8). As far as the 20-minute task is concerned, the third dimension (Visual/Verbal) seems to correlate with

revision approaches (p=0.041). A total of 23 participants had not revised, while four participants had revised heavily. The one participant who had revised lightly was excluded from the ANOVA for reasons of statistical consistency. In the remaining two groups, those who did not revise tend to be significantly less visual (mean 6.43, std ±6.43) than those who did (mean 9.25, std ±2.06). The fact that this dimension seems to dominate was expected because both the visual and the verbal aspects are important for on-screen revision. The result is rather surprising, however, because it was expected that those with a preference for verbal learning would pay more attention to potential errors. One explanation might be that participants with a tendency for visual learning quickly processed the information in their mind and applied solutions. Another unexpected finding is that the significant correlation appears only as regards the 20-minute task. This consolidates our previous impression that this specific time frame caused participants to modify their behavior, but it might also imply that, after the initial "cognitive shock", there was a "learning effect" from the experience that participants took into account when dealing with the 15-minute task.

Table 7.36. Relating learning styles and nature of revision (p-values)

	30'	20'	15'
Dim1_ACT_REF_PRE	0.593	0.277	0.77
Dim2_SEN_INT_PRE	0.273	0.261	0.343
Dim3_VIS_VRB_PRE	0.080	**0.041**	0.548
Dim4_SEQ_GLO_PRE	0.710	0.438	0.167

7.4.2.5. Linearity

Possible correlations of learning styles with patterns of linearity were also checked and the following hypothesis was formulated:

Participants with same learning style will demonstrate the same pattern of linearity.

Analysis based on ANOVA did not reveal any statistically significant relation between any dimension of learning styles and linearity patterns (from linear to non-linear) for any of the three translation tasks (p>0.05 in all cases, cf. Appendix F.9), contrary to expectations.

7.4.2.6. Omissions

Participants' conscious decision to not translate parts of the source text, as reported in their retrospective questionnaires, was also thought it might reflect their learning styles:

Learning styles correlate significantly with decisions not to translate parts of the source text.

It seems that when participants were given 30 minutes to translate a text, the analysis produced a significant difference in relation to the Active/Reflective dimension (p=0.047) between those who translated everything and those who decided to omit information (Table 7.37). The former tended to have a mild preference for active learning and the latter tend to have a mild preference for reflective learning (mean 6.28, std ± 1.99 and mean 4.71, std ±0.76, respectively). When the participants translated under a 20-minute deadline, the third dimension, Visual/Verbal, seems to marginally affect decision-making (p=0.060): those with a mild to moderate preference for visual learning (6.7 to 9 on the 0-11 scale by Felder) are the ones who tend to claim that they omitted parts of the text. The Active/Reflective dimension appears again in relation to the 15-minute task, with a similar pattern. The participants who decided to translate everything tended to have a mild preference for active learning (mean 6.28, std ± 2.02), while those who stated they had left certain parts untranslated tended to be balanced learners (mean 5, std ± 0.94).

Table 7.37. Relating learning styles and omissions

30’	Decision_not_ to_translate_ CORIOLIS	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	18	6.28	1.994	**0.047**
	Yes	7	4.71	0.756	
Dim2_SEN_INT_PRE	No	18	5.83	2.572	
	Yes	7	7.71	2.360	
Dim3_VIS_VRB_PRE	No	18	7.33	2.249	
	Yes	7	5.86	2.673	
Dim4_SEQ_GLO_PRE	No	18	6.61	1.883	
	Yes	7	5.57	0.787	

20’	Decision_not_ to_translate_ RETRO	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	25	5.68	1.547	**0.056**
	Yes	4	6.50	3.109	
Dim2_SEN_INT_PRE	No	25	6.16	2.609	
	Yes	4	6.25	2.630	
Dim3_VIS_VRB_PRE	No	25	6.68	2.231	
	Yes	4	9.00	1.414	
Dim4_SEQ_GLO_PRE	No	25	6.00	1.633	
	Yes	4	6.50	3.109	

15’	Decision_not_ to_translate_ PHOTO	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	18	6.28	2.024	**0.032**
	Yes	10	5.00	0.943	
Dim2_SEN_INT_PRE	No	18	6.11	2.298	
	Yes	10	6.80	2.658	
Dim3_VIS_VRB_PRE	No	18	7.17	2.093	
	Yes	10	6.60	2.716	
Dim4_SEQ_GLO_PRE	No	18	6.39	1.883	
	Yes	10	5.40	1.713	

It should be noted that, although the above findings are based on self-report data, the dataset may be quite reliable as proof of actual behavior because the participants were also asked to give examples. These findings, once again, seem to support the idea that the 20-minute task correlates with a difference in cognitive activity.

7.4.2.7. Completion

Learning styles were also checked against task completion. It has already been demonstrated in Chapter 6 that observations of screen recordings and participants' self-reporting opinions regarding task completion largely coincide. Thus, running two analyses with similar data sets was considered to be redundant. The more solid data set from screen recordings was chosen over the self-report data set. The issue under examination was to see whether specific learning styles contributed to participants managing to reach the end of the document to be translated, irrespective of whether they had left any gaps on their way or whether they had revised their text afterwards or not. A series of t-tests tested the following hypothesis:

Participants with same learning styles will manage to finish their translations to the same extent.

As far as the 30-minute time frame is concerned, participants who have a mild preference for visual learning and could also be characterized as balanced learners (mean score 6.19) have managed to finish their translations (Table 7.38). Those with moderate or even extreme preference for visual learning on the average (mean score of 8.62) have not. Those who did not finish are, on the average, (~8) moderate visual learners. This strong relation ($p=0.006$) indicates that the less extreme participants are in terms of learning preferences and, in this case, in the third dimension, the more successful their performance is in terms of completion. It might be that extreme visual learners get caught up in internal processing, for example with visualization rather than verbalizing their output through typing.

Table 7.38. Relating learning styles to task completion (30-minute task)

	SR_Finish_Tcor	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	8	6.00	1.690	0.825
	Yes	16	5.81	2.040	
Dim2_SEN_INT_PRE	No	8	7.62	1.923	0.106
	Yes	16	5.75	2.817	
Dim3_VIS_VRB_PRE	No	8	8.62	1.408	**0.006**
	Yes	16	6.19	2.455	
Dim4_SEQ_GLO_PRE	No	8	6.38	1.685	0.936
	Yes	16	6.31	1.815	

No such relation appears as regards the second task, carried out in 20 minutes (Table 7.39 below). A similar correlation as with the 30-minute task is produced when the 15-minute task is taken into consideration, however, it is very weak (marginal p=0.088), as shown in Table 7.40. Consequently, it is not treated as significant within the given sample.

Table 7.39. Relating learning styles to task completion (20-minute task)

	SR_Finish_Tretro	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	18	5.83	1.543	0.856
	Yes	10	5.70	2.312	
Dim2_SEN_INT_PRE	No	18	6.22	2.211	0.863
	Yes	10	6.40	3.169	
Dim3_VIS_VRB_PRE	No	18	6.56	2.064	0.877
	Yes	10	7.60	2.591	
Dim4_SEQ_GLO_PRE	No	18	5.78	1.665	0.158
	Yes	10	6.80	1.989	

Table 7.40. Relating learning styles to task completion (15-minute task)

	SR_Finish_Tphoto	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	16	6.25	1.983	0.207
	Yes	10	5.30	1.494	
Dim2_SEN_INT_PRE	No	16	6.44	2.032	0.888
	Yes	10	6.30	2.908	
Dim3_VIS_VRB_PRE	No	16	7.31	2.182	0.088
	Yes	10	5.80	1.989	
Dim4_SEQ_GLO_PRE	No	16	6.31	2.024	0.681
	Yes	10	6.00	1.563	

The pattern involves a particular learning style dimension dominating during the more relaxed time frame of 30 minutes on average but not in the tasks with the tightest deadlines. This might be attributed to the multifaceted nature of the translation process, which calls for activation of many cognitive traits concurrently as available time is reduced.

7.4.2.8. Perceived availability of time for internet searches (RQ)

Data from the retrospective questionnaires was analyzed here partly for practical reasons, given the fact that it would be too time-consuming to analyze relevant behavior in all 78 screen-recording files. Another reason was that screen-recording data might not even verify whether duration of internet searches was sufficient for the needs of each participant separately: even if it were objectively measured that a certain participant had spent half the available time on internet searches, they might still claim that the time for those searches was not enough. Self-report data, however, in spite of being considered relatively soft, would allow for subjectivity which might yield relevant results in terms of learning styles. Thus, our hypothesis is that

Learning styles correlate significantly with perceived time availability for internet searches.

There were no significant results regarding the more relaxed and the tightest time frame (30 and 15 minutes, respectively). When it comes to the 20-minute time frame, however, participants with a strong preference to sensing (mean 9.25), i.e. focusing on concrete facts and procedures, clearly perceived time to be available up to a point in relation to participants with a moderate preference to sensing (mean 6.0) who mostly

claimed that available time was not enough (p=0.028; see Table 7.41). The participants with a preference for intuitive learning (mean 5.6 on Felder's scale) on average stated that time was enough for them. This difference, though, failed to reach statistical significance in the analysis.

Table 7.41. Learning styles related to perceived availability for internet searches (20-minute task)

	Time_internet_search	N	Mean	Std. Dev.	p
Dim1_ACT_REF_PRE	No	3	5.67	2.082	0.967
	Up to a point	4	6.00	0.816	
	Yes	22	5.77	1.926	
	Total	29	5.79	1.780	
Dim2_SEN_INT_PRE	No	3	6.00	2.646	
	Up to a point	4	9.25	0.957	**0.028**
	Yes	22	5.64	2.421	
	Total	29	6.17	2.564	
Dim3_VIS_VRB_PRE	No	3	6.67	3.786	0.933
	Up to a point	4	6.75	1.893	
	Yes	22	7.09	2.223	
	Total	29	7.00	2.268	
Dim4_SEQ_GLO_PRE	No	3	6.00	2.646	0.887
	Up to a point	4	6.50	1.291	
	Yes	22	6.00	1.877	
	Total	29	6.07	1.831	

The finding that Dimension 2 (Sensing/Intuitive) stands out only in the second, 20-minute task, is surprising. This is especially so because both the 20-minute and the 15-minute tasks have presented us with a similar picture in many respects so far. Methodologically speaking, it could be an indication that a larger sample was needed for the dimension to appear in the other tasks too. One possible interpretation might be that participants were thrown abruptly out of their comfort zone after the first task, with the 20-minute time frame considered to be the threshold between a relatively relaxed time frame (30 minutes) and a pressing one (15 minutes). As a result, the dimension related to perception (Sensing/Intuitive) might have emerged as defense mechanism with respect to the new reality. The next task (15 minutes) was similar in nature but the element of surprise

was lacking; in essence, there was nothing new to be perceived and dealt with and cognitive "balance" was restored to previous condition.

7.4.2.9. Perceived availability of time for choosing among alternatives (RQ)

The same rationale as in 7.4.2.8. was followed here to test the hypothesis:

Learning styles correlate significantly with perceived time availability for choosing between alternatives.

Analysis did not verify whether specific learning styles were related to subjective perception of time availability in this context ($p>0.05$ for all three tasks; see Table 7.42).

Table 7.42. Relating learning styles to time availability for choosing alternatives (p-values)

	Time_alternatives		
	30'	20'	15'
Dim1_ACT_REF_PRE	0.095	0.287	0.282
Dim2_SEN_INT_PRE	0.836	0.882	0.767
Dim3_VIS_VRB_PRE	0.118	0.370	0.165
Dim4_SEQ_GLO_PRE	0.096	0.232	0.232

7.4.2.10. Procedures

For the purposes of the present study, procedures were defined as a set of steps leading to a specific result in order to solve a particular problem (cf. 6.2.3.7.). Procedures include omission, literalism, specification and generalization. In this setting, our problems were the eight most important problems as identified by participants themselves. Data from screen-recordings and the Index of Learning Styles were used to test whether learning styles correlated with the use of procedures:

Learning styles correlate significantly with choice of procedure.

Kruskal-Wallis, a non-parametric test similar to ANOVA, was used to test the hypothesis for seven out of eight participant-driven problems discussed in Chapter 4. Kruskal-Wallis was used because it is not influenced by outlying scores, which might occur when dealing with learning styles, for example, with participants who have a very strong preference for either extreme of a given learning style dimension. Another non-parametric test, Mann-Whitney, was used as regards problem 5 because there were only two

procedures used, following exclusion of a single participant who had opted for omission, for reasons of statistical consistency.

Table 7.43 shows that there were no evident effects of learning styles concerning half of the problems: 2, 4, 6, 8. Dimensions 3 and 4 that is, preferences on the Visual/Verbal continuum or the Sequential/Global continuum seem to correlate with choice of procedures for problems 1: “Coriolis effect” (title), 3: “its momentum drives it east of due north”, 5 “Retroviruses” (title), and 7 “threshold frequency”.

Table 7.43. Effects of learning styles on procedures.[53]

	30' N=24														
	P1	%	LS mean	std.	P2	%	LS mean	std.	P3	%	LS mean	std.	P4	%	LS mean	std.
Omission	-	-			1	4.5	NS		6	27.3	**8.67**	1.37	4	20.0	NS	
Literalism	11	45.8	6.09	1.92	4	18.2			6	27.3	6.83	2.64	6	30.0		
Specification	9	37.5	6.00	1.67	4	18.2			7	31.8	6.43	2.07	3	15.0		
Generalization	4	16.7	**7.75**	0.50	13	59.1			3	13.6	3.67	0.58	7	35.0		
	24	100.0			22	100.0			22	100.0			20	100.0		
			DIM4						P3	%	DIM3					
			p=0.059								**p=0.027**					
	DIM1 p=0.761				DIM1 p=0.624				DIM1 p=0.096				DIM1 p=0.448			
	DIM2 p=0.667				DIM2 p=0.421				DIM2 p=0.319				DIM2 p=0.082			
	DIM3 p=0.420				DIM3 p=0.670				DIM4 p=0.704				DIM3 p=0.828			
					DIM4 p=0.198								DIM4 p=0.114			

[53] In those cases where only one participant opted for a given procedure, that participants' data was excluded from analysis for reasons of statistical consistency (P2, P5, P8).

	20' N=28								15' N=26							
	P5	%	LS mean	std.	P6	%	LS mean	std.	P7	%	LS mean	std.	P8	%	LS mean	std.
Omission	1	3.6							7	26.9	5.00	1.63	2	8.3		
Literalism	23	82.1	**7.17**	2.15	11	45.8	NS		3	11.5	**8.00**	1.00	18	75.0	NS	
Specification	4	14.3	4.75	1.71	9	37.5			6	23.0	5.67	1.63	1	4.2		
Generalization	-	-			4	16.7			10	38.5	6.80	1.75	3	12.5		
	28	100.0			24	100.0			26	100.0			24	100.0		
			DIM3								DIM4					
			p=0.041								**p=0.038**					
	DIM1 p=0.128				DIM1 p=0.536				DIM1 p=0.124				DIM1 p=0.973			
	DIM2 p=0.128				DIM2 p=0.144				DIM2 p=0.375				DIM2 p=0.211			
	DIM4 p=0.531				DIM3 p=0.121				DIM3 p=0.125				DIM3 p=0.102			
					DIM4 p=0.192								DIM4 p=0.604			

Regarding problem 1, it seems that participants who are moderate sequential learners (mean 7.75 on Felder's scale, std. ±0.50) opt for generalization almost significantly more (p=0.059) than less sequential learners do. Therefore, the less sequential learners opt for either literalism or specification. Omission was probably not a choice because the problematic area was also the title of the text.

Problem 3 consisted of a long phrase that presented a challenge on many levels: syntactic, lexical, etc. It is statistically clear (p=0.027) that extremely visual learners resorted to omission (mean 8.67, std. ±1.37), mildly visual learners remained close to the source text by using literalism or specification, while the vaguer generalization was the procedure of choice for those with a moderate preference for verbal learning (mean 3.67, std. ±0.58). It was expected that visual learners would stick to what was seen on screen and favor more literal approaches. It was also expected that verbal learners would tend to render material in their own words (Felder and Soloman 1993: 9). What seems paradoxical is that extremely visual learners used omission, the last-resort procedure, as mentioned in Chapter 6. This finding implies that these participants struggled more in relation to the rest. It might even arouse suspicions as to the potential compromise in their final product in terms of quality.

Dimension 3 (Visual/Verbal) also significantly correlates with problem 5, although it is mainly terminological in nature, with the added geometrical disadvantage of being in title position. In this case, visual learners again stayed closer to the source text by using literalism, while verbal learners paraphrased using specification (p=0.041), as expected.

Problem 7 seems similar to problem 3, yet this time it is the fourth dimension (Sequential/Global) that correlates with procedures. It is significantly clear (p=0.038) that the more sequential learners chose literalism (mean 8.0, std. ±1.00), while less sequential ones used specification and generalization. Global learners, on the other side of the dichotomy, opted for omission. The behavior of those participants with a strong preference for sequential learning that is, selection of literalism, was expected, since these learners tend to "gain understanding in linear steps" (Felder and Soloman 1993: 9) and work by building block by block, in our case, segment by segment. Global learners, on the other hand, used omission, probably as their last resort, since, again according to Felder and Soloman, "they may have serious difficulties until they have the big picture (ibid.).

Table 7.43 shows a consistency in dimensions, since only two out of four correlate significantly with procedures, the dimension of input modality, Visual/Verbal, and the dimension of understanding, Sequential/Global. In the two cases where the Visual/Verbal dimension correlates with procedures, the behavior of the participants is relatively consistent: the stronger the preference for visual learning, the more these participants stick to the text. On the contrary, the stronger the preference for verbal learning, the more generalization is used. What is also worth noting is that these correlations appear only as regards the first problem in order of appearance in the text. Actually, in two out of four cases, the problem is the title itself. Nevertheless, the participants call upon different mechanisms to deal with these two issues, yet another sign that, in due course, a delicate balance among learning styles is achieved. From a training perspective, these findings underpin the fact that the process of translation is a multifactorial issue. At micro-level, one might even argue that the translation of titles deserves more attention in class.

7.4.2.11. Management of online resources

It was hypothesized that learning styles would correlate significantly with the way participants handled online resources, as these resources were described in Chapter 6 for the same set of eight problems:

Learning styles correlate significantly with

1. *the type of online resources used (encyclopedias, general/specialized bilingual dictionaries, machine translation sites;*
2. *the frequency said online resources were used;*
3. *the translation phase (planning, translation-upon appearance, translation-during unit processing, revision) during which online searches took place.*[54]

Contrary to expectations, the t-tests showed that learning styles do not seem to correlate with the type of online resources used or, at least, no learning style dimension dominated (Appendix F.10). As far as the second hypothesis is concerned, it was rejected

[54] The phase of preparation is excluded because, according to the definition in Chapter 4, it does not include web searches.

as well by means of Kruskal-Wallis tests. It is noted that certain analyses could not be performed because there were too few cases. There were not enough cases for statistical analyses as regards the third hypothesis either because most participants had resorted to online searches upon appearance of the problematic area (cf. Chapter 6).

7.4.3. Effects of learning styles related to the product

7.4.3.1. On mean scores

A non-parametric test, Spearman's rho, was carried out to test the following hypothesis: *Participants with same learning style have similar quality scores (means) per time frame.*

Mean quality scores per participant were based on the grade average by the two raters, as explained in Chapter 3. It reflects the quality of the text available to the raters, irrespective of degree of Completion. Spearman's rho did not reveal any correlations between quality means and learning styles (Spearman's rho table, Appendix F.11). Therefore, the null hypothesis is confirmed.

7.4.3.2. On degree of Completion

The fifth quality criterion, degree of Completion, is examined here prior to its embedding into the other four criteria because evidence from learning-styles correlations with the process variable of task completion (7.4.2.7.) showed that the Visual/Verbal dimension correlated with one task. The hypothesis tested was that:

Learning styles correlate significantly with the degree of Completion.

Spearman's rho correlation shows that, as far as the first task is concerned (text COR-30'), there is a rather strong negative correlation of statistical significance: $r(25)= -0.513$, $p=0.009$ (Table 7.44). The more extreme the preference for visual learning (Dimension 3, toward 11 on Felder's scale) is, the lower the degree of completion. Since this factor is based on the number of source text words participants had translated, the result implies that visual learners translated less than did verbal learners.

Regarding the second task (text RETRO-20'), there is a positive correlation of statistical significance concerning the fourth dimension, Sequential/Global: the more sequential the participants, the higher the degree of completion. Here, $r(29)=0.397$, and $p=0.033$. Analysis of the third task (text PHOTO-15') shows a tendency similar to the one

for the 20-minute task but of marginal statistical significance, where r(28)=0.339, and p=0.078. Again, the more sequential the participants, the higher the degree of completion.

Taking into account that the 20-minute time frame was the threshold level or the breaking point for many participants, it could be concluded that participants exhibit a different behavior under relatively relaxed time frames vis-à-vis tighter deadlines (both texts in this case). It might also be argued that participants who followed a successive information-coding scheme (Das 1988), typical of sequential learners, applied what they "learned" from the first task and adapted their behavior accordingly.

Table 7.44. Learning styles related to the degree of Completion

Spearman's rho		Dim1_ACT_REF_PRE	Dim2_SEN_INT_PRE	Dim3_VIS_VRB_PRE	Dim4_SEQ_GLO_PRE
30' cor_completion	Correlation Coefficient	-0.086	-0.264	-0.513	-0.002
	Sig. (2-tailed)	0.684	0.203	**0.009**	0.994
	N	25	25	25	25
20' retro_completion	Correlation Coefficient	-0.227	0.079	-0.058	0.397
	Sig. (2-tailed)	0.237	0.684	0.766	**0.033**
	N	29	29	29	29
15' photo_completion	Correlation Coefficient	-0.045	0.163	-0.162	0.339
	Sig. (2-tailed)	0.818	0.407	0.409	**0.078**
	N	28	28	28	28

7.4.3.3. On weighted scores

Degree of Completion was incorporated in each of the four remaining quality criteria through the use of a statistical weight (cf. Chapter 3). The resulting weighted scores are therefore the projections of what the score per criterion would have been had the participant finished the translation. It was hypothesized that participants sharing the same learning style would have similar weighted scores, whether low, average or high, per quality criterion.

Since the time variable is automatically included in our concept of quality, as a fifth criterion, the final hypothesis becomes:

Learning styles correlate significantly with translation quality (weighted scores) per criterion under time constraints.

Spearman's rho reveals a pattern similar to 7.4.3.2. above (Table 7.45). Regarding the first task, carried out within 30 minutes, statistically significant negative correlations were found regarding the third dimension, Visual/Verbal, for all four criteria ($p < 0.023$ in all cases). The higher the score per criterion, the lower the score for the third dimension on Felder's scale, where low scores point to a tendency toward verbal learning. For example, if a participant scores high in Formal Correctness (30'), we expect them to have a tendency toward verbal learning.

The second task was carried out in two thirds of the original time frame. Spearman's rho shows a positive significant correlation regarding Terminology/ Vocabulary, slightly weaker than before ($p=0.029$). The more sequential a participant is (Dimension 4), the higher the score in Terminology/Vocabulary becomes. It seems that following a relatively linear thinking process helped participants keep on track and translate terminology/vocabulary in an effective manner.

There is a significant positive correlation concerning the last task (15'), as well, but the pattern is exactly the reverse in relation to the 20-minute task: the higher the score in three out of four quality criteria (Formal Correctness, Accuracy/Message Transfer, Textual Flow), the more sequential a participant is ($p<0.039$ in all three cases). The only seemingly unaffected criterion is Terminology/Vocabulary. This might be attributed to the tight deadline, which may have impeded participants from looking for appropriate terminological solutions. However, it could be due to the concurrent application of cognitive traits from many learning style dimensions.

Table 7.45. Learning styles related to translation quality (weighted scores per criterion)

		Spearman's rho	Dim1_ACT_ REF_PRE	Dim2_SEN_ INT_PRE	Dim3_VIS_ VRB_PRE	Dim4_SEQ _GLO_PRE
COR_FCOR_WEIGHTED		Correlation Coefficient	0.109	-0.249	-0.461	0.008
		Sig. (2-tailed)	0.604	0.230	**0.020**	0.969
		N	25	25	25	25
COR_TERMIN_WEIGHTED		Correlation Coefficient	-0.040	-0.221	-0.499	0.194
		Sig. (2-tailed)	0.848	0.288	**0.011**	0.354
	30'	N	25	25	b	25
COR_ACCURACY_WEIGHTED		Correlation Coefficient	0.170	-0.185	-0.453	0.131
		Sig. (2-tailed)	0.415	0.377	**0.023**	0.533
		N	25	25	25	25
COR_TFLOW_WEIGHTED		Correlation Coefficient	0.030	-0.129	-0.459	0.217
		Sig. (2-tailed)	0.887	0.539	**0.021**	0.298
		N	25	25	25	25
RETRO_FCOR_WEIGHTED		Correlation Coefficient	-0.176	0.103	-0.031	0.338
		Sig. (2-tailed)	0.361	0.595	0.872	0.073
		N	29	29	29	29
RETRO_TERMIN_WEIGHTED		Correlation Coefficient	-0.023	0.077	-0.089	0.406
		Sig. (2-tailed)	0.905	0.690	0.644	**0.029**
	20'	N	29	29	29	29
RETRO_ACCURACY_WEIGHTED		Correlation Coefficient	-0.152	0.064	-0.169	0.321
		Sig. (2-tailed)	0.430	0.743	0.381	0.090
		N	29	29	29	29
RETRO_TFLOW_WEIGHTED		Correlation Coefficient	-0.102	0.103	-0.103	0.263
		Sig. (2-tailed)	0.600	0.594	0.596	0.168
		N	29	29	29	29
PHOTO_FCOR_WEIGHTED		Correlation Coefficient	-0.013	0.069	-0.232	0.393
		Sig. (2-tailed)	0.949	0.727	0.234	**0.039**
		N	28	28	28	28
PHOTO_TERMIN_WEIGHTED		Correlation Coefficient	-0.056	0.051	-0.133	0.314
		Sig. (2-tailed)	0.778	0.797	0.500	0.104
	15'	N	28	28	28	28
PHOTO_ACCURACY_WEIGHTED		Correlation Coefficient	-0.073	0.109	-0.124	0.468
		Sig. (2-tailed)	0.714	0.580	0.529	**0.012**
		N	28	28	28	28
PHOTO_TFLOW_WEIGHTED		Correlation Coefficient	0.000	0.044	-0.124	0.421
		Sig. (2-tailed)	0.998	0.823	0.530	**0.026**
		N	28	28	28	28

7.4.3.4. On overall translation quality under time constraints

Our main hypothesis is that:

Learning styles correlate significantly with overall translation quality when the translation task takes place under time constraints.

A Spearman's rho analysis reflects a pattern of correlation similar to both 7.4.3.2. (degree of Completion) and 7.4.3.3. (weighted scores of four rater-based criteria), as expected.

Table 7.46. Correlating learning styles with overall translation quality

	Spearman's rho	Dim1_ACT_ REF_PRE	Dim2_SEN_ INT_PRE	Dim3_VIS_ VRB_PRE	Dim4_SEQ_ GLO_PRE
30'	Correlation	0.122	-0.205	-0.470*	0.130
COR_GRADE_WEIGHTED	Coefficient				
	Sig. (2-tailed)	0.562	0.326	**0.018**	0.536
	N	25	25	25	25
20'	Correlation	-0.115	0.108	-0.090	0.365
RETRO_GRADE_WEIGHTED	Coefficient				
	Sig. (2-tailed)	0.553	0.577	0.641	**0.051**
	N	29	29	29	29
15'	Correlation	-0.010	-0.002	-0.140	0.392
PHOTO_GRADE_WEIGHTED	Coefficient				
	Sig. (2-tailed)	0.958	0.991	0.477	**0.039**
	N	28	28	28	28

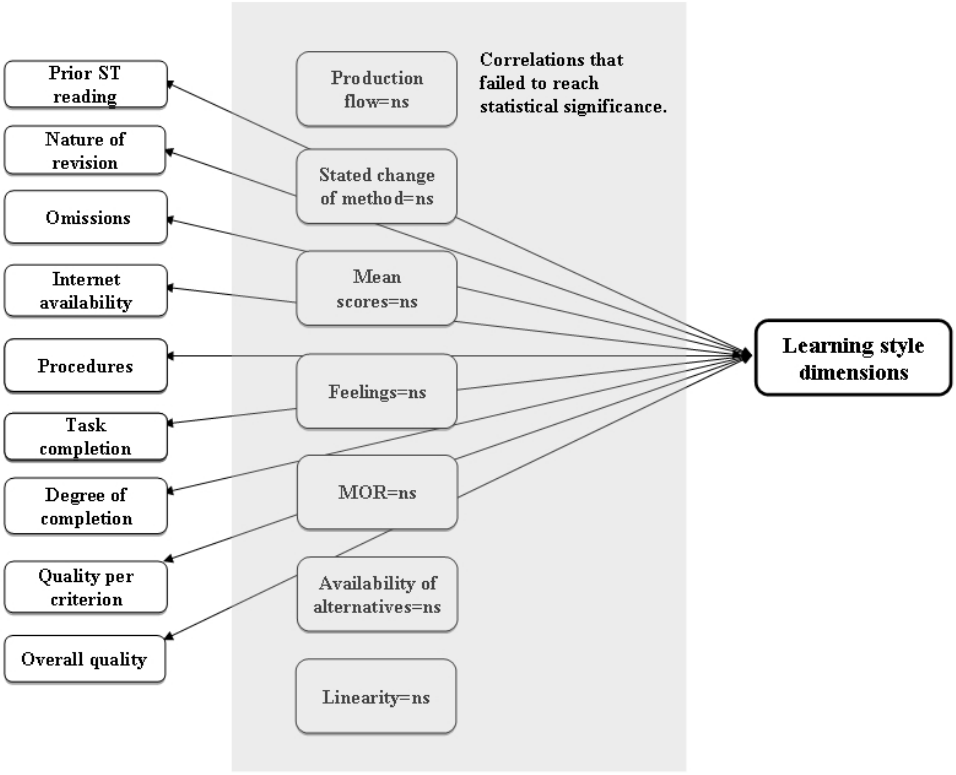
As far as the first task is concerned (text COR-30'), there is a strong negative correlation of statistical significance: r(25)=-0.47, p=0.018 (Table 7.46). The more extreme the preference for visual learning (Dimension 3, toward 11 on Felder's scale) is, the worse the overall quality.

Regarding the second task (text RETRO-20'), there is a positive correlation of statistical significance concerning the fourth dimension, Sequential/Global. The more sequential participants are, the higher the overall quality is. Here, r(29)=0.365, and p=0.051. Analysis of the third task (text PHOTO-15') shows a tendency similar to the one for RETRO but clearer, where r(28)=0.392, p=0.039. Again, the more sequential the participants are, the higher the overall quality is, systematically.

7.4.4. Summary

Learning styles, as patterns of thinking, perceiving, problem-solving and remembering when approaching a learning task, do not seem to correlate with participants' perception of the overall experience, at least in the way they expressed their feelings about the tasks, nor with participants' perceived availability of time for choosing among alternative solutions. Learning styles seem to correlate with participants' perceived availability of time for internet searches, though. They also correlate significantly with several aspects of the translation process, such as participants' decisions to read their source text in advance, their approach to revision, omissions, task completion as well as their choice of procedures for solving specific translation problems. Finally, learning styles correlate significantly with overall quality as well as all its five constituent criteria (Formal Correctness, Terminology/Vocabulary, Accuracy/Message Transfer, Textual Flow and degree of Completion) for most, if not all three, translation tasks (Figure 7.3.).

Figure 7.3. Summary of learning style correlations



7.5. Chapter summary

Three sets of sub-hypotheses, each focusing on one of the three central variables (quality, time, learning styles) were tested in an effort to contextualize potential results from testing the main hypothesis: *learning styles correlate significantly with translation quality under time constraints.* Participants' feelings as to the overall experience, patterns of linearity, perception of time availability for choosing alternative renditions, management of online resources do not seem to reach statistical significance. On the other hand, variables such as approaches to revision, handling task completion and procedures, significantly interact with quality and/or time, learning styles. As far as the main hypothesis is concerned, it is validated for two out of the four learning style dimensions proposed by Felder.

The focus now shifts to the two learning-style dimensions, the Visual/Verbal dimension and the Sequential/Global dimension, which seem to correlate with the majority of variables in the study, including the main dependent variable, quality itself.

Chapter 8. Discussion

8.1. The research issue

The main hypothesis of the present study, *learning styles correlate significantly with quality when the translation task takes place under time constraints*, was validated, with respect to two out of the four learning style dimensions. The Visual/Verbal dimension, which is the dimension related to *input modality*, seems to correlate with the relatively relaxed time frame of 30 minutes, while the Sequential/Global dimension, the dimension related to *understanding*, correlates with the tighter deadlines of 20 and 15 minutes (see Tables 7.44, 7.45, 7.46) .

The finding, however, is devoid meaning unless contextualized. There has been a conscious effort from the start of the study along these lines: to identify, examine separately and then factor in a number of variables related to the pedagogical environment in general and the overall participant performance in particular, so that any possible permeating effects were acknowledged in advance and, in a way, differences that might (also) be attributed to these variables would be seen and subsequently be ironed out.

8.2. Skills, time, process: Effects and their interrelations

To be more specific, a mark at any point along the continuum of Felder's model dimensions may not mean a lot, unless trainees in question also work toward improving their computing, typing and L2 skills, since these exact skills were found to significantly affect product quality as available time decreased. The parallel benefit for pedagogical practice in general is that this approach helps substantiate empirically what many translator trainers observe and instinctively feel should be included in training, even if the responsibility for developing a skill such as typing might be shifted on trainees altogether. Although these findings were anticipated, it is to be noted that typing and computing skills may be considered to be "time-saving features" and taking advantage of them "changes the translation process itself" in certain cases (Asadi and Séguinot 2005: 530).

Both the direct and indirect effects of time were also put under the microscope (cf. Figure 7.2). The direct time effects on product quality translated into compromise in terms of Formal Correctness and Terminology/Vocabulary.

Time or lack thereof, however, also contributed to a set of indirect effects: the delineation of the relationship between time and process performance revealed that time significantly affected the translation process itself, and the ensuing changes in the process had repercussions on product quality in turn. Empirical evidence underlines the fact that, when time is reduced by one third, the production flow often undergoes a vast re-structuring: the average participant abandoned peripheral activities, such as preparation and revision, or even reading the source text in advance, and kept to the core minimum, by squeezing most acts, into just planning and translation phases, with this second phase becoming increasingly blurred due to intermittent revision acts, in their effort to deliver on time. Claims by Jakobsen (2002), Machado (2007) and Alves/Campos (also discussed in Alves and Campos 2009b: 84) as well as Pym (2009) that orientation is transferred into the drafting phase are probably valid for this set of data as well. In other words, the average participant exerted minimum effort in order to achieve the maximum possible output, and their behavior roughly reflected both Seiwert's model of time ecology and Levý's minimax theory, irrespective of final, qualitative results. It should be underlined here that giving up revision altogether was, in most cases, involuntary and rather a by-product of the participants' inability to deliver complete translations under increasing time constraints.

The same increasing time constraints affected task completion negatively on average, as expected, and corresponding evidence from screen recordings paints a similar picture for both tasks with tighter deadlines (20 and 15 minutes). Lack of completion, in turn, led to products of significantly lower quality. For those participants who did manage to finish their translations, irrespective of task blending, and also made it to a separate revision phase, this exact revision significantly improved their products. In fact, the more heavily they revised, the higher the overall product quality. Participants realistically voiced their need for more revision time and the number of comments increased as available time decreased. Increased time reduction also caused participants to report a lack of time for internet searches and for looking up alternatives and their perception seems to be matched by the screen-recording data. From a pedagogical viewpoint, such results and their

subsequent triangulation provide indications that participants are becoming more aware of their own needs and actions. From a neighboring perspective, that of the trainers', such results enhance the validity of the participants' self-report data, and by extension, underline the need to place more trust in students.

8.3. Using learning styles to interpret participants' performance

8.3.1. Using learning styles to interpret participants' process performance

Translation performance, both process and product-based, has been examined through the prism of learning styles in the present study. Many aspects of participants' actual performance within this setting seem to correlate with one or more dimensions of learning styles (cf. Figure 7.3). The fact that certain other aspects of participant performance do not, however, is not to be taken lightly nor interpreted as meaning that learning styles play no role in these cases. Learning styles do exist throughout the translation process, but the case might be that no single dimension *dominates* in those particular aspects and, as a result, no clear behavioral tendency is observed. This might be attributed to the complex nature of the translation task that, at points, may call for concurrent activation and subsequent application of many cognitive styles and traits, or require rapid, and therefore undetected, alternations from one dominant dimension to another.

Aspects of performance where specific learning style dimensions seem to emerge and dominate include prior source text reading, treatment of strategic omissions, reported time availability for internet searches, choice of procedures, task completion (with direct consequences on product quality), revision and product quality itself.

More explicitly, the empirically validated correlations highlight tendencies that seem to sketch the following picture. Relatively balanced global/sequential learners tend to read the source text before translating during the relaxed time frame of 30 minutes. This implies that flexibility in understanding might play a role, i.e. those who can juggle information coding either successively (sequentially) or simultaneously (globally) without a problem will be more likely to read the source text in advance. When time is reduced by one third down to 20 minutes, there is a shift toward the dimension of input modality, the

Visual/Verbal. The participants who still insist on reading the source text in advance, despite the general group tendency to abandon this in order to save time, are those with a preference for visual learning. They may need to read the source text in order to visualize the content or focus on the picture accompanying the text, an element that might help them move on with their (verbal) translation. When the available time is halved to 15 minutes, the focus shifts toward perception and the corresponding dimension, Intuitive/Sensing: those with a preference for intuitive learning opted for reading the source text in advance probably because they could afford to, since they may be "better at grasping new concepts" (Felder and Soloman 1993: 8) and reading the source text helps them create links with their translations, even if, under the circumstances, it might prove more practical to skip reading, like those with a preference for sensing (conscious) learning actually did. The fact that no one single dimension appears consistently in all three tasks was not expected. It nevertheless serves as a reminder that learning styles are situation-dependent, and highlights the variable of time as another, underlying, co-factor.

Participants' conscious decisions not to translate parts of the text also correlate with more than one learning style dimensions, albeit with a different pattern. During the relaxed but also during the most time-constrained task, the process by which "perceived information is converted into knowledge" (Felder 2002: 678) is brought to the foreground. Active learners insisted on translating everything, while more reflective learners were prepared to leave words and phrases out. It seems that, instead of acting right away (translating), those with a preference for reflective learning stopped to reflect on the content and judge whether rendering all of it was necessary under the circumstances. It is interesting that, during the participants' first real encounter with time constraints (20-minute task), consciously omitting information becomes a matter related to input modality: those with a preference for visual learning probably focused on the situation they had sketched out in their mind and decided to continue translating, rather than stick to lexical items.

A rather similar pattern emerges when dealing with the subjective reporting of time availability for internet searches. No learning style dimension seems to dominate when examining how participants perceived such time availability during the first and the last task (30 and 15 minutes, respectively). On the other hand, the dimension of perception

itself (Sensing/Intuitive), originating in Jung's psychological types of sensation and intuition, correlates with experience of time availability. Participants with a preference for intuitive learning probably approached the new reality through "indirect perception by way of the subconscious" (Felder 1995: 22), in contradistinction to more consciously working sensors who reported limited or no time availability. The result indicates that intuitors worked fast but there is no guarantee that they used the internet efficiently, since they tend to be careless (ibid.)

The findings seem to be more consistent when it comes to procedures, the steps participants followed on their way to translating problematic parts. Procedures in the present setting relate either to the way participants perceive sensory information (Visual/Verbal) or to the way they acquire understanding of information received (Sequential/Global), particularly as regards the first problem in order of appearance in each text namely, the title. In the two cases where the Visual/Verbal dimension is the dominant one, visual participants consistently keep close to the source text by using literalism, as if there were no room for visualization and more imaginative renditions. Extremely visual participants, however, do not play it safe. Rather, they resort to omission, a procedure that often involves a considerable qualitative risk in relation to the end product. At the other end of the continuum, participants with a preference for verbal learning insist more on the verbal level and tend to prefer procedures such as specification. In a similar manner, global learners tend to fall back on omission. Sequential learners manage to "function with incomplete understanding of […] material" (Felder 1995: 25) and keep close to the source text, while relatively balanced learners tend to resort to specification.

The last element of the translation process as regards the design at hand, revision, correlates, like task completion above, with the Visual/Verbal dimension but the pattern resembles the one reflected by reported availability of time for internet searches. In other words, the correlation holds only for the second task (20 minutes). Apparently, less visual learners do not revise, while more visual learners do. Moreover, revision significantly affected overall product quality across all time frames. Participants who did not revise at all received significantly lower overall grades than those who did revise (heavily), irrespective of time constraints. This pattern repeats itself when the participants' subjective experience is taken into consideration: participants who felt they had no time for revision had

significantly lower grades than those who felt they had time to revise up to a point, again across all time frames.

Revision deserves particular attention because the situation masks itself as a contradiction at first glance. If a) more visual learners revise and b) heavier revision leads to products of higher quality, the reasonable conclusion would be that the more visual learners deliver products of higher quality in relation to their less visual fellow-learners (ie. learners who might also be characterized as verbal). This is not backed up by empirical evidence, however. On the contrary, as will be discussed in detail below, learners with a very strong preference for visual learning produced translations of a lower quality when compared to less visual ones, during *the 30-minute time frame*. Only in the 20-minute time frame do the more visual learners tend to revise more. In fact, the Visual/Verbal dimension is not even the dominant dimension in relation to overall product quality during the 20-minute time frame. A possible explanation might be that other factors, for instance completion, might have also influenced final scores and to a greater extent. This situation draws attention to the complex interrelations among factors.

As already mentioned, task completion was affected by time constraints, and the pattern is similar for both the tighter tasks. Task completion affected product quality across all time frames, in turn. Surprisingly enough, the picture is reversed when it comes to learning styles: task completion correlates with learning styles during the task with the minimum constraints (30 minutes) but not with the other two (time-affected) tasks. Input modality that is, the Visual/Verbal dimension dominates during the more relaxed time frame. Evidence shows that participants with moderate and strong preference for visual learning wrote significantly less, therefore failing to finish their tasks. As the participants were relatively fresh to the task type and they had only one picture with this first task, it is possible that these extremely visual learners felt “cold” with the task type, swamped by the information provided through the verbal medium and it took them more time to process it. It becomes apparent that, despite specific results, the general picture is that there is a shift in behavior, also reflected in (dominant) learning styles between the relaxed and the more time-constrained time frames (30-minute tasks vs. both 20-minute and 15-minute tasks).

8.3.2. Using learning styles to interpret participants' product performance

When completion is treated as a quality criterion, this last general pattern is repeated: there is a different dominant dimension as regards the more relaxed time frame of 30 minutes, and another dominant dimension for the other two tasks. In the first situation, the Visual/Verbal dimension dominates, as expected, much like above. The extremely visual learners were the ones with lower percentages of completion. The Sequential/Global dimension, related to understanding of material, dominates when examining the tighter deadlines of 20 and 15 minutes. The remaining four quality criteria do not correlate with learning styles, but this is to be expected, given that rater 1 and I evaluated the material delivered and that often included incomplete products.

Completion constitutes, in essence, the weighing factor for incomplete products. As it helps embed time effects into the end product, it colors all subsequent correlations of learning styles and product-related quality levels, i.e. the weighted scores as well as the overall scores, albeit at different degrees. For instance, participants with low scores in all four criteria, Formal Correctness, Terminology/Vocabulary, Accuracy, Textual Flow, tend to have a strong preference for visual learning during the relatively relaxed 30-minute task. Under increasing time constraints, only one criterion seems to be affected, Terminology/Vocabulary, and there is a shift in dimension: sequential learners seem to get the higher scores. When time is halved to 15 minutes, the situation is partially reversed: it is the sequential learners who score higher again but, this time, all criteria *except* Terminology/Vocabulary are affected. Taking into account that the two tasks with the tighter deadlines present a very similar picture in terms of process and behaviors, the same dominant dimension was expected but the shift in correlated criteria was not. At the very least, both Formal Correctness and Terminology/Vocabulary would be expected to correlate during the 20-minute task because there was a concurrent time effect: both these criteria were also found to be significantly affected by time constraints (cf. Chapter 7). Yet it could be argued that this shift points to Terminology/Vocabulary as the most time-sensitive of the four subjective criteria, probably because the participants had to seek external help, therefore spending valuable time away from the main translation space, whereas solving issues of Formal Correctness would be dealt with through re(-)vision.

Revision might constitute the most appropriate starting point for time-savings because it might require between 40% and 90% of a professional translator's effort when dealing with a technical text (Bayer-Hohenwarter 2008: 16). Taking all of the above into consideration, it seems that those with a preference for relatively linear, sequential learning resisted the most under increasing time constraints but then, again, it has to be repeated that, beyond learning preferences, those with more advanced linguistic, computing and typing skills would enter the translating race from a better starting position. Such findings highlight the multifactorial nature of translation and underpin the fact that investigating translation calls for "a constant awareness of the interdependence of any individual facet one chooses to single out" (Neubert 2000: 16), with analogous implications for training, the profession and research.

8.4. Cognitive "shock"

A horizontal view of the experiment, per time frame, confirms that the 30-minute task stands out in relation to the other two in terms of both product and process and may be considered as the only task where participants experienced a situation closer to their normal, i.e. not time-constrained, class tasks. This is also supported by participants' retrospective comments on (lack of) stress, pressure and overall discomfort.

Moreover, most of the results indicate a significant behavioral modification as regards the 20 minute time frame, already labelled as "cognitive shock" (cf. 7.4.2.4), probably due to the rather strong parallel effect of the jump from the 30-minute- to the 20-minute task. With this in mind, it could be argued that the 20-minute time frame signals a critical turning point in participant performance: the quality of the end product is significantly compromised in most cases, while prior source-text reading, revision and omissions are approached in a manner different from before. These findings are corroborated both by self-reports and by screen-recording data. On top of these, there is a specific learning style dimension correlating with these aspects during this exact time frame, the Visual/Verbal dimension. The only exception concerns product quality, where the Sequential/Global dimension dominates. Nevertheless, even this change in dominant

dimension is interpreted as a reflection of this pivotal point in terms of applied cognitive traits.

Overall performance during the 15-minute task oscillates between resemblance with and variation from the 20-minute task. Quality scores, time effects, some learning style-based correlations fall into the first category, where the picture during the 20-minute task resembles the corresponding picture of the 15-minute task: similar (lower) quality scores, similar time effects or lack thereof (production flow, task completion, no time effect when comparing these two frames, etc.), same dominant learning style dimensions or no correlations at all (task completion, product quality). Variations include all those aspects of performance where significant effects and correlations appear only as regards the 20-minute task (learning styles in relation to revision, reading source text in advance) or when the 15-minute task result resembles the 30-minute task result (learning styles in relation to revision, omissions, reported time availability for internet searches).

Even though participants had gained some familiarity with timed tasks throughout the course, it cannot be excluded that for some of them, this first 30-minute task constituted a warm-up activity as well, hence justifying difference in performance vis-à-vis the other two tasks. This relative homogeneity of results as far as the 20- and the 15-minute tasks are concerned might also be explained by the relative proximity in relation to overall time reduction: the second task took place under 30% less time, while the third task took place under 50% less time vis-à-vis the first task. Time, however, was reduced by only 25% from the second to the third task. Nevertheless, the lack of expected analogous results calls for further investigation.

One possible explanation might be that participants went beyond their comfort zone after the first task, with the 20 minute time frame considered to be the threshold between a relatively relaxed time frame (30 minutes) and a pressing one (15 minutes). As a result, a dimension, most often the Visual/Verbal, emerged as defense mechanism to the newly constructed reality. The third task (15 minutes) was similar in nature but lacked novelty; any “vibrations” from the cognitive “shock” were absorbed. Participants possibly went through a period of cognitive “re-alignment”, i.e. reconsidering their approaches up to that point. Cognitive balance was then restored in one way or another. For example, as regards “stated change of usual translation method”, although there was a significant change

moving from the 30-minute task to the 20-minute task, when it comes to 15-minute task, participants fall into two groups of equal-size. This implies that, from those who opted for change during the 20-minute task, some stuck to the new approach, while others fell back to the familiar one.

This synthetic presentation of findings consolidates the previous argument that the 20-minute time frame played a pivotal role in leading participants to modify their behavior but it might also imply that, after the initial "shock", there was a learning effect from within the experience that participants took into account prior to dealing with the 15-minute task. Thinking in socio-constructivist terms, this series of events could be treated as learning-while-doing, in the sense that participants adapted themselves to the environment, having to deal with the initial cognitive shock and, in a way, building on their experience in their own *individual* ways. The participants exhibited flexibility in learning from one task and immediately applying learnt lessons to the next task. More specifically, they seem to have *learned* from the experience, *during* the experience itself. It might even be argued that some of them learned through trial and error. For example, many of them went for a certain approach during the 30-minute task, they switched to a different one during the 20-minute "shocking" time frame and, depending on the results of that exact *trial*, they adjusted their approach during the 15-minute task. From the perspective of educational psychology, these (re)actions might constitute instances of (socio)cognitive conflict followed by self-regulation and equilibration, whereby people learn and redirect their behavior after solving an inner conflict.

8.5. Relating the pilot study to the main experiments

Another horizontal view of the findings, this time in terms of learning styles, shows that when there is a dominant dimension, this will be the one related to the modality (Visual/Verbal) of incoming information, especially as regards the process, or the way of understanding (Sequential/Global) incoming information, especially when relating end-product quality under time constraints. The dimensions related to perception (Sensing/Intuitive) or processing (Active/Reflective) only dominate in rare occasions. The pilot, on the other hand, pointed to a single dominant dimension, the Visual/Verbal begging

the question of why there is no trace of the Sequential/Global one. Prior to any attempts to account for this issue, it should be noted that any comparison with the initial pilot study is expressed with extreme caution because of different data elicitation methods/instruments and, mainly, due to the difference in scope between the sets of tasks.

First, note that findings from the pilot and the main experiment partially coincide. More specifically, it seems that more time available, along with a preference for verbal learning, the higher the scores. Visual participants in the pilot scored lower as regards (pedagogical) numerical marking in general, while visual participants in the main experiment scored lower as regards all weighted criteria (formal correctness, terminology/vocabulary, accuracy, textual flow). Moreover, the pilot showed that the stronger the preference for visual learning, the higher the tendency to deliver unpublishable translations, "unpublishable" in this context mainly referring to incomplete translations. The same negative correlation as regards completion appears in the main experiment, again pointing to verbal participants as those with the higher scores. The difference lies in the fact that, in the main experiment, both these findings are valid *only* when the 30-minute task is concerned.

Proceeding with the necessary caution, it might be argued that this issue concerns a different, broad concept of modality. Participants in the pilot wrote their translations by hand and had their computer use limited to internet searches, while participants in the main experiments typed theirs and used an online work environment exclusively.[55] This shift in modality might have affected quality of sensory input, related to the Visual/Verbal dimension, since by no means is it taken for granted that the single, online environment in the second case is less complex than the combination of online/offline environments in the first case: writing by hand is considered to be more homogeneous than typing, and there may be differences between reading the source text (and looking at the accompanying image) on paper and on-screen, etc. From another viewpoint, the time frames for both the pilot (the first three) and the main experiments remained the same. As time decreased, albeit in essentially different work environments, it is plausible that different sets of

[55] Many thanks to Dr. Hubscher-Davidson for pointing this out to me (2010).

interrelations emerged, accentuating differences beyond input modality and leading to change as regards the dominant learning style dimension. By extension, it might be argued that the work modality cannot be excluded altogether as a factor correlating with learning styles and affecting translator behavior, especially when dealing with the increasingly multi-modal work environments of today (and tomorrow). New work modalities create a new order that needs to be taken into consideration in advance, i.e. during training.

Although the explanations above may partially account for the shift in dimension, the fact remains that there is no justification for why the change in work modality would correlate with dominance of the Sequential/Global dimension in the second and third tasks in the main experiment. This dimension probably emerges because it seems to be the closest one to the Visual/Verbal dimension, especially if one expands the concept of input modality to include elements of internal processing, such as visualization (Silverman 2002). According to Silverman, studies from brain-hemisphere research indicate a possible association between the Visual/Verbal dimension and the Sequential/Global dimension (2002: 68): global learners are more likely to be visual processors and sequential learners are more likely to be verbal processors (Felder and Spurlin 2005: 104). Indeed, in our context, it is true that the negative correlation observed in the pilot and in the 30-minute task in the main experiment (more visual learning correlates with lower scores) transforms into a positive correlation (more sequential learning correlates with higher scores). As participants were faced with concurrent multi-modal information, including typing/computing considerations, it might have been easier for those with a preference for sequential learning a) not to leave elements out, since these learners tend to code information and proceed in linear steps, and b) to move faster because they are able to do something with the material even if they do not fully understand it (Felder 1993: 9). Therefore, it might be assumed that the Visual/Verbal dimension was subsumed under or gave way to the Sequential/Global dimension, “the major dimension of cognitive style affecting learning” (Schmeck 1998: 341).

8.6. Chapter summary

A multi-faceted analysis of students' performance under time constraints has shown that time constitutes a key factor in the translation process. In the current setting, change in (tighter) time frame does not seem to have a significant effect on stated change of translation method, patterns of linearity, conscious omissions, perception of time availability for internet searches. Nevertheless, decrease in available time clearly affects the quality of the translation process. Lack of time affects the very nature of the production flow, as regards preparation and revision. Lack of time affects the decision to read the source text in advance, the nature of revision itself, task completion, subjective perception of time availability to choose alternative solutions. In essence, most students abandon what they consider as peripheral in order to focus on the bare necessities that is, the actual drafting of the translation, checking for documentation and errors on the spot, if at all.

Time or lack thereof does not seem to affect directly overall product quality per se. However, it does affect aspects of the translation process which have direct repercussions on the product. For example, lack of time negatively affects task completion on average. Decrease in available time indirectly deprives students from correcting typos and syntactical mistakes and it impedes them from looking up required terminology, thereby compromising aspects of translation quality such as formal correctness and terminology/ vocabulary. Revision is similarly compromised: although the more heavily students revised, the better the overall quality of their products, not many were given this chance.

In an effort to link students' performance with students themselves, the variable of learning styles was included in the analysis. Several aspects of students' performance were mapped onto the corresponding learning style dimensions. Specific learning style dimensions seem to emerge and dominate with respect to prior source-text reading, treatment of strategic omissions, reported time availability for internet searches, choice of procedures, task completion (with direct consequences on product quality), revision and product quality itself. The main hypothesis of the study is validated: The Visual/Verbal learning style dimension and the Sequential/Global learning style dimension correlate significantly with quality when the translation task takes place under time constraints. This means that modality and understanding of input, respectively, are related to students' time-

constrained behavior. Data actually indicate that students with a preference for a relatively linear, sequential learning resisted the most under increasing time constraints *provided* they had advanced linguistic, computing and typing skills. Data also suggest an interplay between the two most frequently-emerging dimensions: global learners are more likely to be visual processors and sequential learners are more likely to be verbal processors. Under increasing time constraints and therefore, under a new set of delicate interrelations, the Visual/Verbal dimension seems to withdraw and the Sequential/Global dimension comes to the foreground as the dominant dimension. The comparison with findings from the C2008 pilot study hints that differences in work modality, such as translating with pen and paper or translating in an exclusively computerized environment might also play a role as regards student behavior.

Cognitively speaking, it seems that the 30-minute task is experienced as beilng closer to a normal task (without time time constraints) and as such, it stands out in relation to the other two with respect to student bahavior. The 20-minute time frame, on the contrary, shows evidence of intense cognitive activity and behavioral modifications, a kind of "cognitive shock". The 20-minute time frame constitutes a pivotal point in student performance, also in terms of decrease in product quality. Students recover in their own ways during the 15-minute time frame. It is interesting that they seem to perform in rather predictable ways: in many cases, they either fall back to the familiar approach they had followed during the rather relaxed 30-minute time frame or stick with the new approach they had tried during the 20-minute time frame. This suggests a trial-and-error process where students select whichever approach worked best or maybe they felt most comfortable with during the 20-minute time frame. These last findings indirectly underline the use of learning styles as an application of cognitive styles in learning situations.

Chapter 9. Concluding remarks

This last chapter presents the conclusions from work undertaken and specifies their scope and level of generalizability. It acknowledges limitations. It ends with an array of implications for translator training and, by extension, for the profession and offers suggestions for future research.

9.1. Limitations of the study

It has been a challenge to juggle an end-product variable (quality), a process-bound variable (time) and a personality variable (learning style), to combine qualitative and quantitative methodologies, while paying due respect to human-computer interaction within a pedagogical framework. It has been a positive and somehow intriguing experience to see other trainers and scholars working in the same direction as I was, and yet another challenge having to keep up with the significant amounts of valuable literature being published from the start of the doctoral program until the very end of thesis writing, quite often right after conducting my experiments. While every effort has been made to prevent and/or effectively manage a few less than fortuitous situations, the present study does not purport to be perfect and comes with its own set of limitations. Some of them are inherent in the sense that they arose as a result of the research design or took shape during the materialization of the experiments. Adopting an optimistic perspective, however, it is interesting to observe that certain limitations also point to areas worthy of further investigation and, possibly, a training focus.

A larger sample would have made certain statistical tests feasible, at least those regarding management of online resources, and might have yielded better correlations, especially as regards revision. This was not possible given the software glitch during the C2009 experiment, although it must be noted that there was conscious effort to exploit all data from C2009 experiment that could be analyzed, thereby minimizing variance in findings as a direct result from using two authentic class units. While agreeing with Li's claim that

> many of the findings about the translation process, interesting and exciting as they might be, should probably be best regarded as working hypotheses to be confirmed or discarded after carrying out further large-scale […] studies, (2004: 309)

any additional data, especially process data, at this stage and outside the framework of a joint and funded endeavor, would have been daunting to handle.

Since professionals were not included in the study, and the focus was on pedagogical quality as the precursor to professional quality, direct industrial relevance is rather limited to in-house training contexts, even though young professionals in particular might benefit from several findings, such as the effect of time on task completion, overall production flow and the nature of revision. The fact remains that the study would have been more complete with the inclusion of professionals, especially in terms of comparison with other studies and within the framework of Life Long Learning.

A fact that limits extrapolation of results is that the investigation is based on a single language pair, Greek-English. There is no guarantee that the same source texts would be considered of equal translation difficulty by other-language speakers, nor that they would face the same set of problems. A replication using another language pair would be a very interesting idea, also valuable in terms of validity. The need for a reliable L1 test for Greek is also underlined; as many trainers are painfully aware, linguistic competence in L1 is not to be taken for granted.

The present study focuses on individual features, but not on individual translator profiles. It treats students as a group and analyzes tendencies, simulating an authentic training environment. For example, it does not examine the features of individual participants who delivered products of steady (high or low) quality nor the performance of those who might have delivered products of higher quality as time decreased. A line had to be drawn before any deeper analysis could proceed. Empirically speaking, this might have been achieved with the proviso that experiments were preceded by an extra feasibility study backed up by a battery of statistical tests to determine the necessary number of participants, also in order to minimize outliers and to avoid reducing the research into a collection of valuable case studies but with weakened potential for extrapolation.

Practically speaking, it would have been ideal if every participant had completed their translation, especially regarding product assessment; unfortunately, at least in my experience, things are rarely ideal in authentic translation environments. Every measure was taken to guarantee that most students would be able to deliver at least large chunks of translation for evaluation and further analysis, while ensuring that they would experience potential lack of available time (through retrospective questionnaires). The addition of statistical weights (cf. Chapter 3) also helped provide material suitable for analysis. From another viewpoint, lack of completion might have benefited the participants directly, in the sense that they faced this probably embarrassing situation and they are now aware that a) it can happen to them, b) there are ways to deal with it, if they wish so.

Participants' (low) typing speed certainly contributed to the problem of incomplete translations. Despite the fact that variance in typing speed was factored in as a variable, the experimental tasks would have simulated much more a professional environment and findings would be more solid if students knew how to touch-type. The low typing speed may have interfered with the participants' production process in ways which are difficult to predict and measure. Empirical findings in Chapter 7 suggest a negative effect of inadequate typing skills on translation quality. This underlines the importance of touch-typing for translators and the need to foster the skill quite early on in training.

The internal validity of the study and confidence in the evaluations would be stronger if evaluation data came from two external raters, rather than resorting to the second-best strategy of using data from one external rater and me. This has been a time-consuming and energy-draining experience, quite a lesson in itself on a more personal level and one to give careful consideration to before designing any empirical work in the future. In addition, the existence of outliers might have affected the findings based on averages; in such cases, data from analyses of variance have been used to draw a more accurate picture.

Felder's learning style model and corresponding instrument were carefully chosen and employed as the most appropriate ones for the present study, yet the approach could have been more critical, for example, proposing a more transparent name for the "Sensing" dimension (Chesterman 2008: personal communication). Admittedly, "sensing" might disorientate translation researchers. A less daring approach was followed and the names were kept because any modifications to the contrary might confuse trainers and researchers

already familiar with learning styles. On the other hand, it was felt that Educational Psychology is in need of at least a standardization of nomenclature and, possibly, an even more precise instrument for adequately grasping this complex phenomenon.

Critics of the learning style model chosen for the study and even skeptics of the whole learning styles concept might not feel comfortable with the use of them in the present study and in the future. Even they, however, might not easily deny that, as Felder, Felder and Dietz point out:

> [i]t is not necessary to know the profiles of the individual students in a class to make use of this information; it suffices to know that students of all types are probably represented. If instructors try to address each type category at least part of the time, the chances are good that the quality of their teaching will improve. (2002: 15)

If, on the other hand, "the goal includes increasing students' metacognitive awareness (understanding of how they learn and how others may learn differently)", instructors would need to "assess the learning style preferences of the students in the class and discuss the meaning of the results" (Felder 2010: 4). Hubscher-Davidson draws an interesting distinction as regards the more specific context of translator training:

> [i]t is not necessary for the *trainer* to know exactly what types his students belong to, […], however, it would be necessary for the *researcher* to know in order to monitor progress of the different types when experimenting with new training methods. (2007: 315, her emphasis)

In any case, it is hoped that the employment of learning style theory will be seen as an act of "limited borrowing" across disciplines (Malmkjær 2000: 166) allowing "for the retention of a properly translational focus" (ibid.: 166-7) rather than a "wholesale adoption of a full blown theory in order to explain translation (away) in terms of the borrowed theory (ibid.: 166). The borrowing is conducted in view of promoting Translation Studies instead of assigning it a subservient role.

Translator training in each institution can be idiosyncratic and unique. A single empirical study may not claim to present a representative picture of all translator training

environments. On the other hand, when judgments made concerning knowledge and skills displayed in one situation *are* applicable to other situations, transferability is feasible and should be sought (Kiraly 2000: 145).

9.3. Conclusions and implications

9.3.1. Conclusions

In Chapter 1, three research questions and the main hypothesis for the present study were formulated. This section provides proposed answers as they follow from empirical anaylsis in Chapters 6 and 7 and continues by sketching pertinent implications.

Research Question 1: What happens when translation students work under time constraints?

The description and consequent analysis of what happens during the specific deadline-driven translation process yielded a variety of results of potential interest to all stakeholders involved. Increased time constraints:

- negatively affect preparation time;
- negatively affect time for revision;
- negatively affect task completion on average;
- affect the nature of revision itself (students either do not revise or revise heavily);
- affect subjective perception of time availability to choose alternative solutions;
- affect the decision to read the source text in advance;
- force many students to focus on the core translation phase;
- affect choice of procedures;
- negatively affects aspects of translation quality such as formal correctness and terminology/ vocabulary.

The same analysis also points to additional benefits:

- It provided a method “to extract subjective information in such a way that it can be statistically reliable” (Rothe-Neves 2003: 18) through the combination of “soft” self-report data with screen recordings in as many cases as possible. In fact, the similarity of findings from these two sources suggests that students are realistically

aware of what is happening, at least more than I was giving them credit for, and it might thus prove beneficial to trust them more in the future.

- It showcased a quality assessment approach in a pedagogical framework capable of generating "research-useful first-class data" (ibid.)[56].

Research Question 2: Are there any ways to help students learn to produce quality translations when they work under time constraints?

Empirical findings suggest that students in the setting under discussion and, possibly, students from similar training environments, might learn to produce (higher) quality translations when they work under time constraints, if

- they improve their *touch*-typing and computing skills (preferably as a part of their compulsory courses or at least as a standard requirement in order to pass a translation workshop);
- they improve their language skills with help from their trainers;
- their trainers focus a) on those aspects of product quality that seem to be less time-resistant, namely Formal Correctness and Terminology/Vocabulary in the current setting, *and* b) on certain aspects of process quality, such as the nature of revision, as indicated by empirical findings in chapter 7.
- their trainers identify the time frame that provokes students' "cognitive shock" and provide students with timed translation tasks around their comfort zone. It is envisaged that careful gradation of such "stretching" exercises would force students to work faster.

Research Question 3: Do people-based variables, such as learning styles, play a role within our pedagogical environment? To what extent?

Learning styles seem to constitute a factor related to a great extent to (student) translator performance. In fact, it seems that, in combination with answers to Research

[56] The five-criteria assessment scale used in main experiments for the present study has been consistently applied in the under- and postgraduate practical translation courses I offered since spring semester 2011. At the time of writing, I have received positive feedback from the vast majority of students (81/92 undergraduate students, 18/20 postgraduate students; source: course evaluation sheets 2010-2011 and 2011-2012).

Question 2, students may learn to produce quality translations in general, if trainers enrich their courses with tasks and activities accommodating all learning style dimensions (for a list of such activities, mainly intended for second language acquisition but which may also apply to a translation context, cf. Felder 1988: 680; 1995: 28-29; 2010). More specifically, as empirical data for the present study indicate, certain learning style dimensions seem to correlate with:

- prior source-text reading
- nature of revision
- treatment of omissions
- subjective perception of time availability for internet searches
- choice of procedures
- task completion and degree of completion
- overall quality and quality per criterion

Hypothesis: learning styles correlate significantly with quality when the translation task takes place under time constraints.

This main hypothesis has been tested and supported by empirical data collected from three groups of students. It appears that learning styles do indeed play a significant role in the given pedagogical setting, in fact, to the extent that two learning style dimensions, the Visual/Verbal and the Sequential/Global chime in with students' reactions, as these are portrayed by process and product data, in many respects. However, validation of the main hypothesis does not suggest that only certain types of learners should become professional translators. In harmony with the policy of inclusion followed in this study (cf. Chapter 1), Felder states that "learning styles provide no indication of what the students are and are not capable of" (2010: 5). Thus, results from this or other relevant studies should not be misused to this effect but should rather help create an environment of respect for all idiosyncrasies. Validation of the main hypothesis may suggest, however, that some learners "are not being as well served by current pedagogical practice" (Pym 2008: personal communication), including my own. While no one denies the fact that there is room for improvement in this area, irrespective of learning styles, empirical endeavors such as the

present attempt to open "a window of opportunities for change" (Chesterman 2008: personal communication).

9.3.2. Implications and direct applications

The issue of stretching (student) translators beyond their comfort zone, mainly by including time-constrained tasks, merits additional elaboration. It depends on the individual researcher/trainer/translation manager to decide on a preferred approach. The fact remains, as already suggested in Chapter 8, that it seems important to locate the point of "cognitive shock" for a particular group or individual and focus on it. Trainers may stretch trainees around their identified comfort zone causing "constructive friction" (Entwhistle and Peterson 2003), researchers may investigate shifts at cognitive/behavioral level, while translation managers may reach informed decisions when assigning tasks to available translation professionals with a view to optimizing quality of performance. At another level, translators themselves may become realistically aware of their behavioral tendencies, taking calculated risks and organizing work accordingly. The case might be that

> this ability to efficiently adapt one's knowledge to problematic translation tasks may be the main *flexibility* factor that distinguishes the professional translator from the non-professional translator". (Jensen 2001: 179, my emphasis)

This last point brings up the concept of ecological validity, the second guiding principle in the present study along with the policy of inclusion (cf. Chapter 1). i.e. "the naturalness of the investigated process" (Hansen 2008: 4), here also seen as a systematic attempt to intertwine the pedagogical, the professional and the research-driven in a synergetic mode. At the very least, in the current setting at Aristotle University, empirical findings from this study may be directly applied in class without recourse to invasive methods. It is fortunate that, if my students become aware of their strengths and weaknesses early enough in the course of their studies, they will still have approximately two semesters to take advantage of focused remedial help before they enter the profession.

As far as other settings are concerned, it would be wise to proceed with the necessary caution before making claims on to generalizability and representativeness. Ecological

validity is here closely linked with replicability, as was the intention from the start of the project. The design is based on an ecological setting and low-cost technology. In fact, the use of a single tool for keystroke logging and screen recording decreases the distance between uncontrollable, authentic classroom reality and controlled experimental conditions. The design, moreover, is fast to implement, readily applicable in other authentic training settings and replicable in other research environments with minimum modifications involving any of the following parameters:

- language pair; directionality;
- collective time frames; individual time frames;
- texts: domain, familiarity;
- assessment scale;
- participants' prior knowledge or academic background;
- novices vs. professionals; junior translators-seasoned professionals (in-house training);
- participants' professional experience; comparisons among different groups;

It should be emphasized that many of these steps may actually be taken by students themselves paving their way toward learner autonomy (Kiraly 2000), adaptability and flexibility. As long as criteria for any adopted assessment scale are transparent, for example, students may critically observe their strong and not so strong points at a glance and they may also easily calculate the degree of completion for most tasks. As long as they are given access to their own screen recordings, students have ample opportunities to observe and critically reflect on their process performance and determine what worked best for them *on their own* and at their own pace. Understanding their personal translation processes and reflecting on their personal translating style would help them improve their end-product quality in the long run (Dancette 1997) and ensure repetition when they see their succesful decisions (Way 2008: 94), ultimately assisting them in activating their own internal learning mechanisms.

On the teacher's side, it seems that the key to efficient training lies with flexible teachers trained to put into action different approaches and methods and to adapt to their students by building adequate scaffolding that gradually disappears as students become

independent agents. That is, the teacher presents, models, guides, counsels and, finally, lets go (González Davies 2004: 7).

9.4. Thoughts for future action

9.4.1. Additional suggestions for training

It is taken for granted that more research and subsequent replications are necessary in order to corroborate findings, despite the fact that the present study confirms and consolidates many hunches that trainers having been entertaining for some time.

Learning styles constitute a matter of *relative* dominance of each dimension, depending on the specific task at hand. This has implications for translator training. Trainers may facilitate trainees by involving them in another type of selected "stretching" tasks that would push trainees outside their comfort zone and help them develop features trainees seem to lack or fall behind by becoming familiar with them. For example, trainers might assist students with a preference toward global learning to adapt by exposing them to sequential tasks and vice versa, familiarizing "privileged" sequential learners with global tasks, the aim being the increase of balance among dimensions and the strengthening of student flexibility and adaptability as a means toward increased self-confidence. At the same time, it might prove useful for trainers themselves to critically view their teaching styles and check how *they* would manage this kind of training.

Moreover, it appears important to take advantage of screen recordings in the classroom and the immediate awareness that emerges as a direct result of having students watch them (their own or fellow students' recordings). This approach might reveal individualized best practices, keeping in mind that not one single way leads to successful performance.

From another perspective, time-related findings from the study, such as the nature of compromise in end-product quality, might also be used in tasks related to interpreting, such as sight translation tasks.

9.4.2. Implications for the translation profession

Young graduates may tend to be more self-aware when they enter the market and make beneficial decisions regarding their career path, provided further research corroborates current findings and they in turn are incorporated into training. In line with the concept of self-development and the EU-promoted key competence of "learning-to-learn" (cf. Chapter 2), Robinson sees the professional translator as learner and exclaims:

> Learning is what happens when you're doing something else — especially something enjoyable, but even something unpleasant, if your experience leaves a strong enough impression on you. Translators learn words and phrases, styles and tones and registers, linguistic and cultural strategies while translating, while interpreting, while reading a book or surfing the internet, while talking to people, while sitting quietly and thinking about something that happened. (Robinson 2003: 51)

In this vein, certain findings might provide a hint to translation project managers in their effort to assign the right translator to the right task. Project managers may check whether time constraints lead to compromised products in terms of formal correctness and terminology/vocabulary in their environment and, if so, at least, make sure to have a reviewer-proofer focusing on those particular aspects available.

9.4.3. Avenues for future research

The fact that students with different dominant learning style dimensions respond in different ways to time constraints makes learning style theory yet another promising area to be considered by those who favor interdisciplinarity in translation research. For sure, "independent, critical, longitudinal and large-scale studies" are necessary in the field of learning styles (Coffield et al. 2004b: 143). It would be worthwhile working in two directions: refining concepts and tools related to learning style theory and striving to find additional elements of specific relevance to translation. Moreover, an opportunity might arise for reciprocity in multidisciplinary research. For example, learning style experts might be interested in testing findings from the present study to draw links between Felder's model and those of Kolb, Dunn and Dunn, and Myers-Briggs, to mention a few.

We have seen that modality and understanding of incoming input correlate significantly when the translation task takes place under time constraints. This might prove useful to researchers interested in relating learning styles to translation-specific multimodal learning and professional environments, such as online/distance translation courses and audiovisual translation, respectively.

The present study has provided a holistic picture of what students do under time constraints and how they do it, at least in the given setting. It would be interesting to move a step further, taking advantage of work on translator types (e.g. Tirkonnen-Condit 2000, House 2000) and co-ordinating a systematic, empirical attempt to synthesize translator profiles in a way that might lead to translator styles[57] beyond ad hoc classifications, by following a bottom-up approach and using professional translators (cf. Carl et al. 2011).

Another path might be to investigate phenomena highlighted in this study, for example, learning-while-doing in an ever-changing multimodal environment, from a sociological perspective or from a socio-constructivist viewpoint, linking situated cognition (Kiraly 2000) with broader situated social practice.

"Professional knowledge exists, in academia, in a peculiarly disassembled state that prevents its use" (Abbott 1988: 53). Perhaps the real challenge for researchers is to overcome obstacles stemming from the fact that "knowledge from academic studies does not make its way into the profession" (Séguinot 2008: 9) and to ensure the opposite, by being flexible themselves.

9.5. Instead of an epilogue

This experimental study highlights the importance of the time variable and exemplifies the relation of learning styles vis-à-vis the performance of translation students. It seems that both time considerations and learning styles warrant attention and space in a translation curriculum with a firm vocational orientation. Current technology offers the tools with which we are able to offer students individualized advice and show them how to critically

[57] "Style" here roughly defined as "a set of traits" (Chesterman, 2008).

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look at their own performance, acknowledge and accept their strengths and weaknesses. The university, or any pre-professional training environment, is the only safe place where future translators can experiment and make mistakes without facing job-related repercussions. One of our tasks, therefore, as trainers and/or researchers, becomes to provide them with the opportunity to err in the comfort of the academic environment by exposing them to as many realistic scenarios as possible, such as time-constrained activities, preferably steering away from dogmatic attachment to a single translator training method. Then, we can work *with* them helping them learn how to learn; we can encourage and solidify successful performance or identify-and help *them* identify-ways to improve it, in their *own*, individual ways, before they enter the translation industry.

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Appendices

Appendix A. Participants

The following participants have consented in writing to having their names mentioned in the present study:

	2007-2008	2008-2009	2009-2010
1	Gagali Soultana	Valaoura Katerina	Apostolopoulou Evgenia
2	Koukouvaou Meropi	Vamvakou Fenia	Varela Eleni
3	Koumentakis Yiorgos	Konstantinidou Nena	Votskou Melpomeni
4	Ouzounidou Maria	Neofytou Anna	Kessouli Eleftheria
5	Pliatsios Demetris	Xanthou Despoina-Christina	Ktenidou Elisabeth
6	Sariyiannaki Despoina	Xefteri Ioanna	Bouboura Stavroula
7	Sigkouni Ioanna-Artemis	Papageorgiou Christina	Papadopoulou Aliki
8	Damianidou Eva	Papanastasiou Katie	Paraschou Vassiliki
9	Temourtzidis Vassilis	Chatziantoniou Despoina	Stella Alexandra
10	Jones Stefanie	Chatzivassileiou Antonia	Zeri Maria
11	Tsianakas Charalambos	Lalidou Eirini	Ketikidou Paraskevi
12	Karaiskou Emily	Takidou Eleftheria	Korkotidou Maria
13	Bogoudi Sofia	Chitzou Efrosyni	Kyrkopoulou Daphne
14	Papakostas Demetrios	Ambelourgou Maria	Lazoglou Maria
15		Karyofylli Eva	Loizou Louisa
16		Daltayianni Savvina	Mitrou Maira
17		Siskou Marina	Bamidi Maria
18		Tsifitopoulou Stella	Tsaknaki Antonia

Appendix B. Course Material

B.1. Technical and Scientific Translation Workshop (TIS2-322) Course Description

COURSE CODE: _____TIS2-322_____

COURSE TITLE:_SCIENTIFIC AND TECNHICAL TRANSLATION WORKSHOP_____

CREDIT UNITS: _____3_____

ECTS UNITS:_____6_____

COURSE TYPE: COMPULSORY / **ELECTIVE** / OTHER:_____

HOURS PER WEEK: LECTURE: _1___ EXERCISES: _2____ TOTAL: _3___

COURSE LEVEL: 1ST, 2ND, **3RD (OR 4TH)**: _____

LECTURERS:__KYRIAKI KOUROUNI_____

LANGUAGE OF INSTRUCTION: __GREEK-ENGLISH_____

COURSE DESCRIPTION AND OBJECTIVES:

THE AIM OF THIS COURSE IS TO DEVELOP SPECIFIC SKILLS NEEDED BY TRANSLATORS WORKING WITH SCIENTIFIC AND TECHNICAL MATERIAL. STUDENTS WILL DEAL WITH A VARIETY OF LITERATURE AND TOPICS RANGING FROM ARTICLES TO PRODUCT CATALOGUES AND FROM INFORMATION TECHNOLOGY TO CHEMISTRY GAINING AN UNDERSTANDING OF TECHNICAL/SCIENTIFIC TERMINOLOGY AND STYLE THROUGH PRACTICAL TRANSLATION WORK. TRANSLATION STRATEGIES WILL BE HIGHLIGHTED AND REFERENCE WORKS, DICTIONARIES AND OTHER SOURCES WILL BE PRESENTED. RELATED ISSUES SUCH AS EDITING AND PROOF-READING WILL ALSO BE HIGHLIGHTED. THE COURSE IS ADDRESSED TO STUDENTS WHO HAVE SUCCESSFULLY PASSED THE COURSE TRANSLATION METHODOLOGY. 1/3 OF CLASS TIME IS SPENT IN THE COMPUTER LAB. ATTENDANCE IS ESSENTIAL.

ON SUCCESSFUL COMPLETION OF THE COURSE, STUDENTS UNDERSTAND AND ARE AWARE OF:

- THE CONCEPTS OF TEXT FUNCTION, COHESION AND COHERENCE
- THE RELATION AMONG TEXT FUNCTION, TOPIC AND STRUCTURE
- THE RELATION BETWEEN TEXT TOPIC AND SPECIAL LANGUAGE USAGE
- BASIC PROFESSIONAL PRACTICES AND CONVENTIONS

STUDENTS ARE ALSO ABLE TO:

- TRANSLATE BASED ON SKOPOS THEORY
- TRANSLATE (SHORT) SPECIALIZED TEXTS
- PROOF-READ/EVALUATE TRANSLATION WORK BY THEM OR OTHERS

AND THEY WILL

- BE FAMILIAR WITH TERMINOLOGY USED IN SEVERAL SOURCES OF SCIENTIFIC/TECHNOLOGICAL CONTENT
- HAVE IMPROVED THEIR IT SKILLS, TOUCH-TYPING SKILLS
- HAVE DEVELOPED THEIR TEAMWORKING AND COOPERATION SKILLS.

RECOMMENDED READING:

IS THERE A COURSE TEXTBOOK? NO_____

IS THERE A LIST OF READINGS? YES_____

ASSESSMENT METHODS: __CONTINUOUS ASSESSMENT ALONG WITH FINAL EXAM DEPENDING ON NUMBER OF STUDENTS.

B.2. Scientific and Technical Translation Workshop (TIS2-322) Course Syllabus

Institution: _____ENL_____			
Course Code: _____TIS2-322E___(Class: 2 hours, Lab: 1hour, Total 3 hours)			
Semester: _____			
	Topic	**Homework given**	**Comments**
Week 1	Introduction Course policies Presentation of Syllabus Diagnostic Sheets Intro to Blackboard/their accounts RAMtype (touch-typing) Text 1: "Tools" (Technical)	Part of "Tools" Download & practice RAMtype	Stress attendance, Clarify Lab/Conventional contact hours Check student preferences for topics (med, bio?)
Week 2	C: Discussion of "Tools" L: check sites used, present alternatives -provide hd dictionary list	Text 2: "EMR" (T) practice RAMtype	Also discuss: Cohesion, Coherence, Consistency
Week 3	C: Discussion of "EMR" L: sites with technical terminology in Greek, online parallel texts	Text 3: "Wild Goose" (Manual) Translate only 3 pars. pp.3-4 practice RAMtype	Leave in Library folder: 1) Grk Grammar and Punctuation Guide, 2) Mossop's chapters on Revision
Week 4	C: Exercises on Grammar, Punctuation; presentation of main syntactic	To revise their own "Wild Goose"	All exs b4 Revision session If climate is

	differences bt EN-EL (SVO languages, adj order, adverb position, subordinate clauses) L: Introduction to Revision	translation practice RAMtype	good>swap translations for homework
Week 5	C, L: Revision/Editing Discuss own revisions Provide colleague's translation of "Wild Goose". They revise, then edit it in class	practice RAMtype	Mention: Same criteria to be applied for the work they submit Last task in groups
Week 6	IN-CLASS test (technical)	practice RAMtype	Book lab
Week 7	C: Feedback/Discussion of test. L: looking for scientific info/terminology	Text 4: Larger Text for HW (scientific) Text 5: V. short text (Sci, usually Bio/Med)	Grades only on BlackBoard. Choose encyclopedia entry
Week 8	C: Discussion; L: create own bookmark lists on that topic	Text 6: same topic as T.5	(Bio>Med>Psycho?) From tangible to abstract
Week 9	C: Discussion L: T6. translate in class for TWO different audiences (experts vs lay people)	Revision of T6.	Those who translated for "experts" get a translation for "lay people" and vice versa

Week 10	Discussion of T6. Cohesion, Coherence, Consistency		Deadline for HW
Week 11	Feedback/Discussion of HW. L: market conventions/simulation I	practice RAMtype	Grades only on BlackBoard.
Week 12	How to deal with authentic "bad" texts: omissions, factual errors, wrong paragraph order; Preparation for final assessment L: market conventions/simulation II		Course Evaluation (15 min max) Own Evaluation
Week 13	Final assessment in computer lab		

B.3. Translation Methodology (TIS1-314) Course Handout 1

COURSE OUTLINE - ΠΕΡΙΓΡΑΦΗ ΜΑΘΗΜΑΤΟΣ

TRANSLATION METHODOLOGY - ΜΕΘΟΔΟΛΟΓΙΑ ΤΗΣ ΜΕΤΑΦΡΑΣΗΣ (Μετ 1-314Ε)

Instructor: David Connolly

Course Aims and Objectives

- To present translation as a problem-solving process
- To examine a range of strategies for dealing with practical translation problems
- To help students develop translation skills and an awareness of what the translation process involves
- To help students acquire a critical attitude to translations

Course Description

The course will focus on translation as a problem-solving process and examine a range of strategies for dealing with practical translation problems. The emphasis will be on the process and product of translation, though theoretical issues will be discussed where these are relevant. Each lesson will outline a set of related notions and problems and will lead to practical work and related translation tasks, though **students will not be required to translate texts**. Examples will be drawn from a variety of material, from literary works to technical and commercial texts.

(NOTE: ATTENDANCE IS ESSENTIAL)

Method of Teaching and Assessment

- Teaching will take the form of seminars, discussion and class work.
- Assessment will be by written examination and will take the form of a translation commentary.

Learning Outcomes

Students will:

- acquire the skills necessary to deal with a wide range of practical translation problems
- develop a self-awareness of what they do when they translate, how they do it and why they do it one way rather than another
- have the tools to analyze, assess and comment on the products of translation

Relevant Bibliography

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Hervey, Sandor and Higgins, Ian (1992), *Thinking Translation. A Course in Translation Method: French to English*, London & New York: Routledge.

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Specific topics:

1. **Introduction to Course**
   Newmark (1988), pp. 3-10 (Introduction).

   Vermeer, Hans J., 'Didactics of Translation', in Baker (1998), pp. 60-63.

   Handout 1

2. **Translation as a process**
   Hervey and Higgins (1992), pp. 13-19 (Preliminaries to translation as a process).

   Newmark (1988), pp. 19-38 (The Process of Translation).

   Handout 2

3. **Translation as a product**
   Hervey and Higgins (1992), pp. 20-25 (Preliminaries to translation as a product).

   Kenny, Dorothy, 'Equivalence', in Baker (1998), pp. 77-80.

   Newmark (1982), pp. 38-56 (Communicative and Semantic Translation)

   ------ (1988), pp. 48-49 (Equivalent Effect).

   Robinson, Douglas, 'Free Translation' in Baker (1998), pp. 87-90.

   Robinson, Douglas, 'Literal Approaches' in Baker (1998), pp. 125-127.

   Handout 3

4. **Translation commentary (annotations)**
   Handout 4

5. **Translation procedures: unfindable words, neologisms, idioms, metaphors**
   Newmark (1988), pp. 179-183, 193-218, 140-150, 104-112.

   Handout 5

6. **Cultural issues: translation procedures**
   Harvey, Keith (1998) 'Compensation', in Baker (1998), pp. 37-40.

Hervey, S. and Higgins, I. (1992), pp. 28-44 (Cultural issues in translation).

Newmark, Peter (1988), pp. 94-103 (Translation and Culture).

Venuti, Lawrence (1988) 'Strategies of Translation', in Baker (1998), pp. 240-244.

Handout 6

7. **Transliteration of proper names and place names**
   Connolly (2001), pp. 95-110.

   Newmark (1982), pp. 70-83 (The translation of proper names and institutional and cultural terms)

   Handout 7

8. **Language variety: dialect, sociolect, social register and tonal register**
   Connolly (2005), pp. 212-219.

   Hervey and Higgins (1992), pp. 115-134 (Chapters 9 & 10).

   Newmark (1988), pp. 194-195 (The Translation of Dialect).

   Handout 8

9. **Translation editing and criticism**
   Hervey and Higgins (1992), pp. 189-199 (Chapter 15).

   Newmark (1988), pp. 184-192.

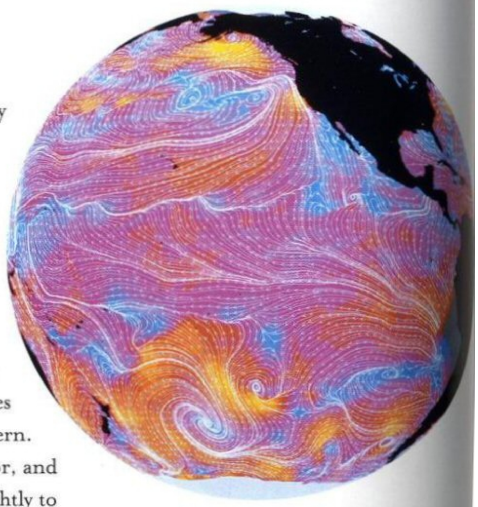
   Handout 9

10. **Exam preparation: question types**
    Handout 10

Appendix C. Source Texts

The effects of Coriolis

Just because we're all passengers on spaceship Earth doesn't mean we travel at the same speed or even in the same class. Our vehicle, after all, is a sphere.

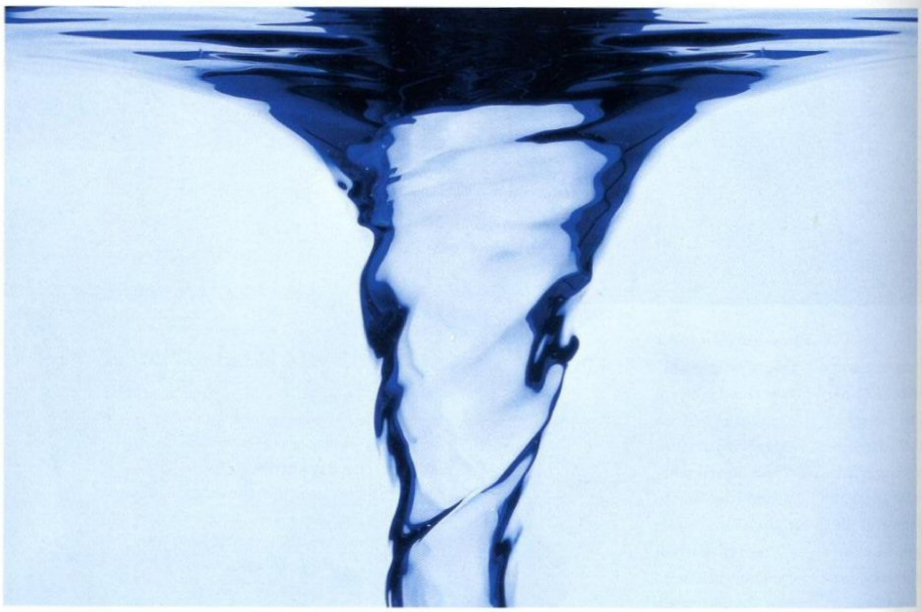


Earth takes us for a quick spin every day, but just how quick depends entirely on where we live. The Equator rotates at nearly a thousand miles per hour, but most parts of the United States move just over half that fast. The poles are all but motionless with respect to Earth's axis. Such tremendous differences lie at the heart of the Coriolis effect, named for French physicist Gaspard Coriolis (1792-1843).

When a mass of equatorial air, moving from west to east, veers north to fill a low-pressure pocket, its momentum drives it east of due north. Conversely, a mid-Atlantic air mass heading south will lag to westward of its faster-moving destination. Either way, both air masses veer to the right in the Northern Hemisphere, and the left in the Southern.

So when hot oceanic air rises in the Atlantic north of the Equator, and surrounding air on all sides rushes in, each incoming bit bends slightly to the right, forming a counterclockwise pattern that is the distinctive shape of a hurricane or tornado. ■

Down the drain ▸ *Contrary to persistent popular mythology, water draining from a sink or bathtub does not rotate in different directions in the Northern and Southern Hemispheres. At kitchen and bath-size scales, any possible faint Coriolis effect is far exceeded by small irregularities in the shape of tub or sink, and by motion patterns in the water as it gurgles away.*



The body's immune system

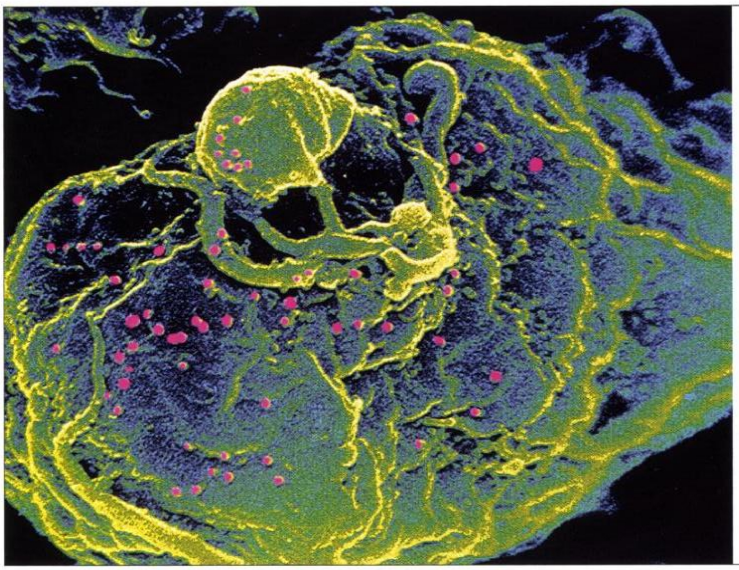
With a world of microbes out to get us, how can we hope to survive? The answer lies in one of life's most complex and amazing adaptations.

Our immune system is a powerful array of weaponry that is varied, versatile, and self-adjusting. Its level of sophistication puts the most high-tech Pentagon planner to shame. It responds to assaults in both general and specific ways.

The general stage begins when any tissue is injured. Signals from the damaged site trigger release of histamine, a chemical messenger that causes small blood vessels to widen near the injury. Various white blood cells head to the problem area, and squeeze their way through gaps that form in the enlarged walls of nearby blood vessels. Result: reddening, heating, and swelling.

Among the first to arrive are white blood cells called phagocytes, which swallow bacteria or snap up tissue wreckage and cellular debris. Some time later, your specific immune response kicks in. It has two basic divisions: an antibody recognition system operated by B-cells that handle most infections by identifying infected cells and marking them for destruction; and a cellular-attack system made up of different kinds of T-cells. One kind, "killer" T-cells, go after invaders directly by destroying the membranes of infected cells. ■

The lymph system ▸ *permeates the body like the circulatory system, and contains specialized cells to fight pathogens. These lymphocytes recognize enemies by telltale proteins or other molecules sticking out of their membranes. Those protrusions are called antigens, and every B- or T-lymphocyte has particular receptors that can bind to only one antigen. B-cells produce antibodies—protein complexes that snare antigens and neutralize or hobble them.*



Retroviruses

Although most viruses carry their genetic information in the form of DNA, some use RNA. Within this group are the retroviruses—so-called because they produce a DNA copy from RNA, the reverse of normal cell procedures. Retroviruses pose a formidable challenge: The human immunodeficiency virus (HIV) that causes AIDS is a retrovirus. Like many other RNA viruses, HIV is more likely to mutate. But the main reason it's so deadly is that it attacks the immune system's helper T-cells, which make up about 70 percent of all T-cells and function as a kind of master control for the immune system. At left, attacking HIV appears as pink dots on the cell surface. Without helper T-cells, bodily defenses are severely impaired; cancers, other diseases, and opportunistic infections that normally are suppressed can thrive.

The photoelectric effect

For centuries, physicists argued whether light was a pure wave or a stream of discrete particles. They now believe that it's actually a little of both.

A lot of folks assume that Albert Einstein (1879-1955) must have received the Nobel Prize for his theory of relativity or for penning the world's most famous equation, $E=mc^2$. But in fact, he won it for explaining the photoelectric effect, a much more practical phenomenon that's at work in your camcorder or digital camera.

Earlier, scientists noticed that when light rays above a threshold frequency strike certain metals, enough electrons are ejected to create a measurable current. Einstein made the then-outrageous assertion that this could be understood by thinking of light as individual particles, or photons, hitting each electron and knocking it out of the metal. He added that each photon's energy was due to the frequency of its light, not the intensity. He was proved right, and got the Nobel. We got the electronics.

When coupled to switches, photoelectric devices can be used to open doors automatically or trigger alarms. A transmitter beam is aimed at a receiver some distance away; as long as light hits the receiver and throws off enough electrons to provide a current, nothing happens. But if the beam is interrupted by something opaque, the current disappears, which trips a switch and starts the action. ■

Capturing motion and sound ▸ *is a snap with a video camera. Its imaging heart is a charge-coupled device, or CCD, whose silicon "film" makes use of the photoelectric effect. After being focused by the camcorder's lens, the image strikes a CCD, which is made up of as many as several million tiny light sensors. Photons striking each tiny pixel on the silicon grid dislodge electrons, and the pattern of light and dark is stored electronically on a magnetic tape or memory chip.*

▾ **Einstein on Mars** *Because the photoelectric effect results in an electronic signal (as opposed to the film in a camera), video cameras are ideal for instantaneous transmission. That's how NASA broadcast the exploits of its robot Mars rover in 1997, using a camera on the lander.*

Fresh water: not here

It sounds good, but "fresh" water basically doesn't exist; it's been around and around so many times that you could consider it the ultimate recycler.

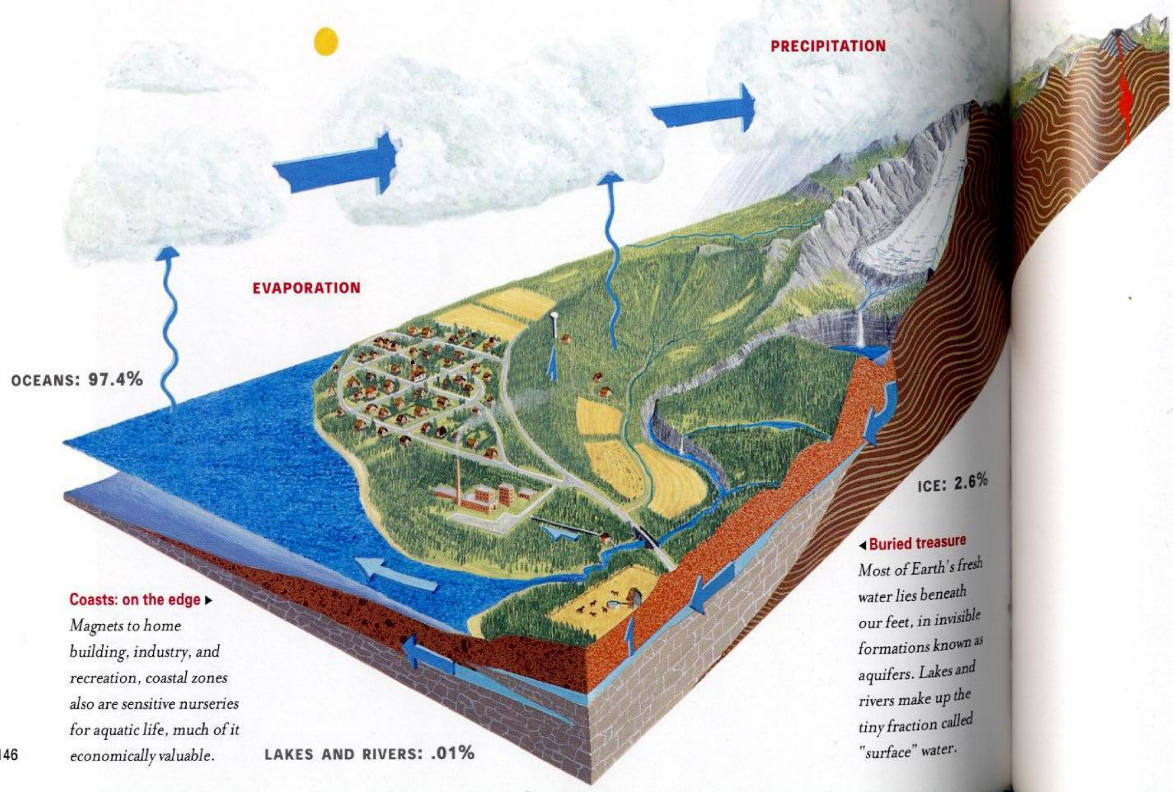
Next time you leave the faucet running for minutes at a time while you brush your teeth or soap your hands, consider this: A mere one one-hundredth of one percent of all the water on the planet is readily available fresh water. About 97.4 percent of Earth's total water supply is in the oceans; some 2.6 percent is locked up in polar ice or in deep underground aquifers.

Of course, there's really no such thing as "fresh" water. Molecules of water pass through endless cycles—evaporating into the atmosphere, falling as rain, and running back to the sea with new loads of dissolved minerals—but there are no outside sources. The odd icy comet or meteorite hits our atmosphere now and then, but basically all our water has been here for about 4 billion years, ever since early volcanic eruptions and "outgassing" presumably liberated huge amounts of trapped water and volatile gases, creating the seas. ■

The water cycle

Each day, solar power evaporates a trillion tons of water from the planet's surface and pumps it into the atmosphere. Each day, the atmosphere surrenders the same amount of vapor, condensed as rain, sleet, snow, and hail. This endless renewal is the water cycle, and it represents the greatest physical force at work on the planet. Thus, while your drinking water is constantly recycled and never really fresh, it is continually purified by the cycle. Of all the water that evaporates, about 86 percent of it comes from the oceans, and the remaining 14 percent from land. But land masses get 22 percent of all precipitation that falls from the titanic distillery that we call the hydrologic cycle.

Polar ice ▸
Only about 3 percent of Earth's water is fresh. Approximately 70 percent of fresh water is held in the polar ice caps and glaciers. Essential to life, water makes up 60 to 70 percent by weight of all living organisms and is intregal to the process of photosynthesis.



Coasts: on the edge ▸
Magnets to home building, industry, and recreation, coastal zones also are sensitive nurseries for aquatic life, much of it economically valuable.

◂ Buried treasure
Most of Earth's fresh water lies beneath our feet, in invisible formations known as aquifers. Lakes and rivers make up the tiny fraction called "surface" water.

Appendix D. Material for the pilot study (C2008 instruments, scores, analysis)

D.1. Background questionnaire (Pilot C2008)

Questionnaire 1 (pre-test)

Please answer the following questions.

Tick (√) the box you consider most applicable.

If the scale is:

1 2 3 4 5

and you want to tick '3', please do it like this:

1 2 √3 4 5

Any comments you might have, please write them at the end of this Questionnaire.

1. Name _____

2. Age _____

3. Valid e-mail address (university or other)_____

4. You are in your _____ year of study.

5. How do you feel about your level of English at this moment?

very dissatisfied 1 2 3 4 5 very satisfied

6. How do you feel about the level of your mother tongue (Greek)?

very dissatisfied 1 2 3 4 5 very satisfied

7. Where did you learn English? (eg. School, phrontisterion, stay abroad, parents, etc.)

_____

8. Apart from English and Greek, do you know any other languages?

yes. If yes, state the other languages you know. no. (if not, skip to question **9)**

Other language(s):

_____, _____

_____, _____

_____, _____

9. Have you taken any theoretical translation courses?

yes no (if not, skip to question **10**)

9.a. If yes, which one(s)?

9.b. Please state your final grade(s), if available.

Course(s) Grade(s)

_____, _____

_____, _____

_____, _____

10. Have you taken any translation workshops?

yes no (if no, skip to question **11**)

10.a. If yes, which one(s)?

10.b. Please state your final grade(s), if available.

Course(s) Grade(s)

_____, _____

_____, _____

_____, _____

11. Are you familiar with the use of translation aids (dictionaries, the internet…)?

If yes, how/where?

_____

_____

12. Have you ever done any translations outside the University courses?

yes no (If not, skip to question **13**)

12.a. If yes, what type of material have you translated and in which field?

_____

12.b. Who did you translate for? (e.g. a friend, a firm...)

_____

12.c. Were they paid translations or a favour?

paid unpaid

13. When you graduate, would you like to be involved in translation in any way?

yes, as a professional translator/interpreter

yes, part-time, in combination with another, 'main' job

not really

14. Do you like translating *on your own* (e.g. when doing your homework for exercise classes)?

strongly dislike 1 2 3 4 5 like very much

15. Do you like translating *with others* (e.g. in translation exercise classes)?

strongly dislike 1 2 3 4 5 like very much

16. Do you prefer translating on your own or with others?

on my own with others no preference

17. What kinds of activities have you done (outside class) to improve your translation skills since the beginning of this academic year?

_____

_____

18. Any comments you might have, please write them here:

_____

_____

_____

_____

Disclaimer

19. Do you agree to take part in this study?

yes no

20. Do you agree that the findings of this study, including your answers to this questionnaire as well as (parts of) your individual translations, the rest of the accompanying questionnaires and reports, may be used solely for academic purposes as per Law 2472/97

on Data Protection as modified by Law 3635/2007 and published anonymously (i.e. without your name or the names of the other subjects being mentioned in the publication)?

yes no

Date: _____

Signature:_____

D. 2. Retrospective Questionnaire (Pilot C2008)

Questionnaire 2 (following completion of both tasks on each day)

Please answer the following questions.

Please circle the answer you consider most applicable.

Any comments you might have, please write them at the end of this Questionnaire.

1. I had enough time to finish the first translation.

True False

2. I had have enough time to finish the second translation.

True False

3. I had to change my usual translation method.

True False

4. I read the whole text before I started translating it.

True False

5. I could think clearly despite time constraints.

True False

6. I had time to choose among alternative solutions.

True False

7. I had time to revise my translation.

True False

8. I had time to perform internet search(es).

True False

9. Any other comments you might have, please write them here.

Thank you!!!

D.3. C2008 Translation Quality Assessment and ILS scores

	T1	Time	T2	Time	T3	Time	T4	Time	LS1	LS2	LS3	LS4
1.1	8 PTI	30	9 PT	20	6 UTC	15	6 UTC	10	5b	1a	7a	1b
1.2	8 PTI	30	9 PTI	20	7 UTC	15	7 UTC	10	5b	5b	1b	11b
1.3	8 PTI	30	7 UTC	20	8 UTC	15	9 UTC	10	5b	5b	3a	1b
1.4	7 PTI	30	7 PTI	20	8 PTI	15	9 PTI	10	1b	3a	3b	1a
1.5	8 PTI	30	7 UTC	20	5 UTC	15	5 UTC	10	1b	3a	1a	1b
1.6	9 PT	30	8 UTC	20	7 UTC	15	6 UTC	10	1a	3a	5a	1a
1.7	8 PTI	30	8 UTC	20	6 UTC	15	5 UTC	10	1b	3a	5b	1a
1.8	7 PTI	30	7 PTI	20	7 PTI	15	8 PTI	10	3b	1b	3a	1b
1.9	6 PTI	30	6 PTI	20	5 UTC	15	3 UT	10	1a	7b	1a	7a
1.10	10 PT	30	8 PTI	20	10 PT	15	10 PT	10	3b	1b	5b	3a
1.11	7 PTI	30	6 UTC	20	6 PTI	15	8 PTI	10	1b	1b	5b	5a
1.12	9 PTI	30	9 PTI	20	7 UTC	15	7 UTC	10	5b	7a	3a	1a
1.13	6 UTC	30	6 UTC	20	3 UTC	15	2 UTC	10	1b	3a	7a	1a
1.14	7 PTI	30	7 PTI	20	6 PTI	15	5 UTC	10	5b	9b	1b	5b
1.15	7 PTI	30	7 UTC	20	6 UTC	15	5 UTC	10	1b	7a	5a	5b
2.1	8 UTC	10	8 UTC	15	8 UTC	20	9 PT	30	3b	7a	1a	5b
2.2	8 UTC	10	7 PTI	15	7 UTC	20	7 PTI	30	3a	5a	7a	5a
2.3	7 PTI	10	7 PTI	15	6 UT	20	5 UT	30	5a	5b	9a	1b
2.4	5 UTC	10	6 UTC	15	5 UTC	20	6 UTC	30	1b	1a	3a	3a
2.5	9 UTC	10	10 PT	15	8 UTC	20	10 PT	30	5a	5a	7a	9a
2.6	7 UTC	10	10 PT	15	8 UTC	20	8 PTI	30	3b	1a	7a	1b
2.7	8 UTC	10	6 UT	15	9 PT	20	6 UT	30	5a	1b	9a	1a
2.8	7 UTC	10	7 PTI	15	6 UTC	20	5 UTC	30	1b	7a	5a	3b
2.9	9 PT	10	10 PT	15	9 PT	20	10 PT	30	1b	7a	5a	5a
2.10	9 PT	10	9 PTI	15	8 PTI	20	9 PT	30	7b	5a	7a	5b
2.11	7 UTC	10	7 PTI	15	9 PT	20	9 PTI	30	9b	7a	5b	3a
2.12	5 UTC	10	7 PTI	15	8 UTC	20	9 PTI	30	3b	1a	3b	1b
2.13	9 UTC	10	9 PTI	15	8 UTC	20	9 PT	30	1b	1a	1b	3a
2.14	8 PTI	10	7 PTI	15	6 UT	20	6 UT	30	7a	3b	9a	1a
2.15	6 UTC	10	6 UTC	15	6 UTC	20	6 UTCom	30	5b	3a	7b	5a

D.4. C2008 analysis of numerical assessment in relation to text, time and learning style dimension 3 (Visual/Verbal)

Dependent Variable:grades

visvrb1	Time	text	Mean	Std. Deviation	N
very strong vis	10	text 1	7.67	0.577	3
		Total	7.67	0.577	3
	15	text 2	6.67	0.577	3
		Total	6.67	0.577	3
	20	text 3	7.00	1.732	3
		Total	7.00	1.732	3
	30	text 4	5.67	0.577	3
		Total	5.67	0.577	3
	Total	text 1	7.67	0.577	3
		text 2	6.67	0.577	3
		text 3	7.00	1.732	3
		text 4	5.67	0.577	3
		Total	6.75	1.138	12
moderate vis	10	text 1	8.17	0.983	6
		text 4	4.75	1.893	4
		Total	6.80	2.201	10
	15	text 2	8.83	1.472	6
		text 3	5.50	1.732	4
		Total	7.50	2.273	10
	20	text 2	7.50	1.291	4
		text 3	7.67	1.033	6
		Total	7.60	1.075	10
	30	text 1	7.50	1.291	4
		text 4	8.17	1.941	6
		Total	7.90	1.663	10
	Total	text 1	7.90	1.101	10
		text 2	8.30	1.494	10
		text 3	6.80	1.687	10
		text 4	6.80	2.530	10
		Total	7.45	1.839	40
fairly vis	10	text 1	6.50	2.121	2
		text 4	6.40	2.408	5
		Total	6.43	2.149	7
	15	text 2	7.00	1.414	2

		text 3	6.40	1.342	5
		Total	6.57	1.272	7
	20	text 2	7.20	1.095	5
		text 3	6.50	2.121	2
		Total	7.00	1.291	7
	30	text 1	7.60	1.140	5
		text 4	7.50	2.121	2
		Total	7.57	1.272	7
	Total	text 1	7.29	1.380	7
		text 2	7.14	1.069	7
		text 3	6.43	1.397	7
		text 4	6.71	2.215	7
		Total	6.89	1.524	28
fairly vrb	10	text 1	7.00	2.828	2
		text 4	7.00	2.000	3
		Total	7.00	2.000	5
	15	text 2	8.00	1.414	2
		text 3	7.00	1.000	3
		Total	7.40	1.140	5
	20	text 2	7.67	1.155	3
		text 3	8.00	0.000	2
		Total	7.80	0.837	5
	30	text 1	7.33	0.577	3
		text 4	9.00	0.000	2
		Total	8.00	1.000	5
	Total	text 1	7.20	1.483	5
		text 2	7.80	1.095	5
		text 3	7.40	0.894	5
		text 4	7.80	1.789	5
		Total	7.55	1.276	20
moderate vrb	10	text 1	6.50	0.707	2
		text 4	7.67	2.517	3
		Total	7.20	1.924	5
	15	text 2	4.00	4.243	2
		text 3	7.33	2.309	3
		Total	6.00	3.240	5
	20	text 2	7.33	1.155	3
		text 3	7.50	2.121	2
		Total	7.40	1.342	5
	30	text 1	8.33	1.528	3
		text 4	7.50	2.121	2

		Total	8.00	1.581	5
	Total	text 1	7.60	1.517	5
		text 2	6.00	2.915	5
		text 3	7.40	1.949	5
		text 4	7.60	2.074	5
		Total	7.15	2.110	20
Total	10	text 1	7.47	1.356	15
		text 4	6.33	2.257	15
		Total	6.90	1.918	30
	15	text 2	7.40	2.261	15
		text 3	6.47	1.598	15
		Total	6.93	1.982	30
	20	text 2	7.40	1.056	15
		text 3	7.40	1.298	15
		Total	7.40	1.163	30
	30	text 1	7.67	1.113	15
		text 4	7.60	1.805	15
		Total	7.63	1.474	30
	Total	text 1	7.57	1.223	30
		text 2	7.40	1.734	30
		text 3	6.93	1.507	30
		text 4	6.97	2.109	30
		Total	7.22	1.676	120

Appendix E. Material for the main experiments (C2009-C2010: instruments, grades, scores)

E.1. Questionnaire 1 C2009, C2010

Background Report

Please answer the following questions in detail. Bear in mind that there are no right or wrong answers. The answers you provide will be used anonymously and exclusively for research purposes. Be honest!

1. Full Name and student ID nr._____
2. Age _____
3. Valid e-mail address _____
4. You are in your _____ year of study.
5. Your grade average so far: _____

6. How do you feel about your level of English at this moment?

very dissatisfied 1 2 3 4 5 very satisfied

6a. Please tick the level that best reflects your level of English.

Beginner
Elementary
Lower Intermediate
Upper Intermediate
Advanced
Very Advanced

7. How do you feel about the level of your mother tongue (Greek)?

very dissatisfied 1 2 3 4 5 very satisfied

7a. Please tick the level that best reflects your level of English.

Beginner
Elementary
Lower Intermediate
Upper Intermediate
Advanced
Very Advanced

8. Where did you learn English? (school, phrontisterion, stay abroad, parents, etc.)

_____

9. Apart from English and Greek, do you know any other languages?

Yes No

9a. If you answered "Yes" in question nr. 9: Which other languages do you know?

_____

10. Have you taken any theoretical translation courses?

Yes No

10a. If yes, which one(s)?

10b.Please state your final grade(s), if available.

Course(s) **Grade(s)**

_____ _____

_____ _____

_____ _____

11. Have you taken any translation workshops?

Yes No

11a. If yes, which one(s)?

11b.Please state your final grade(s), if available.

Course(s) **Grade(s)**

_____ _____

_____ _____

_____ _____

12. Do you consider yourself familiar with the use of translation aids (dictionaries, the internet…)?

Yes Up to a certain degree

No

12b.If you answered "Yes" or "Up to a certain degree": how / where?

_____

_____

13. Have you ever done any translations outside the University courses?

Yes No

13a. If you answered "Yes": what type of material, in which field?

_____

13b. Who did you translate for? (e.g. a friend, a firm...)

_____

13c. Were they paid translations or unpaid (eg. a favour)?

Paid Unpaid

14. Any comments you might have, please write them here:

_____

_____

Disclaimer

I consent that the material I provide for the research conducted by Ms. Kourouni, such as my answers to the present questionnaire as well as my translations, material for other questionnaires/reports/interviews be used exclusively for academic purposes as per Law 2472/97 on Data Protection as modified by Law 3635/2007 and be published anonymously.
I would like to be mentioned, if possible, as a participant to this study: Yes No

Date: _____

Signature:_____

E.2. Questionnaire 2 (Retrospective Questionnaire) C2010

Retrospective Report

Full name and student ID nr……

Text: A B C

Time frame:

Please answer the following questions in detail. Bear in mind that there are no right or wrong answers. The answers you provide will be used anonymously and exclusively for research purposes. Be honest!

1. How did you feel during the activity?

Please tick the box that best reflects your feelings, based on the following explanations:

1 = not at all 2 = up to a certain degree 3 = very much so

	1	2	3
Focused/concentrated			
Under time pressure			
Restless/upset			
Relaxed			
Tired and disinterested			

2. Did you read the whole text before translating it?

Yes No

3. Did you try to identify the central message of the text before translating it?

Yes No

4. If you answered "Yes" in question nr. 3: What is the central message of the text?

_____

_____

_____

_____

5. Did you have to change your usual translation method?

Yes No

6. If you answered "yes" in question nr. 5: Which is your normal method? Briefly mention the main steps.

_____

_____

_____

6. Which 5 problem areas in the text were the ones presenting you with the greatest difficulty?

Problem area 1._____

_____

_____

_____

Problem area 2._____

_____

_____

_____

Problem area 3._____

_____

_____

_____

Problem area 4._____

_____

_____

_____

Problem area 5._____

_____

_____

_____

7. Which particular difficulties did you encounter during the translation as regards the above-mentioned areas?

My difficulty (-ies) regarding problem area nr. 1 was/were

_____

_____

_____

_____

My difficulty (-ies) regarding problem area nr. 2 was/were

_____

_____

_____

_____

My difficulty (-ies) regarding problem area nr. 3 was/were

_____

_____

_____

_____

My difficulty (-ies) regarding problem area nr. 4 was/were

_____

_____

_____

_____

My difficulty (-ies) regarding problem area nr. 5 was/were

_____

_____

_____

_____

8. How satisfied are you with your solutions?

Please tick:

For my solution regarding problem area nr. 1, I am:

very satisfied

rather satisfied

rather dissatisfied

totally dissatisfied

Why?

_____

_____

For my solution regarding problem area nr. 2, I am:

very satisfied

rather satisfied

rather dissatisfied

totally dissatisfied

Why?_____

_____

For my solution regarding problem area nr. 3, I am:

very satisfied

rather satisfied

rather dissatisfied

totally dissatisfied

Why?_____

_____

For my solution regarding problem area nr. 4, I am:

very satisfied

rather satisfied

rather dissatisfied

totally dissatisfied

Why?_____

_____

For my solution regarding problem area nr. 5, I am:

very satisfied

rather satisfied

rather dissatisfied

totally dissatisfied

Why?_____

_____

9. Are you satisfied with your final product?

very dissatisfied 1 2 3 4 5 very satisfied

Why?_____

_____

10. How difficult was this text for you?

very easy 1 2 3 4 5 very difficult

10. How interesting was this text for you?

very interesting 1 2 3 4 5 not interesting at all

11. Did you have enough time to finish the translation?

Yes No

12. Did you have time to choose among alternative solutions?

Yes Up to a point No

13. Did you decide at any point not to translate part of the original text?

Yes No (If you answered "No", skip to question 14)

13.a. If you answered "Yes", please write down the words-phrases of the original text you decided not to translate.

Omitted text	Why did you leave it out?
_____	_____
_____	_____
_____	_____

_____ _____

14. Did you have time to revise your translation?

Yes Up to a certain degree No

15. Did you have time to perform internet search(es)?

Yes Up to a certain degree No

16. Any other comments you would like to share with us?

_____

_____

_____

Thank you!!!

E.3. Grades per criterion(C2009, C2010)

Rater 1

COR						RETRO						PHOTO					
Formal Correctness	Terminology - Vocabulary	Accuracy	Textual Flow	**Completion COR # Words**	**Completion COR # Words%**	Formal Correctness	Terminology - Vocabulary	Accuracy	Textual Flow	**Completion RETRO # Words**	**Completion RETRO # Words%**	Formal Correctness	Terminology - Vocabulary	Accuracy	Textual Flow	**Completion PHOTO # Words**	**Completion PHOTO # Words%**
6	5	6	6	135	100%	8	8	9	9	134	100%	7	7	8	7	138	100%
7	5	6	7	114	84%	8	8	8	8	134	100%	7	6	5	7	80	58%
6	6	5	6	135	100%	8	7	8	8	134	100%	8	7	6	7	138	100%
4	3	3	4	135	100%	6	6	6	7	134	100%	7	6	6	7	138	100%
5	4	5	5	135	100%	7	7	6	6	134	100%	6	6	6	6	138	100%
6	7	6	6	121	90%	7	6	7	7	134	100%	7	6	7	8	109	79%
7	6	7	8	135	100%	7	6	7	8	134	100%	7	6	5	6	134	97.1%
7	7	8	8	135	100%	8	8	7	8	134	100%	8	8	7	8	138	100%
6	6	7	7	135	100%	8	7	7	7	134	100%	7	7	7	8	138	100%
5	5	5	4	135	100%	5	6	6	7	134	100%	7	6	5	7	138	100%
7	7	8	7	101	75%	8	7	8	9	134	100%	8	9	9	8	71	51.4%
7	6	7	6	106	79%	7	6	8	7	134	100%	8	6	7	8	103	74.6%
7	6	7	7	135	100%	6	7	7	6	119	88.8%	7	7	7	8	138	100%
7	7	7	8	97	72%	7	7	6	7	125	93.3%	8	7	7	7	81	58.7%
7	7	7	8	135	100%	7	7	8	8	134	100%	7	6	6	7	85	61.6%
8	8	8	9	135	100%	8	7	8	8	134	100%	8	8	8	8	138	100%
3	3	2	2	135	100%	8	6	7	7	134	100%	7	5	7	8	138	100%

3	3	2	3	116	86%	5	4	5	3	134	100%	6	6	6	7	109	79.0%
7	6	7	7	135	100%	7	6	6	6	134	100%	7	7	6	7	138	100%
7	7	6	8	135	100%	7	6	7	8	134	100%	6	6	7	7	138	100%
9	8	8	8	135	100%	8	8	8	9	134	100%	7	8	7	8	138	100%
7	8	8	7	135	100%	8	7	7	7	134	100%	6	7	7	7	138	100%
5	6	5	6	135	100%	6	6	6	6	134	100%	7	6	7	7	115	83.3%
5	5	6	5	135	100%	6	6	5	6	134	100%	7	6	6	7	109	79%
6	6	6	6	135	100%	7	6	7	7	134	100%	7	6	7	7	138	100%
6	6	6	7	112	83%	7	6	6	6	122	91.0%	7	5	6	6	115	83.3%
8	8	8	8	108	80%	7	6	6	6	121	90.3%	7	6	6	7	112	81.2%
7	6	6	6	135	100%	6	6	5	6	134	100%	CRASH					
7	7	8	7	135	100%	5	3	4	3	90	67.2%	5	4	3	4	90	65.2%
CRASH						8	7	8	8	134	100%	9	9	9	9	138	100%
8	8	7	7	129	96%	7	7	6	6	120	89.6%	8	7	8	8	126	91.3%
7	7	8	8	135	100%	6	6	6	7	122	91.0%	7	7	6	7	138	100%
7	7	7	7	135	100%	4	3	4	4	131	97.8%	6	7	7	7	138	100%
7	8	7	8	135	100%	6	6	6	7	134	100%	7	7	6	8	138	100%
7	7	8	6	88	65%	5	3	6	6	65	48.5%	8	8	8	8	80	58%
7	8	7	7	122	90%	8	6	7	7	102	76.1%	7	6	7	7	138	100%
8	7	7	7	135	100%	7	6	7	6	132	98.5%	6	6	7	7	115	83.3%
7	7	6	7	135	100%	6	6	7	7	134	100%	8	7	8	8	138	100%
6	5	5	6	116	86%	5	6	6	6	122	91.0%	7	6	6	7	138	100%
6	6	5	6	135	100%	7	8	7	8	134	100%	7	6	6	7	138	100%
7	7	6	7	88	65%	7	8	6	7	56	41.8%	7	7	5	6	80	58%
7	6	8	7	108	80%	7	6	7	7	134	100%	7	6	7	6	130	94.2%
7	6	6	6	135	100%	7	7	8	7	98	73.1%	5	6	7	6	80	58%

8	7	8	7	135	100%	8	7	8	8	134	100.0%	8	7	7	8	138	100%
8	7	7	7	135	100%	7	6	8	7	134	100.0%	7	7	8	7	97	70.3%
7	6	5	6	135	100%	7	6	6	7	130	97.0%	7	7	6	7	138	100%
6	5	5	6	135	100%	5	6	6	6	121	90.3%	6	5	5	6	78	56.5%
7	7	6	7	135	100%	7	6	6	6	134	100.0%	5	6	6	7	138	100%
LATE ARRIVAL						6	5	6	6	65	48.5%	7	7	7	8	80	58.0%
8	6	7	8	135	100%	7	8	8	7	134	100.0%	7	8	8	8	138	100%
HEALTH ISSUE						6	4	6	6	81	60.4%	7	6	6	7	114	82.6%
7	7	7	8	135	100%	6	6	6	7	131	97.8%	7	6	6	7	109	79%
CRASH						5	7	7	6	102	76.1%	8	8	7	7	90	65.2%
7	7	7	8	135	100%	7	6	7	7	120	89.6%	7	7	6	6	138	100%

Rater 2 (trainer)

COR				RETRO				PHOTO			
Formal Correctness	Terminology - Vocabulary	Accuracy	Textual Flow	Formal Correctness	Terminology - Vocabulary	Accuracy	Textual Flow	Formal Correctness	Terminology - Vocabulary	Accuracy	Textual Flow
6	5	6	6	8	8	9	9	6	7	8	7
7	6	6	7	8	8	8	8	8	6	6	7
6	5	5	6	8	8	8	8	8	7	7	7
4	3	3	3	6	6	6	7	8	6	5	7
4	3	4	3	7	7	6	7	7	7	6	7
6	6	5	5	8	7	7	8	8	7	7	7
5	5	6	7	7	7	7	8	7	7	5	6
7	6	7	7	8	7	8	8	8	7	7	7
7	5	5	6	8	6	6	7	8	6	5	7
7	5	5	5	6	7	7	6	8	7	6	7
7	7	8	8	7	8	8	8	8	9	9	8
7	7	7	7	7	7	7	7	9	7	8	6
6	6	7	7	7	6	6	7	9	8	7	8
7	7	7	7	6	7	6	7	8	7	7	8
6	7	7	8	6	7	8	8	8	7	7	7
8	8	8	8	9	8	8	8	9	9	9	9
3	3	3	2	8	6	7	7	8	6	6	7
3	3	2	4	5	5	4	4	7	5	5	6
7	6	6	6	8	7	6	7	7	7	6	6
6	6	5	7	8	8	7	8	7	8	8	8
9	8	9	9	9	8	8	9	8	8	8	8
7	7	7	7	8	8	7	7	5	7	8	7

4	5	4	5	7	7	7	7	6	7	7	7
5	5	6	6	7	7	7	7	5	5	6	6
8	7	6	7	8	7	7	8	6	6	7	6
7	7	7	7	8	7	7	7	6	6	6	6
8	7	8	7	8	7	7	7	6	6	7	6
8	6	5	6	7	6	7	7	CRASH			
7	6	6	6	6	4	5	5	7	4	5	5
CRASH				9	7	8	9	9	9	9	9
8	7	7	8	8	8	7	7	9	8	8	8
6	7	7	8	7	6	7	7	8	6	7	7
8	7	5	7	6	4	5	5	7	6	6	6
7	7	8	8	8	7	6	7	6	6	7	7
7	6	7	7	7	4	5	5	8	8	8	8
7	6	7	7	8	6	6	7	7	6	5	6
7	8	8	8	7	5	6	7	7	5	7	7
6	7	6	7	7	7	7	6	8	7	8	8
5	6	6	6	5	7	6	7	6	6	7	7
8	6	7	5	6	7	7	8	7	6	6	7
8	8	6	7	7	8	6	8	7	7	6	5
7	7	8	7	8	6	7	8	7	6	7	7
8	7	8	7	8	6	7	7	5	7	7	6
9	8	8	8	8	7	8	8	6	7	8	8
8	6	6	6	8	6	7	8	7	7	7	6
7	6	6	6	7	7	7	8	8	7	6	7
7	5	5	6	6	6	7	7	5	4	5	5

6	7	5	7	7	6	5	7	6	8	7	8
LATE ARRIVAL				6	6	6	6	6	7	7	7
9	7	8	9	8	9	9	8	8	8	8	8
HEALTH ISSUE				7	5	6	6	6	7	6	7
8	6	7	7	7	7	8	8	8	6	6	7
CRASH				6	7	7	7	7	7	7	7
8	7	7	8	6	7	6	7	7	6	6	6

E.4. Overall grades per participant

PART.#	30_GRADE_WEIGHTED	20_GRADE_WEIGHTED	15_GRADE_WEIGHTED
31	8.30	9.40	8.85
32	7.62	9.20	6.08
33	8.25	9.15	8.85
34	7.35	8.50	8.60
35	7.65	8.65	8.55
36	7.73	8.85	7.59
37	8.55	8.85	8.28
38	8.85	9.10	9.00
39	8.45	8.80	8.75
40	8.05	8.50	8.65
41	7.44	9.15	6.49
42	7.41	8.80	7.43
43	8.65	7.93	9.05
44	7.16	8.25	6.47
45	8.85	8.95	6.45
46	9.25	9.20	9.40
47	7.05	8.80	8.70
48	6.31	7.75	7.14
49	8.60	8.65	8.65
50	8.60	8.95	8.85
51	9.40	9.35	9.10
52	8.90	8.95	8.70
53	8.00	8.60	7.70
54	8.15	8.55	7.14
55	8.60	8.85	8.60
56	7.63	8.16	7.40
57	7.90	8.12	7.42
58	8.50	8.50	CRASH
59	8.70	5.78	5.76
60	CRASH	9.20	9.60
61	8.73	8.17	8.68
62	8.90	8.06	8.75
63	8.75	7.62	8.60
64	9.00	8.65	8.70
65	6.66	4.96	6.68
66	8.22	7.32	8.55
67	9.00	8.46	7.60
68	8.65	8.65	9.10
69	7.41	7.86	8.60
70	8.45	8.90	8.60
71	6.71	5.36	5.98
72	7.65	8.80	8.30
73	8.75	7.24	5.93

74	9.15	9.10	8.95
75	8.75	8.85	7.02
76	8.45	8.57	8.75
77	8.25	7.87	5.44
78	8.60	8.50	8.65
79	LATE ARRIVAL	5.26	6.28
80	9.10	9.20	9.15
81	HEALTH ISSUE	5.93	7.56
82	8.85	8.62	7.39
83	CRASH	7.17	6.81
84	8.95	8.02	8.55

E.5. Typing speed test (C2009, C2010 results)

C2009	WPM	C2010	WPM
	31	28	56	18
	32	19	57	21
	33	26	58	24
	34	19	59	20
	35	26	60	31
	36	18	61	21
	37	20	62	22
	38	17	63	37
	39	25	64	17
	40	30	65	14
	41	16	66	29
	42	23	67	25
	43	27	68	19
	44	18	69	22
	45	18	70	29
	46	36	71	22
	47	17	72	22
	48	20	73	19
	49	25	74	25
	50	43	75	17
	51	27	76	24
	52	17	77	27
	53	26	78	30
	54	17	79	18
	55	18	80	31
			81	14
			82	18
			83	26
			84	33

E.6. ILS scores (C2009, C2010)

AA (C2009)	**ACT-REF**	**SENS-INT**	**VIS-VRB**	**SEQ-GLO**	**AA (C2010)**	**ACT-REF**	**SENS-INT**	**VIS-VRB**	**SEQ-GLO**
31	6	7	10	7	56	5	10	8	6
32	7	11	8	6	57	4	7	8	8
33	7	8	4	5	58	5	1	8	7
34	2	4	6	2	59	4	6	8	5
35	6	7	7	7	60	4	5	7	7
36	7	8	10	7	61	6	8	7	8
37	8	9	5	7	62	5	6	5	6
38	7	6	9	4	63	4	4	4	6
39	9	10	9	7	64	11	5	11	11
40	8	10	8	3	65	9	6	10	6
41	3	7	7	7	66	7	8	7	8
42	7	7	11	2	67	4	4	3	7
43	3	5	4	8	68	5	4	4	9
44	7	5	6	3	69	7	9	9	7
45	6	2	10	6	70	5	9	5	6
46	1	8	5	3	71	6	4	9	4
47	5	8	10	4	72	4	9	11	4
48	10	6	11	3	73	8	5	5	5
49	8	9	7	6	74	8	3	4	5
50	6	2	9	3	75	6	9	9	6
51	1	7	4	4	76	7	3	8	3
52	5	9	6	7	77	4	6	4	6
53	7	6	10	7	78	3	10	9	6
54	6	8	2	5	79	6	3	9	4
55	7	10	7	8	80	6	9	8	7
					81	5	4	7	2
					82	7	4	5	7
					83	7	8	7	5
					84	6	10	4	5

Appendix F. Material for C2010 statistical analyses

This Appendix includes non-significant results from statistical analyses. Due to the high volume of statistical output, corresponding tables are not included in the physical body of the thesis. Instead, this material may be found at: http://www.enl.auth.gr/staff/kourouni_appendix_F.pdf.